
GBYP 2013

Atlantic-Wide research Program on Bluefin tuna
Area E, Italian FIR Only



Final Report

July 12, 2013

Summary

The present report compiles data on bluefin tunas survey led by Action Air for the ICCAT, which occurred in the vicinity of Sicily, between June 28th and July 10th, 2013.

During the 12 spotting days, we observed 6 tunas schools on 5 days. Each tunas observation, along with other species observation, was recorded according to the form established by the ICCAT, in an Excel file (see appendix 2 and 3). It has to be noted that among spotting days, only two days matched perfect spotting conditions (Sea state < 2, no haze).

The whole survey area was overflowed at least one time but the vicinity of Catania and Siracusa because of military and civil aviation ban. At the end of the mission, the estimated total weight was 720 T of tunas observed, mainly medium sized individuals.

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I) Preparation

a) Background and objectives

The objectives of the comprehensive ICCAT Atlantic-Wide Research Programme on Bluefin Tuna (GBYP) are to improve basic data collection and our understanding of key biological and ecological processes and to develop a robust scientific management framework. An important element of this programme is to develop fisheries independent indexes of population abundance. Therefore, aerial surveys have been conducted in the Mediterranean on the most documented spawning grounds, previously observed in 2010 and 2011.

For the needs of the mission, the Mediterranean Sea was divided in 7 blocks:

- Area A: Western Mediterranean/Balearic Sea
- Area B: Western Mediterranean/Sardinian Sea
- Sub-area C: Tyrrhenian Sea
- Area D: Central-southern Adriatic Sea/Northern Ionian Sea
- Area E: Strait of Sicily/Central-southern Mediterranean Sea
- Area F: Ionian Sea/Eastern Mediterranean Sea/Aegean Sea
- Area G: Aegean Sea/Levantine Sea

This report is related to aerial surveys performed by Action Air, occurring in the block E, Italian FIR only, mainly for Bluefin Tuna observation.

b) Means and methodology

Aircraft: CESSNA 206, Code: F-BRAI

An upper wings aircraft capable of flying autonomously for 5 hours. For the spotting needs, it is able to fly at 1000 feet and 100 knots.

Because of the urgency of the situation, bubbles windows could not be applied on the aircraft for this mission. However, the airplane is equipped with windows which can be opened during the flight to counterbalance the dead angle under the airplane (Figure 3).

Camera: CANON® Eos 5D, equipped with EF 200 mm f/2.8 lens.

GPS: GPSMAP 196 Garmin®

Used in conjunction with the MapSource® software, it allowed us to schedule the route and to record the track of each flight along with the waypoints.

Crew:

Pilot: Daniel WALTHER

Professional spotter: Khalifa ZARIOHI.

Scientific spotter: Josselin JUAN



Figure 1: The crew and the aircraft



Figure 2: The wing sticker



Figure 3: The opened window

Each day, the GPS containing the route programmed the day before, was installed in the plane, along with the camera. During the flight, the pilot followed the waypoints and checked the rightness of the course while spotters recorded data and photos about observed species, especially tuna schools. After the landing, the track and data recorded were saved on the computer following the specific forms.

The survey took place between June 28th and July 8th. For the duration of the mission, we were based in Malta.

Flights were carried out according to the needs of the spotting mission (Beaufort scale < 4, clouds above the airplane) and the flight safety directives.

II) Protocole

Survey Area:

The studied area was the area E, Italian FIR Only.



Figure 4 : Eurocontrol FIR/UIR in the lower airspace (Sicily vicinity)

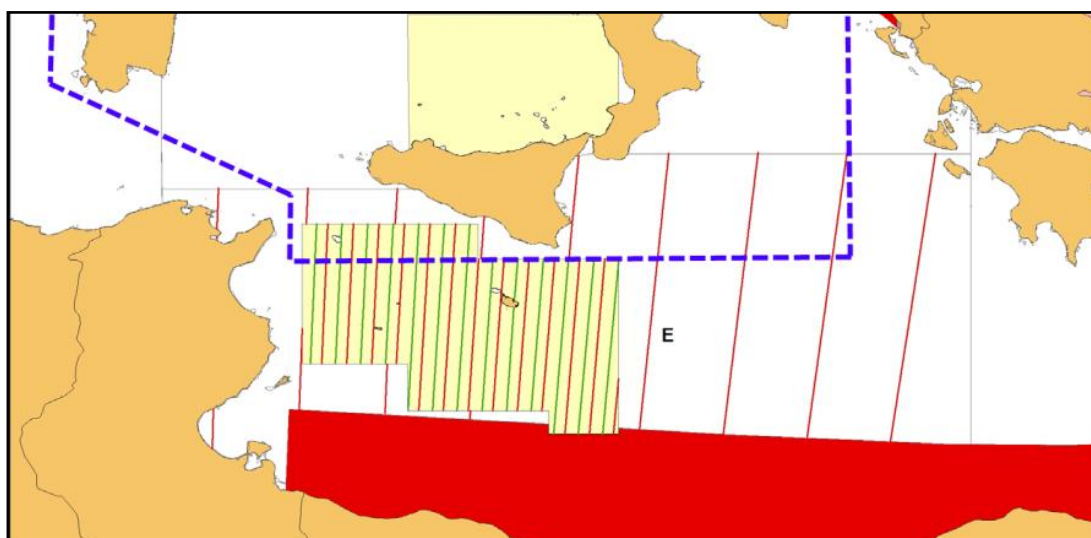


Figure 5: Area concerned (blue dotted line) by the Italian FIR restriction in block E

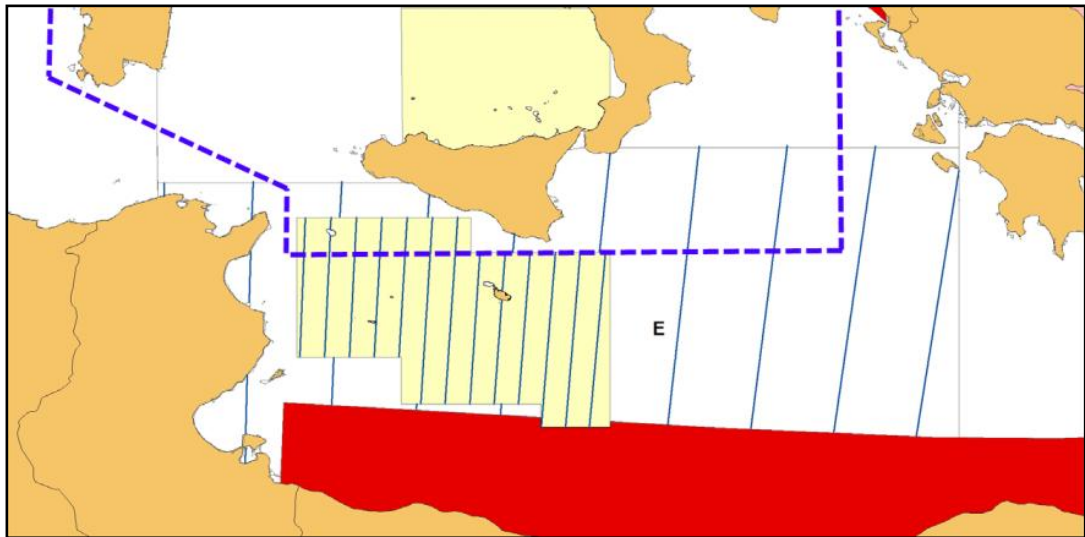


Figure 6: Extra Area concerned (blue dotted line) by the Italian FIR restriction in block E

Transects were divided up between 5 maps:

- 3 maps for transects inside the area surveyed in 2010 and 2011: maps A, C and D.
 - 2 maps for transects outside the area surveyed in 2010 and 2011: maps B and E.
- Two of these five maps regroup extra tracks: maps D and E.

Because of time imperatives, we focused on completing at least one map of transects located in the area surveyed past years (map A) and one map of transects located outside this area (map B). Some transects were shortened due to active forbidden areas, especially those situated east of Sicily, in the vicinity of Siracusa and Catania.

a) Map A



Figure 7: Map A

Transect Map A	A01-A02	A03-A04	A05-A06	A07-A08	A09-A10	A11-A12	A13-A14	Total
Length (nm)	29	30,2	30,4	31,3	30,3	32,6	30,2	214
Length performed (nm)	29	30,2	30,4	31,3	30,3	32,6	30,2	214

Figure 8: Table of theoretical and performed transects

Note: All transects were performed

b) Map B



Figure 9: Map B

Transect Map B	B01-B02	B03-B04	B05-B06	B07-B08	B09-B11	B12-B13	Total
Length (nm)	36,5	59,2	90,3	88,2	64,2	91,8	430,2
Length performed (nm)	36,5	59,2	90,3	0	64,2	91,8	342

Figure 10: Table of theoretical and performed transects

Note: Transects B07-B08 *could not* be performed because of active forbidden areas in the vicinity of Siracusa and Catania.

c) Map C



Figure 11: Map C

Transect Map C	C01-C02	C03-C04	C05-C06	C07-C08	C09-C10	C11-C13	Total
Length (nm)	33,3	31,3	31,9	29,3	30,1	73,4	229,3
Length performed (nm)	33,3	31,3	31,9	29,3	30,1	0	155,9

Figure 12: Table of theoretical and performed transects

Note: Transect C11-C13 *could not* be performed due to poor weather state.

d) Map D



Figure 13: Map D

Transect Map D	D01-D02	D03-D04	D05-D06	D07-D08	D09-D10	D11-D12	D13-D14	Total
Length (nm)	29,6	27,9	30,3	31,1	31,8	31,3	32,6	214,6
Length performed (nm)	29,6	27,9	0	31,1	31,8	0	0	120,4

Figure 14: Table of theoretical and performed transects

Note: Transects D05-D06, D11-D12 and D13-D14 *could not* be performed due to poor weather state and active forbidden areas at that time.

e) Map E



Figure 15: Map E

Transect Map E	E01-E02	E03-E04	E05-E07	E08-E09	E10-E11	E12-E13	Total
Length (nm)	50,3	18,9	62	94,1	91,1	85,1	401,5
Length performed (nm)	50,3	18,9	0	0	0	0	69,2

Figure 16: Table of theoretical and performed transects

Note: Only transects E01-E02 and E03-E04 were performed. The others ones *could not* be performed due to poor weather state and active forbidden areas at that time.

III) Results

a) Log Book and flight

The flights started on June 28th, 2013 and ended on July 10th, 2013. 49:29 hours of flights were conducted with 8:18 hours on transect and 41:11 hours off transect (Log book and flights are detailed Appendix 1). During the whole mission, one survey on June 29th was not performed due to a strong wind.

- Map A was fully performed during the mission.
- Map B was fully performed *but* transect B07-B08 because it crossed an active forbidden military area in the vicinity of Siracusa, and a VFR corridor for airliners flying to and from Catania.
- Map C, D and E were *partially* performed due to poor weather state and activation of forbidden areas at that time.

Total transects flew was 901,5 nm (Figure 17).

Map	A	B	C	D	E	Total (nm)
Theoretical Length (nm)	214	430,2	229,3	214,6	401,5	1489,6
Length performed (nm)	214	342	155,9	120,4	69,2	901,5

Figure 17: Table of total theoretical and performed transects

b) Bluefin Tuna

During the survey, only 6 tunas schools were observed and all observations were done OFF effort (All observations are detailed in Appendix 2 and on the map Fig.18). Tuna schools presence was detected mainly thanks to our experienced professional spotter and the presence of birds which took advantage of tunas hunting sardines (Fig. 19, 20).

Estimated total weight was 720 T. All observations were verified by the professional spotter Khalifa ZARIOHI.

The total weight is constituted by:

- 8,3 % of small sized tunas (< 25 kg).
- 63,9 % of medium sized tunas (80 to 120 kg).
- 27,8 % of large sized tunas (~ 180kg).

According to our spotter, the low number of tunas observations is due to the fact that the mission was probably too late in the season.



Figure 18: Observed tunas schools

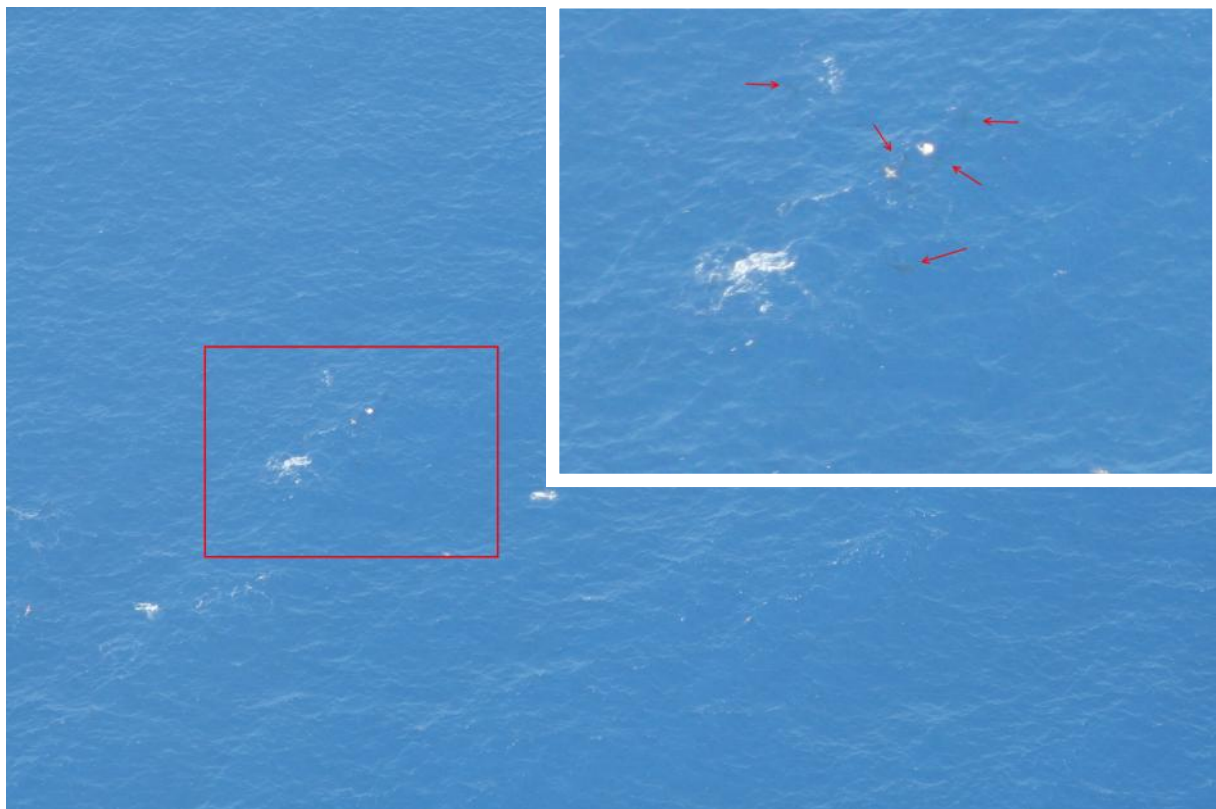


Figure 19: Tunas school



Figure 20: Birds over a tunas school hunting sardines

c) Other species

Other species were observed during the mission like:

- Sperm Whales
- Unidentified Whale
- Common Dolphin
- Unidentified Dolphin
- Loggerhead Turtle

We mainly observed dolphins. Some of observed animals could not be identified with certainty because of the distance or the lack of clues (recall that the ICCAT instructions about no detour in the case of secondary interest), but we could identify their affiliation to a species family in particular thanks to the size, the swimming attitude or the color.

All observations and coordinates are detailed in Appendix 3.

IV) Conclusion

The objective of the survey was to collect as much data as possible during the observation of Bluefin Tunas school (*Thunnus thynnus*), in order to provide mathematical models on spawning population migration, the presence of young tunas, etc. Thanks to previous researches, we do know that bluefin tunas spawning occurs in hot water ($> 24^{\circ}\text{C}$) in specific and restricted areas (around the Balearic Islands, Sicily, Malta, Cyprus and in some areas of the Gulf of Mexico), and once a year in May-June (Karakulak *et al* 2004. Mather *et al* 1995. Nishikawa *et al* 1985, Schaefer 2001).

However we did not see as many tunas schools as expected, although we were performing surveys around Malta, one of these suitable areas. Two explanations may be suggested:

- The low temperature in the concerned survey area (Fig. 21).
- The date of the mission, which occurred, according to the professional spotter, too late for the observation as tunas had already migrated to Balearic Islands.

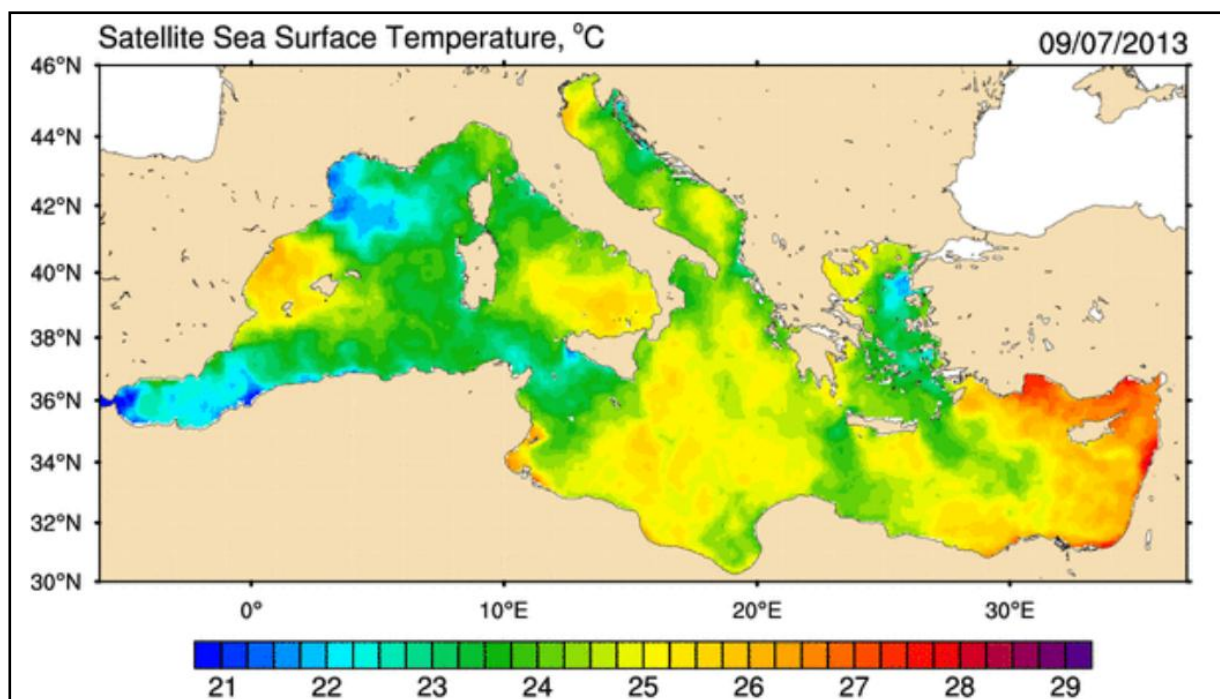


Figure 21: Sea Surface Temperature map, extracted from INGV site