

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	İsmet Saygu
<b>Project Title</b>	A future for Atlantic Bluefin Tuna: Depicting migration patterns as a pathway to conservation
<b>Application ID</b>	23420-1
<b>Grant Amount</b>	£5000
<b>Email Address</b>	ismetsaygu@gmail.com
<b>Date of this Report</b>	05.09.2019

**1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.**

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Temporal patterns in the occurrence of Atlantic bluefin tuna (BFT)				We detected temporal changes of frequency of occurrence of BFT encountered by fishers.
Spatial patterns in the occurrence of BFT				We detected spatial changes of frequency of occurrence of BFT encountered by fishers.
Size of BFT encountered by fishers				Median values of average and maximum individual weights observed by local fishers were calculated.
Sightings of BFT				We could not observe BFT in the small-scale fishing operations. However, we could observe BFT individuals on the deck in the fishing ports.
Visual material collection				We collected visual material during our visits in the fishing ports. In addition, we obtained visual materials from commercial bluefin tuna fishers.
Interactions with stakeholders				We organized meetings and interviews with fishers in the fishing ports all along Mediterranean coast of Turkey. Fishers actively contributed to the project. In addition, we actively used social media by sharing our project activities, giving brief information on tuna ecology and fisheries, and informing from tuna catching operations during BFT fishing season.

**2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.**

In context of this project, we applied interviews based on structured questionnaires with fishers over the Mediterranean coast of Turkey. We believe that we managed to gain the trust of fishers. Our previous experience and existing network with fishers contributed us. However, Atlantic bluefin tuna (BFT) is highly migratory large predator. Therefore, every single fisher cannot come across with BFT. The encounter

depends on fisher's gear and fishing area. We experienced this in the first interviews, and we therefore reconsidered our approach to fishers and questions. Firstly, we organized meetings with fishers who have high encounter probability with BFT, such as swordfish longliners. After the meetings, we also spoke with other fishers who was doing daily activities in the fishing ports.

One difficulty arose during the project was the similarity amongst different tuna fish species. We realized that fishers frequently confused about the species. To tackle this, we specifically made sure if fishers can identify BFT individual showing photographs and asking specific questions about the key characters for true identification. Our final catalogues and question of interviews are presented in Fig. 1 and Fig A1.

Another difficulty was the observations of BFT during fishing operations. Although we joined a few fishing operations with small scale fishers around the area, we could not observe any BFT individuals. BFT is not a target species for small scale fishers, even for swordfish longline, we dealt with this difficulty by visiting several fishing ports, which were the most active ones in the Mediterranean coasts of Turkey to observe BFT individuals on the deck. In this way, a few individuals could be recorded (Fig. A2). Moreover, we contacted with BFT observers, who are our colleagues, to get information and photos from the BFT fishing operations. Fishery fleet operate from 25 May to 25 June (1 month) according to ICCAT rules during BFT spawning period in the Mediterranean including eastern Mediterranean (Fig. A3). ICCAT and national observers monitor fishing and carrying operations during the season.

**Fig. 1.** Catalogue and the structured questions of the interviews.





**Anket Soruları**

1. Bu türe ne ad veriyorsun?
2. Ne zaman av veriyor ya da karşılaşıyorsun? En çok karşılaştığın ve hiç karşılaşmadığın aylar nelerdir?
3. Son 5 yılın en iyi avı (kg ve birey) ve zamanı?
4. Karşılaştığın en büyük birey (kg)?
5. Karşılaştığın ortama birey ağırlığı (kg)?
6. Küçük bireylerle karşılaşıyor musun? Ağırlıkları (kg) ve zamanı?
7. Hedef türlerin neler? Bu tür hedef türlerinden biri mi?
8. Nerede yakalıyorsun? (Mevki (nerenin açığı); derinlik)
9. Yıllar içinde karşılaşma sıklığının arttı –azaldı–aynı?



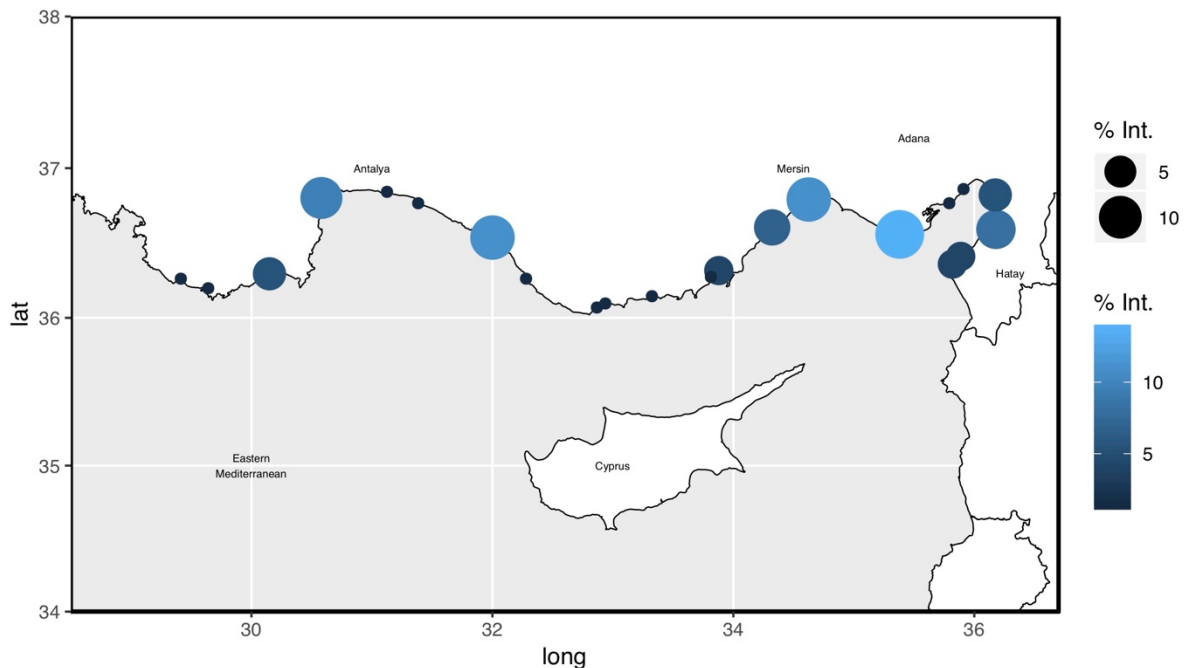
**3. Briefly describe the three most important outcomes of your project.**

The Atlantic bluefin tuna (BFT: *Thunnus thynnus*) is of great economic value specially after the development of the Japanese sushi-sashimi market. This caused overfishing pressure on BFT stocks all over the world. Additionally, fishing strategy of BFT has evolved towards capture-based aquaculture by way of catching, farming and fattening. Due to the overfishing pressure, BFT is listed as Endangered in the IUCN red list. This slow growing, highly migratory large predator is conserved and managed by ICCAT as eastern and western stocks. The eastern stock resides throughout the Mediterranean and eastern Atlantic and breed in well-defined areas in the Mediterranean including the north-eastern Mediterranean between May and July. Their fishery depends on this spawning migration in the eastern Mediterranean, and fishery fleet operate from 25 May to 25 June (1 month) according to ICCAT rules during their spawning period.

Recently, high quality tagging data is gathered by researchers. Although, these data revealed that BFT has homing behaviour which means migrate to specific spawning areas, tagging experiments also gave controversial results about BFT's

behaviour after spawning. Whereas some of individuals appear staying around the spawning areas, others reveal complex migration patterns. In this context, our aim was to detect the potential residency behaviour of BFT in the eastern Mediterranean by consulting local fishers' knowledge. In order to achieve this aim, a total of 73 valid interviews was conducted across 23 fishery ports scattered along study area (Fig. 2). Our questions were gathered data about when and where fishers come across BFT and their morphological traits.

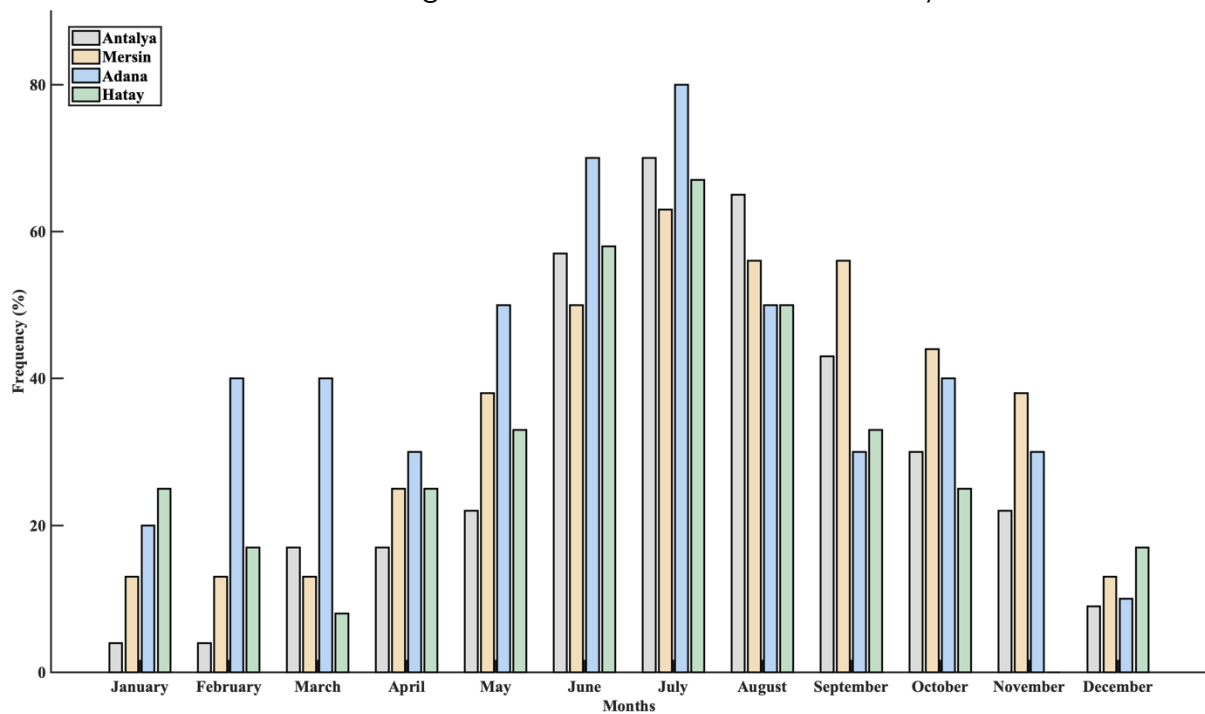
**Fig. 2.** The fishing ports where the interviews were conducted



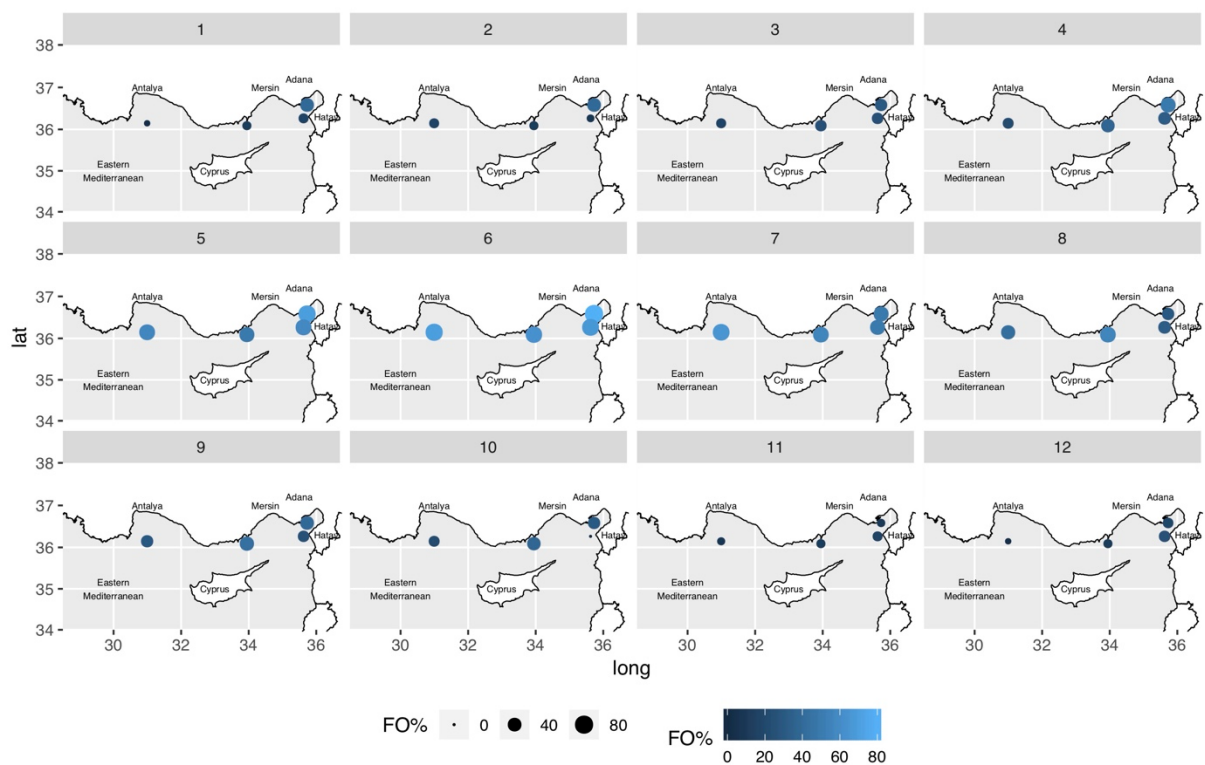
### 3.1. Local fishers encounter with Atlantic bluefin tuna out of well-known breeding season along the Mediterranean coast of Turkey

Fishers mostly come across with BFT during June and July covering their breeding season, and one months before and after months follow up (Fig. 3). In addition, fishers stated that it is possible to come across with BFT at any month of the year along the Mediterranean coast of Turkey (Fig. 3 and Fig. 4). These results provide support for the idea that some individuals of BFT resides in the eastern Mediterranean all along the year or migrate this area in out of the spawning season as well. In that case, this may be feeding migration, and therefore are shown the importance of the area in terms of their habitat preferences both feeding and spawning periods. Although local fishers' knowledge has a number of limitations, this study was developed using the best available data and highlights the potential importance of Mediterranean coast of Turkey as conservation hotspot for BFT. It is hoped that this information can provide a baseline for further understanding of their residency and migratory behaviour in the eastern Mediterranean and extend to whole Mediterranean. However, it is critical to fully understand residency and migratory behaviour of BFT by also using experimental studies such as tagging and biochemical studies providing more reliable information.

**Fig. 3.** Temporal changes of frequency of occurrence (FO%) of Atlantic bluefin tuna based on different cities along the Mediterranean coast of Turkey.



**Fig. 4.** Spatial changes of frequency of occurrence (FO%) of Atlantic bluefin tuna by months (numbers on the figure titles show months).

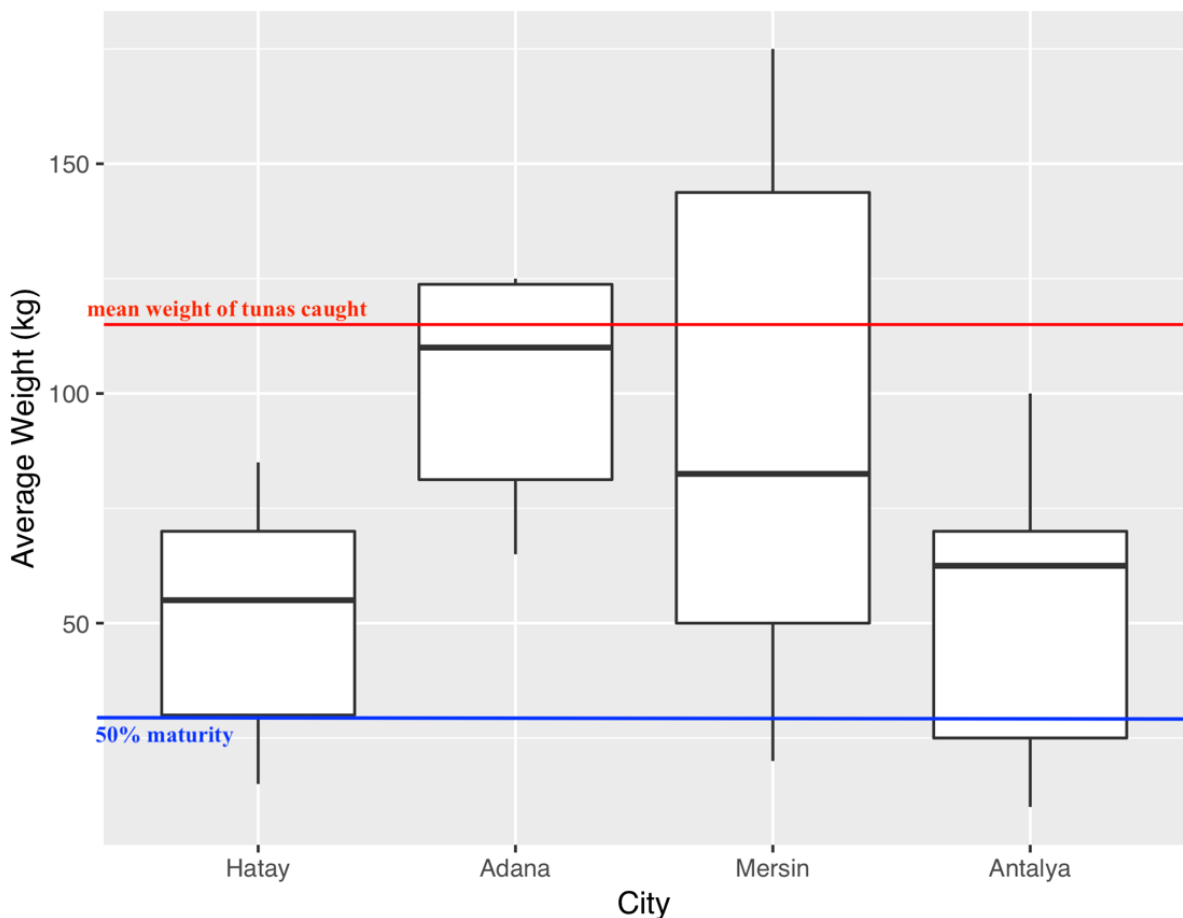




### 3.2. Local fishers mostly encounter with juvenile Atlantic bluefin tuna individuals

Female BFT individuals reach 50% maturity at 30 kg (115 cm) and 100% maturity at 50 kg (135 cm) in the Mediterranean and eastern Atlantic. Median of the mostly encountered individuals' weight was larger than the weight of first sexual maturity (L50) in the Mediterranean coast of Turkey based on the fishers' knowledge (Fig. 5). It is therefore this finding may suggest the idea that the area can be an important for BFT as both feeding and breeding, and this information may help to conserve BFT.

**Fig. 5.** Median of average individual weight observed by local fishers. Blue line shows the 50% maturity of BFT and red line is mean weight of BFT caught in the research area according to literature.



### 3.3. Atlantic bluefin tuna is not target species for small-scale and recreational fishers in the region

The eastern Mediterranean is an important spawning and fishing area for the BFT. It is therefore known that BFT has mostly shown somewhere in the triangle of Mersin-Cyprus- Antalya where the most of fishing happens between 25 May and 25 June by purse seiners. This fishery is managed by ICCAT and serves the capture-based aquaculture which consists of three procedures, the catching, farming and fattening. According to our results, BFT exists along the region during the year, and we therefore questioned if small-scale fishers catch BFT during the year. Fortunately, few fishers reported catching BFT (Fig. A2). Fishers stated that BFT is not target species in the region and cannot be caught as bycatch easily because catching is restricted by the fishing gears used in the region. When we asked to fishers when

they come across with BFT, they responded based on their sightings instead of catching incidences. Still, some fishers reported to catch very few BFT individuals (max. 2 individuals) during the year, and to inform to the competent authority. Swordfish longline and drift net had the highest probability to catch BFT as bycatch according to fishers' experience. While drift net fishery was intensive in the Alanya town, Antalya, swordfish longline fishery was higher in the western side of the area than that of eastern side. However, a few purse seine fishers expressed that they could catch a number of BFT individuals as bycatch because they cannot identify if the sonar echo belongs to BFT or not. For example, a group of purse seine fishers in the region reported that they caught a number of BFT off the Turkish-Syrian border around 70 m depth contour in the winter months. Therefore, further investigations should specifically include purse seine fishery operating both in the region.

**4. What do you consider to be the most significant achievement of this work?**

**5. Briefly describe the involvement of local communities and how they have benefited from the project.**

In this project, we applied the local ecological knowledge approach under citizen science to collect data. Fishers actively contributed to the project. The aim of the project was also provided the interactions among fishers and researchers. For this purpose, we explained project aims before starting interviews (informative meetings). After we completed the interviews with previously organized fishers, we spent more time at the fishery ports, and we tried to explain the importance of BFT for the ecosystem. We also asked fishers what kind of problems they have. We believe that we have achieved to gain fishers' trust and convince them to volunteer to our further projects. In addition, we constituted a database which include fishers communication, demographic and professional information by gaining their approval. Some visual materials during the interviews in the fishing ports are given in Fig. A4.

We created a memorable motto "GoBluefin" and logo that focus on the conservation of Atlantic bluefin tuna under "Large Pelagics Research Group" (Fig. 6). The project official e-mail address is [gobluefin@gmail.com](mailto:gobluefin@gmail.com). Moreover, our social media accounts are available. We used real-time social media by sharing our project activities, giving brief information on BFT ecology and fisheries, and informing from BFT catching operations during fishing season.

Twitter and Instagram account links are follows:

Twitter: @gobluefin –

<https://twitter.com/gobluefin>

Instagram: @gobluefin -

[https://instagram.com/gobluefin?utm\\_source=ig\\_profile\\_share&igshid=1syc869w9i6le](https://instagram.com/gobluefin?utm_source=ig_profile_share&igshid=1syc869w9i6le)



**Fig. 6.** Project and research group logos



In addition, we prepared catalogues describing not only BFT but also other large pelagic fishes to teach fishers how to distinguish these species, particularly for the family Scombridae (Fig. A1).

#### **6. Are there any plans to continue this work?**

We believe that we obtained the information providing the necessary baseline for the residency and migration behaviour of BFT in the region. However, based on the experience gained during this project, we should extend this study to purse seine fishing in the eastern Mediterranean, Aegean Sea and the Marmara Sea. In addition, some fishers reported that they catch juvenile BFT around Alanya in September. However, we are not sure if their identification is correct because it is hard to identify juvenile BFT among other family members, according to our current experience. It therefore may be important for further research in terms of conservation of BFT juveniles.

Moreover, we believe that we have established a valuable network among fishers, local communities and scientists. We should keep and extend this network by consistently contacting with these stakeholders through conservation and research projects. This is also best way to induce nature conservation approach for all stakeholders, particularly fishers here.

#### **7. How do you plan to share the results of your work with others?**

We are going to make an oral presentation in an international symposium. Now, we are planning to attend "International Water and Health Congress" which will be held between 12 and 15 November 2019 in Antalya, Turkey.

We have actively been using social media accounts of the project. Additionally, our social media posts have been reposting by Çukurova University Fisheries Faculty social media accounts having more than 3000 followers including local communities, fishers, scientist, students, etc. We will share key findings of the project both in English and Turkish on these social media accounts.

We are also planning to share our final report in Turkish with management authorities, after the final report are approved by the Rufford Foundation.

**8. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?**

We have started the project as anticipated. We visited 30 fishing ports along 1577 km coast in the Mediterranean coast of Turkey. However, we could conduct interviews 23 of these 30 ports. We needed to visit several times some of fishing ports to meet fishers who has been coming across with BFT. Prior to the interviews, we described project aims to fishers to introduce ourselves and gain their trust to obtain more reliable information. Project team directed questions after fishers accept to collaborate. This introductory meeting provided an opportunity to explain the brief history of this extraordinary giant fish, and fishers' role to fill the conservation gaps.

Catalogues with photos of BFT and other large pelagic fishes was hanged and distributed to fishers who want to keep it in fishing boat and/or port (Fig A1.). All interviews were carried out until first of August 2019. Moreover, we joined few fishing operations and visited Alanya fishing port between May and July 2019 to observe BFT in order to validate the interview data. We have chosen Alanya port to visit according to our preliminary interview results. We have obtained visual materials during the project. In addition, we have taken extra two months to finalize the report.

**9. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.**

Item	Budgeted Amount	Actual Amount	Difference	Comments
Materials for Presentations (technical devices)	500	300	-200	We borrowed some technical presentation devices instead of buying similar one.
Printing Costs (questionnaire, posters, flyers and website)	550	550		We did not establish web site. However, we used its budget for logo design and printing.
Visual Recording Equipment (action camera and related objects)	450	720	+270	We also bought some extra objects such as stabilizer, protector case, battery etc.
Travels for Interviews, Meetings and Fishing	1700	1560	-140	We used this budget as anticipated in the proposal.

Operations (public transport and fuel: 6308 km)				However, we just preferred to stay in the towns where to close fishing ports a few more days. Thus, we saved little amount from travel budget.
Accommodation and Maintenance (30£ x 60 days)	1800	1900	+100	We put 100 pounds on the side to attend international conference in Alanya, Antalya, Turkey. The price will be used for accommodation during at stay in the conference.
<b>TOTAL</b>	<b>5000</b>	<b>5030</b>	<b>+30</b>	

**10. Looking ahead, what do you feel are the important next steps?**

In context of this project, we carried out interviews with small-scale fishers based on a structured questionnaire. Additionally, we performed interviews with a few purse seiners. Our questionnaires were to gather information on spatio-temporal distribution of the Atlantic bluefin tuna (BFT) in the research area out of well-known breeding season. Our results indicated that fishers encounter BFT individuals during unexpected seasons. We should carry out such interviews with particularly purse seiners. In addition, we should attend purse seine operations a number of times during the year except for known breeding season in the eastern Mediterranean. Moreover, research area should extend to Aegean Sea and the Marmara Sea where several purse seiners reported to observe BFT individuals along the year.

**11. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?**

We have been using the Rufford Foundation logo and acknowledging the name in all published materials. All social media posts include a photo having the Rufford Foundation logo and/or text with mention and hashtag of the Rufford Foundation. Moreover, we are going to use the logo on the planned oral presentation in the "International Water and Health Congress".

**12. Please provide a full list of all the members of your team and briefly what was their role in the project.**

**Dr. İsmet Saygu, project coordinator**

**Adress: Cukurova University, Fisheries Faculty.**

**E-mail: isaygu@cu.edu.tr; ismetsaygu@gmail.com**

**Led the project team, managed the all work packages, organized the meetings, conducted the interviews, attended fishing operations, collected the visual data, visited fishing ports to observe BFT on the deck and performed the data analysis.**

**Dr. Sinan MAVRUK, researcher**

Address: Cukurova University, Fisheries Faculty

E-mail: smavruk@cu.edu.tr

Assisted the meeting organizations, conducted the interviews and performed data analysis and visualization.

**Dr. Fethi BENGİL, researcher:**

Address: Girne American University, Marine School

E-mail: fethi.bengil@gmail.com

Assisted the meeting organizations and visited fishing ports to observe BFT on the deck.

**Dr. Elizabeth Grace Tunka Bengil, researcher:**

Address: Girne American University, Marine School

E-mail: tunkaeronat@hotmail.com

Attended fishing operations and visited fishing ports to observe BFT on the deck.

**Dr. Ferhat Büyükdeveci, researcher:**

Address: Ministry of Food, Agriculture and Livestock

E-mail: ferhat.bykdeveci@gmail.com

Assisted the meeting organizations and conducted the interviews

**Dr. Emre Fakiođlu, researcher:**

Address: WWF Turkey

E-mail: emrefakioglu@gmail.com

Conducted the interviews and collected the visual data

**13. Any other comments?**

**Appendix below:**



Appendix A

Fig. A1. The catalogue of large pelagic fishes in the region

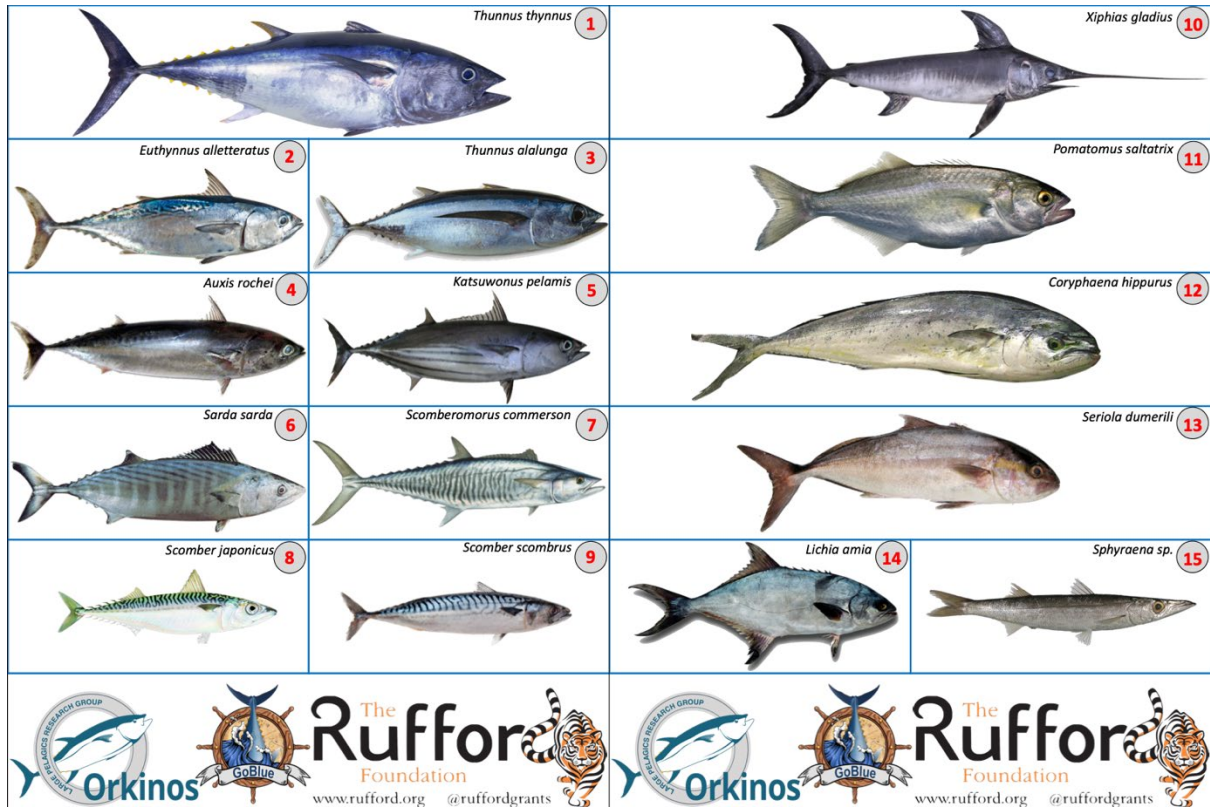
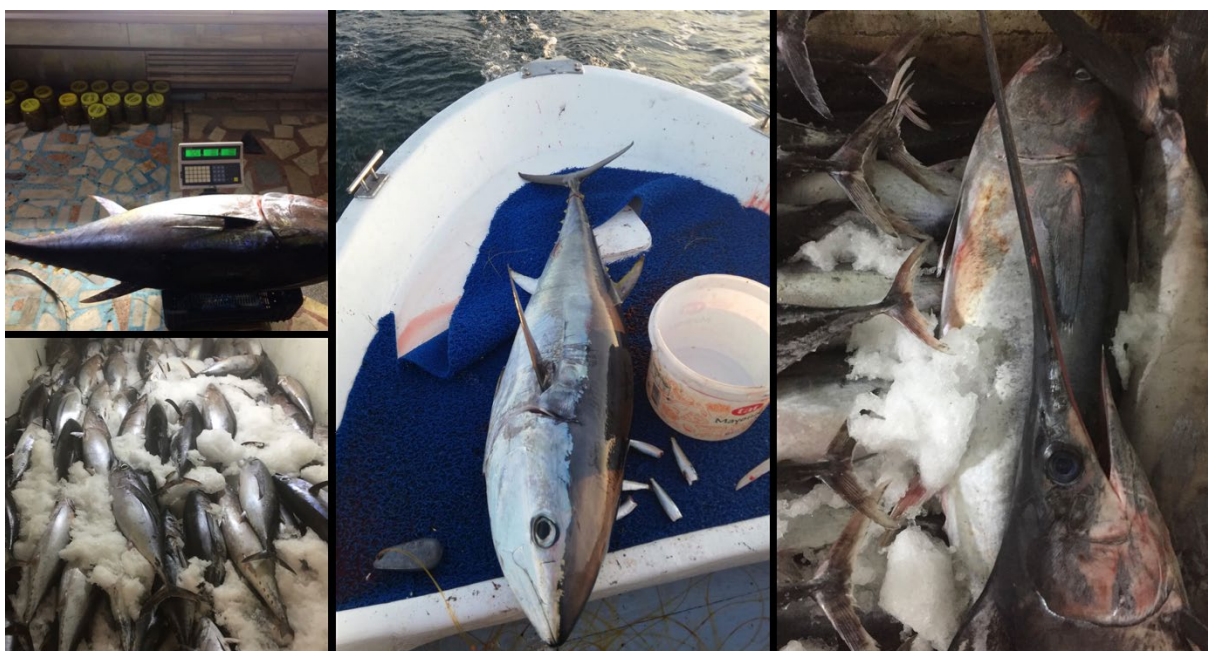


Fig. A2. Examples of observed Atlantic bluefin tuna (BFT) individuals on the deck in the fishing ports. These unexpected BFT catches were recorded by the controlling authority.





**Fig. A3.** Photos from commercial bluefin tuna fisheries





**Fig. A4.** Example photos during the interviews in the fishing ports (please see social media accounts for detailed visual material)

