

# Where have all the tuna gone?

How tuna ranching and pirate fishing are wiping out bluefin tuna in the Mediterranean Sea

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# Defending Our Mediteranean

"Greenpeace is committed to defending the health of the world's oceans and the plants, animals and people that depend upon them."

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## Content

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# 1. Executive summary

Fishing for northern bluefin tuna is one of the most profitable fishing industries in the Mediterranean. In ancient Rome, the capture of tuna and its transformation into salted fish were two of the empire's most stable industries and businesses [1]. Today's mismanagement, boosted by purse seine fishing fleets and the fast development of tuna fattening ranches, threatens the future of the bluefin tuna and the future of hundreds of fishermen.

In May 1999, Greenpeace published a detailed report denouncing the depletion of this species and analysing its causes [2]. Pirate fishing by vessels flagged to third countries was identified as the main threat to the bluefin tuna population and already then scientists were warning about its serious overexploitation. The biomass of adult bluefin tunas -the spawning stock biomass- had decreased 80% over the previous 20 years. Huge amounts of juvenile tuna were caught every season. Clearly, drastic measures were needed to recover the bluefin tuna population.

Today the situation has deteriorated even further, with pirate fishing for tuna mainly carried out by the fishing fleets of Mediterranean countries, catching tuna in quantities that largely exceed the quota legally allocated to them.

Tuna ranching, a relatively new industry in the Mediterranean, is the main driving force behind the current levels of unreported and illegal fishing. Tuna are caught and taken alive to these ranches, where they are fed for months before being exported, mainly to Japan. The complexity of the tuna ranching business, its poor regulation, and the extent of trade activities that usually involve several countries have helped build a cover for large illegal tuna catches.

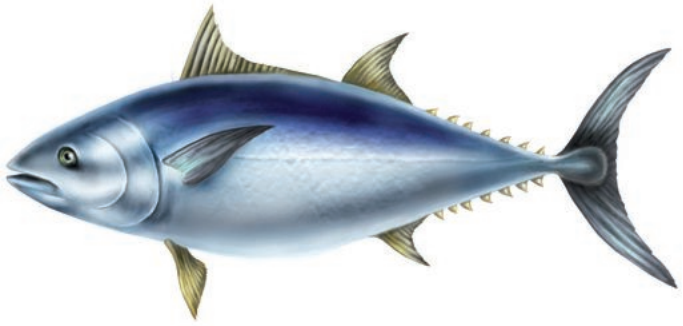
More than 50 tuna farms are spread all along the Mediterranean coasts. Their fast development happened with very little control - indeed trying to avoid being properly controlled - and has led to a farming capacity that exceeds by close to 20,000 tonnes the total amount of tuna that could be legally caught in the region.

It is indisputable that today nobody knows for sure the amount of bluefin tuna taken from the Mediterranean Sea every year, but it is clear that current catch levels are well above the legal quota that Governments party to the International Commission for the Conservation of Atlantic Tunas (ICCAT) had agreed, and therefore, committed to comply with, back in 2002.

The tuna ranching industry is very well integrated and organised. The fishing fleets that supply the ranching industry with live bluefin tuna are out of control. Their flag States have failed to comply with international obligations. The tuna business in the Mediterranean has done everything it can to operate without limits and fish as much as possible, including thousands of tonnes of illegally caught bluefin tuna. Organised illegal fishing has a name: **it's called pirate fishing.**

1 López Linage, J. and Arbex, J.C. 1991. Pesquerías tradicionales y conflictos ecológicos: 1681-1794. Ministry of Agriculture, Fishing and Food. General Secretary of Sea Fishing. Lundwerg Editores, Madrid.

2 Gual, A. 1999. The bluefin tuna in the Eastern Atlantic and Mediterranean: Chronicle of a death foretold. Greenpeace International.



Not only have a few companies been very successful in expanding this lucrative activity without control, but they have done so with institutional support. The European Union, for instance, has greatly contributed to the increase of fishing capacity in the Mediterranean and farming capacity in countries such as Spain. This highly irresponsible behaviour, at a time when scientists were already warning about the need to recover the east bluefin tuna stock, has been coupled with a lack of interest in adopting measures to properly control the industry, as well as measures to effectively start rebuilding the bluefin tuna population.

Through this report we examine the state of bluefin tuna in the Mediterranean Sea, review the different sources of information available on the fishery and on the associated tuna ranching activities in the Mediterranean Sea and we conclude that:

- Bluefin tuna catches in the East Atlantic and Mediterranean Sea may have been over 41,000 tonnes in 2004 and over 44,000 tonnes in 2005. This is 12,000 t (37.5 %) more than the Total Allowable Catch of 32,000 t in 2005;
- These illegal catches above the agreed quota largely occur in the Mediterranean Sea;
- Large quantities of immature tuna are caught and other illegal fishing practices are a common;
- Several countries hide or falsify their data and scientists have not been able to assess the stock because basic data is missing or unreliable;
- The very high amount of fish needed to feed the tuna is also a matter of concern amongst other things due to the potential to introduce disease and the overfishing of fish stocks in the Mediterranean and other fishing grounds;
- Large public subsidies (as high as $34 million since 1997 in the case of the European Union) coupled with foreign investments from Japan and Australia have encouraged greater bluefin tuna catches;
- Just a few investors are now controlling the benefits of what was previously a common resource shared by fishing cultures all around the Mediterranean Sea;

**In short, the commercial extinction of bluefin tuna from the Mediterranean Sea is just around the corner.**

In light of the current situation, Greenpeace proposes a strong solution to the crisis facing the bluefin tuna. Rather than allowing the continued fishing of tuna in their important breeding and feeding grounds, these areas should be made into marine reserves. Large scale marine reserves, where no fishing or other damaging activities are allowed, can benefit migratory species by protecting them at crucial times in their life cycle.

The lack of control over bluefin tuna fishing and ranching activities as well as the extent of pirate fishing in the region make it clear that stronger measures to control the fishing and ranching industries are needed. These should include: a strict and independent observer scheme for tuna fishing vessels and ranches; submission of accurate fishing and farming information to ICCAT on a regular basis; a new minimum landing size that matches the sexual maturity of the species; and a long term rebuilding plan for the East Atlantic stock, that includes a new total quota set on a precautionary basis.

With marine reserves protecting tuna in their breeding grounds, and sustainable and enforced management measures, the bluefin tuna of the Mediterranean Sea faces a future, as do many whose legitimate livelihoods depend upon it. However, if they are allowed to continue, pirate fishing and rampant tuna ranching will rob the Mediterranean of this resource.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# 2. The northern bluefin tuna

Bluefin tunas (Thunnus thynnus) are large, voracious fish, weighing as much as 700 kg, and are excellent swimmers. They are long-lived animals that can reach the age of 20 years and migrate long distances, in order to breed and to find food.

These fish are gregarious and prey on small schooling fishes like anchovies, squids and other species. Oceanic, but seasonally coming close to shore, bluefin tuna can tolerate a wide range of temperatures. They school by size, sometimes together with other species.

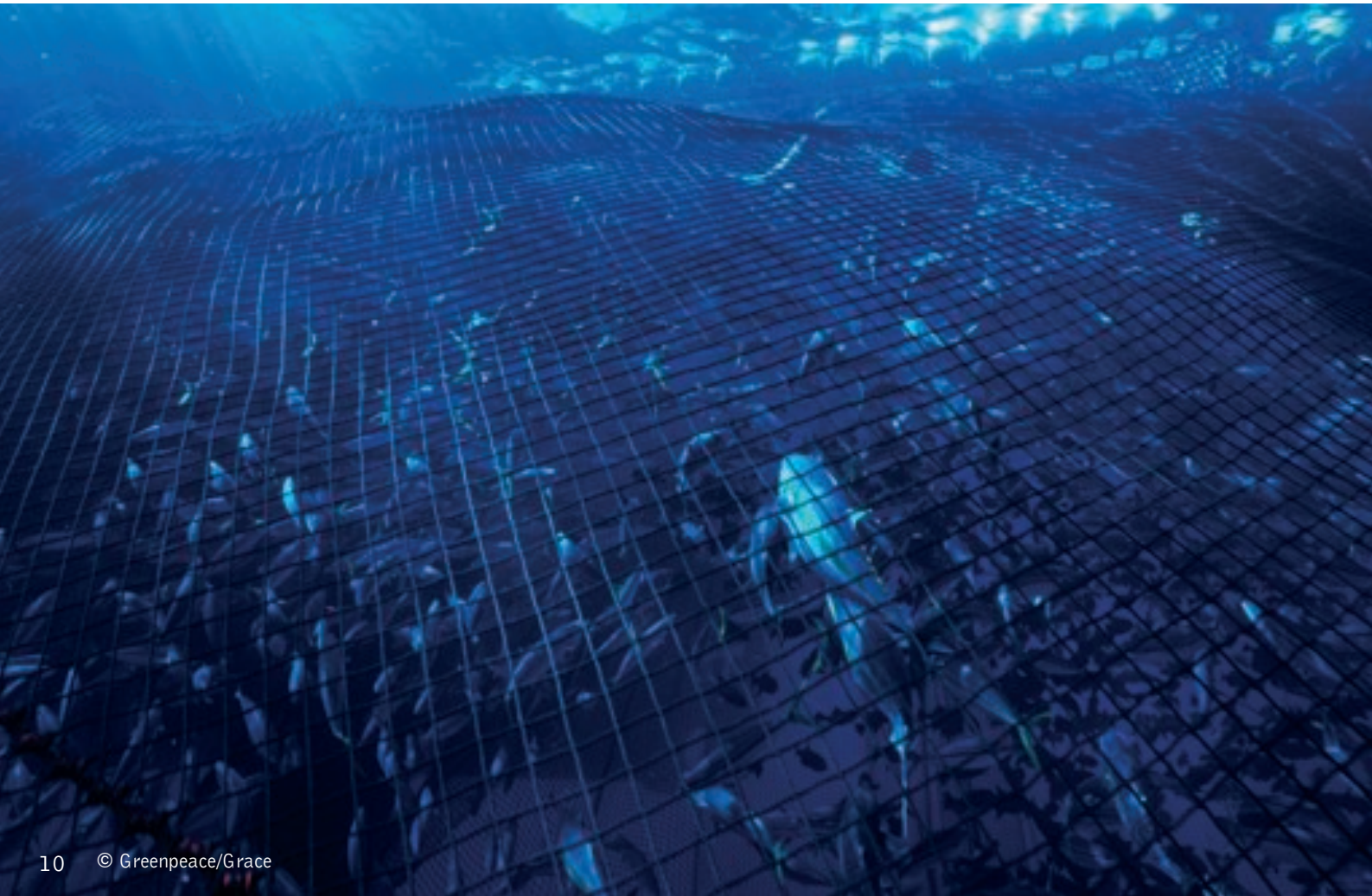
## 2.1. The East and West Stocks

Tuna does not recognise political borders. It is a highly migratory species, and swims and can be fished both on the high seas and in national waters. Whatever decisions are taken to regulate its exploitation must be decided -and implemented- internationally.

The International Commission for the Conservation of Atlantic Tunas (ICCAT) was created to that end. Responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and adjacent seas like the Mediterranean, ICCAT parties include 41 countries, plus the European Community.

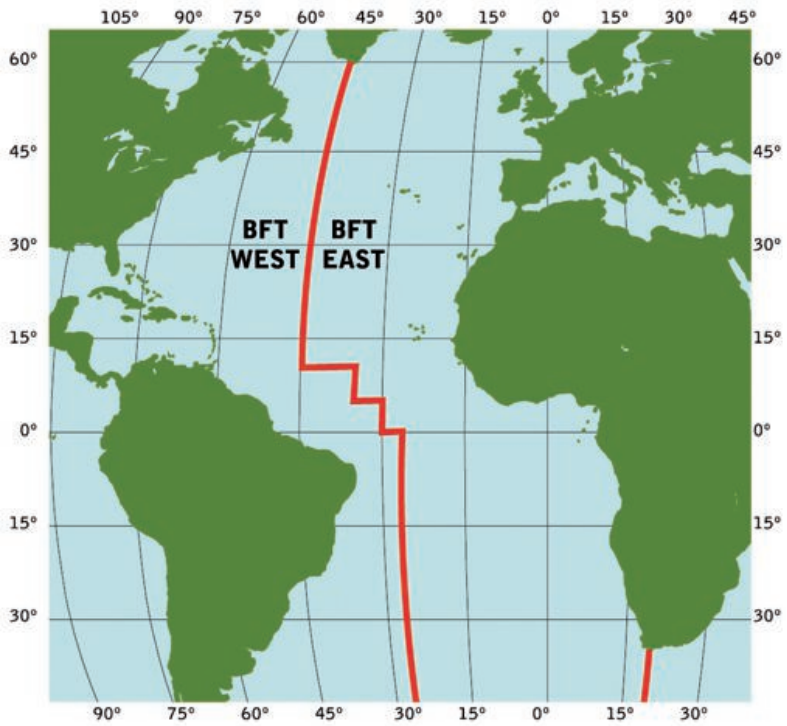
Bluefin tuna is distributed over both sides of the North Atlantic Ocean. In order to study and regulate how much, when or how tuna should be fished, 25 years ago it was assumed that two different sub populations of bluefin tuna exist in the North Atlantic: the so called "West" and "East" northern bluefin tuna stocks. These two management units defined by ICCAT are subject to separate assessments and regulatory measures. Nevertheless all experts know that the line that separates both stocks is a political, not biological, line [3].

[3] In fact, it is known that some tuna undertake trans oceanic migrations and there has been growing evidence on the mixing of both bluefin tuna populations through the collection of tagging data. Some experts believe these migrations raise doubts on the decision to manage these two stocks separately.



Map 1: Northern bluefin tuna west and east stocks.




Elaborated from ICCAT

Fleets catching northern bluefin tuna are distributed all over the North Atlantic Ocean, from the Gulf of Mexico to Newfoundland in the West Atlantic, from the Canary Islands to the south of Iceland in the East Atlantic, and throughout the Mediterranean Sea. In recent years, fisheries have also quickly developed in a previously unknown area of concentration of fish in the North Central Atlantic.

## 2.2. The biology of bluefin tuna.

There are only two known spawning regions for the northern bluefin tuna: the Gulf of Mexico and the Mediterranean Sea. Adult bluefin tuna [4] concentrate in these areas, during the breeding season, doing so between mid-April and mid-June in the Gulf of Mexico and from the end of May until the end of June in the Mediterranean Sea.

After the breeding period, many of the adults return to the Atlantic in search of food. However, in the Mediterranean, some of the adult stock is thought to be resident in areas such as Libya, Corsica or the eastern basin of the Mediterranean Sea.

4 Tuna reach reproductive age at around 5 to 8 years.

Map 2: Bluefin tuna breeding areas in the Mediterranean Sea

Information sourced from ICCAT [5] and Qinetiq [6]

## 2.3. An overexploited species pushed to the limit

Whether in the west or in the east, it is clear that the current management system of ICCAT is not succeeding in achieving its main task: sustainable exploitation of the northern bluefin tuna population. Far from it, in fact. Both populations are facing enormous difficulties, which threaten the commercial viability of the most important fishery in the Mediterranean Sea in the future.

### The west stock: bluefin tuna not recovering

The main fishing nations catching bluefin tuna in the West Atlantic are the United States (899 tonnes in 2004), Canada (537 tonnes) and Japan (396 tonnes)[7].

In the 1970s a serious decline was observed in the fishery and in 1997, the biomass of breeders was only 14-17% of what it was estimated to have been in 1975. The bad state of the Western stock forced ICCAT to adopt a so-called "rebuilding program" in 1998. The objective of this program was to rebuild the stock with 50% probability and by 2018 to the spawning biomass level associated with the Maximum Sustainable Yield (MSY).

This objective could hardly be described as ambitious, and even though since 1998 reduced catch quotas have been enforced, these measures have not been enough and the stock has not recovered.

The last stock assessment was carried out in 2002. According to the scientists "the results indicate that the spawning stock biomass (SSB) declined", and "the potential for rebuilding is less clear". Not a very promising result eight years into a rebuilding programme.

That same year, the Commission set an annual Total Allowable Catch of 2,700 tonnes, that would enter into force in 2003[8]. Catches reported in 2003 were 2,191 t [9]. One year later, reported catches were about 2,000 t. Something has clearly gone disastrously wrong when the allocated quotas are not even reached. Could this really be considered a "rebuilding" program?

5 Oray, I.K.; Karakulak, F.S.; Alıclı Z.; Ates, C. and Kahraman, A. 2005. First evidence of spawning in the eastern Mediterranean Sea - preliminary results of tuna larval survey in 2004. Col. Vol. Sci. Pap. ICCAT, 58(4)

6 Qinetiq. 2002. Environmental Impact Assessment (EIA) in support of the procurement of Sonar 2087

7 ICCAT Annual Report 2004-2005. Volume II.

8 ICCAT Recommendation [02-07].

9 ICCAT 2005. BFT. Atlantic bluefin tuna. ICCAT REPORT 2004-2005 (II).

### The east stock: the kingdom of overexploitation and trickery

The bulk of the bluefin tuna catches from the east stock take place in the Mediterranean Sea (18,296 in 2004) [10]. To a much lesser extent, this fish is also caught in the Eastern Atlantic (8,665 t in 2004) [11].

Historically, doubts have been raised about the extent of catch misreporting in the region [12]. But more than ever before, it now seems that there is a growing quantity -as high as several thousands tonnes- of tuna that is caught but never declared. According to the ICCAT database, the main bluefin tuna fishing nations in the NE Atlantic and the Mediterranean Sea are France (reporting around 6,500-7,000 tonnes per year from 2002 to 2004), Spain (around 5,000-6,300 t/year) and Italy (around 4,500-5,000 t/year). Turkey -despite not even having a fishing quota- and Tunisia, have reported several thousand tonnes in recent years. Libya reported no catch data to ICCAT from 2002-2004.

The main fishing gear targeting the eastern stock is purse seining [13]. Purse seine catches are three times those of longliners, which are the second gear in importance. An ancient traditional coastal system, based on fixed trap nets set from the coast, is still in use in some countries. These nets stay in the water for several months and act as a labyrinth, intercepting tuna in their migrations.

Between 1994 and 1997, total declared catches were around 45,000 to 50,000 tonnes/year (in contrast to around 21,000 tonnes/year during the previous 20 years). The impact of these high catch levels on the population made scientists express their concerns in 1998 about the state of the stock. Today, the situation is even worse than then.

### *The state of the eastern stock is unknown*

The last assessment of the eastern stock was meant to be carried out in 2002. In previous years, it had been postponed due to the deficient quality of data. Once again scientists made reference to the "large quantities of undersized fish caught but not reported" and the "increasing under-reporting in the last few years, especially since 1998" [14]. Other basic data, for example size data, were not available [15].

[10] ICCAT 2005. Task I dataset, web application, available online at: http://www.iccat.es/task1.asp

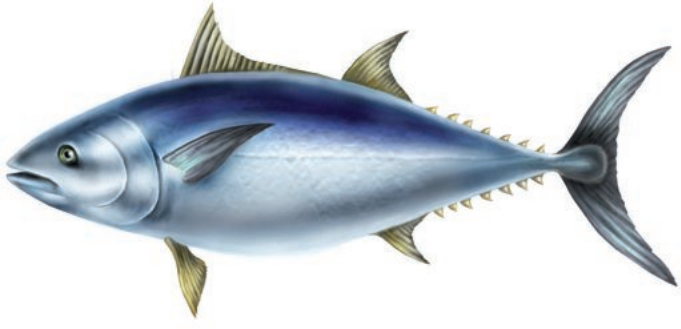
[11] ICCAT 2005. BFT. Atlantic bluefin tuna. ICCAT REPORT 2004-2005 (II).

[12] This is well illustrated by the fact that some countries have in recent years reviewed their past reported catches, declaring now catch figures well above those declared in the past. One may think that they were trying to correct mistakes in their reports. The reality, however, is that the allocation of catch quotas in ICCAT is based on historical catches, and members to ICCAT are therefore interested in communicating larger catches in the past to obtain fishing rights at present.

[13] Purse seining involves the setting out of a long net around the school of fish, the top of the net usually being on the surface. When the net has encircled the fish, the net is closed to form a "purse" that holds the catch.

[14] ICCAT Report 2002-2003 (I) - Vol II.

[15] The SCRS acknowledged that catch per unit effort data and size data were not available for some countries.



However, scientists detected a strong overexploitation. Fishing mortality in 2000 was believed to be 2.5 times higher than the maximum level considered sustainable. They clearly concluded then "current catch levels cannot be sustainable in the long-term" [16]. Despite the concerns expressed by scientists, delegates to ICCAT ignored their advice and in 2002 adopted an unsustainable annual quota of 32,000 tonnes for the years 2003 to 2006 [17]. This quota was 23% higher than the maximum level recommended by the scientists [18]. More than half of this quota (18,582 t) was allocated to the European Community [19].

A new assessment should be carried out in 2006, however continued misreporting will probably make it, again, impossible.

**Table 1. Bluefin tuna quotas allocated to ICCAT members 2003-2006**

| | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| Algeria | 1500 | 1550 | 1600 | 1700 |
| China (People's Rep) | 74 | 74 | 74 | 74 |
| Croatia | 900 | 935 | 945 | 970 |
| EC | 18582 | 18450 | 18331 | 18301 |
| Iceland | 30 | 40 | 50 | 60 |
| Japan | 2949 | 2930 | 2890 | 2830 |
| Tunisia | 2503 | 2543 | 2583 | 2625 |
| Libya | 1286 | 1300 | 1400 | 1440 |
| Morocco | 3030 | 3078 | 3127 | 3177 |
| Others | 1146 | 1100 | 1000 | 823 |

Information sourced from ICCAT Recommendation [02-08]

16 ICCAT Report 2002-2003 (I) - Vol II.

17 ICCAT Recommendation [02-08].

18 "Analyses suggest that at current levels of recruitment and the present level of large and small-fish fisheries, catch levels of 26.000 MT or more are not sustainable over the long term". ICCAT Report 2002-2003 (I) - Vol II.

19 It should be noted that if quotas are exceeded ICCAT can not close the fishery. Firstly, it does not have the means to know catch levels until one or two years later (there are no mechanisms to monitor catches in real time). And secondly, ICCAT has not been empowered to close a fishery.

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# 3 Tuna ranching: a highway towards collapse

## 3.1. What is tuna ranching?

Tuna ranching began to expand in the Mediterranean region in the late nineties. This highly industrial activity basically consists of fattening wild-caught tuna in floating cages, which are set up close to the coast. There, tunas are fed for 6-7 months with fresh or frozen fish until their size and fat content increases, making them more valuable in Japan and other countries.

Since the tuna must be kept alive, it is purse seiners that catch the fish for ranches. Therefore, tuna ranching relies on the activity of this particular segment of the fishing fleet. Once they are caught, the tuna are transferred to towing cages that are pulled by tugboats that transport the live tunas to the farm. This must happen at a very low speed, 1 or 2 knots, otherwise many would die during the process [20]. The transport can take days, weeks or even months [21].

Depending on where the wild tuna is caught (as the fishing season varies across the Mediterranean) and how far it must be transported, the ranches may begin stocking their cages from May to August. The tuna are then fattened usually for around 6-7 months [22], however those ranches stocked with particularly small fish may fatten them for even longer [23]. The main export of tuna from the ranches occurs in November and December, but depends also on agreements between the producer and purchaser.

## 3.2. The tuna ranching "boom"

In the Mediterranean Sea, tuna ranching began its expansion in the late 1990s. Since then, this industry has been expanding throughout the region, with little or no regulation and guided largely by the decisions of a few investors. Such operations have run out of control and today farms have spread to 11 countries, including Portugal.

**Table 2. Farming tuna proliferation in the Mediterranean and East Atlantic**

| 1985 | 1996 | 2000 | 2001 | 2002 | 2003 | 2004 | 2006 |
|---|---|---|---|---|---|---|---|
| Spain | Spain | Spain | Spain | Spain | Spain | Spain | Spain |
| | Croatia | Croatia | Croatia | Croatia | Croatia | Croatia | Croatia |
| | | Malta | Malta | Malta | Malta | Malta | Malta |
| | | | Italy | Italy | Italy | Italy | Italy |
| | | | | Turkey | Turkey | Turkey | Turkey |
| | | | | | Cyprus | Cyprus | Cyprus |
| | | | | | Libya | Libya | Libya |
| | | | | | | Greece | Greece |
| | | | | | | Lebanon? | Tunisia |
| | | | | | | | Morocco |
| | | | | | | | Portugal |
| | | | | | | | Lebanon? |

Information sourced from Lovatelli, A. 2005 [24] and ICCAT [25]

20 There is a certain -and unknown- percentage of fishes that die during purse seining operations. This mortality would increase at higher tugging speeds.

21 Advanced Tuna-Ranching Technologies SL (ATRT), 2005.

22 Lovatelli, A., 2005. Summary Report On The Status Of Bluefin Tuna Aquaculture In The Mediterranean. FAO.

23 Croatia stocks most of its fattening cages with small tuna specimens ranging on average between 8-25 kg/fish. For Croatia the season may last for a minimum of 4 months to a maximum of 20 months.

24 Lovatelli, A. 2005. Summary Report on the status of BFT aquaculture in the Mediterranean. FAO Fisheries Report No 779

25 ICCAT database on declared farming facilities, available online at www.iccat.es/ffb.asp

Such an expansion is very difficult to justify when taking into account the total dependence of tuna ranching on the bluefin tuna fishery, a fishery that has been facing serious difficulties for more than a decade now and for which both scientists and NGOs have been consistently warning that catch levels are too high.

After much delay, and facing its lack of information about tuna ranching, ICCAT ruled in 2003 that countries should report their authorized farming facilities [26] and has established a list, which, amongst other information, includes farming capacity.

**Table 3. Reported farming capacity in the Mediterranean Sea**

| Country | No. of farms | Farming capacity (tonnes) |
|---|---|---|
| EC Cyprus | 3 | 3000 |
| EC Spain | 14 | 11852 |
| EC Greece | 1 | 1000 |
| EC Italy | 9 | 5800 |
| EC Malta | 7 | 9650 |
| EC Portugal | 1 | 500 |
| Croatia | 5 | 5350 |
| Libya | 1 | 1000 |
| Morocco | 1 | 1000 |
| Tunisia | 4 | 2400 |
| Turkey | 12 | 9460 |
| **TOTAL** | **58** | **51012** |

Information sourced from ICCAT[25] updated on 11 May 2006.

That information, summarised in Table 3, does not however reflect the real farming capacity. Libya, for example, reported one farming facility to ICCAT in 2006 although their involvement in tuna ranching has been known for a number of years already. Furthermore, experts have noted that Algeria, Syria, Israel and Lebanon could become important either in the capture or in the farming of bluefin tuna in the Mediterranean [27]. Except for Algeria they are not ICCAT Contracting Parties. Although Lebanon has not provided official data, sources state that one farm was planned for 2004. In 2005 a proposal was made to establish tuna ranching in France, which met with strong opposition [28].

The total reported farming capacity of 51,012 tonnes is an indisputable incentive for illegal catches in the region, when compared to a legal quota of 32,000 t. In fact, as it has been noted by the FAO "since 1996 the percentages of bluefin tuna used for farming have increased continuously, so currently most of the bluefin tuna catch in the Mediterranean is used for farming" [29]. It has to be noted that catches from gears others than purse seiners have averaged some 15,000 tonnes per year in previous years.

26 ICCAT Recommendation [03-09].

27 FAO. 2005. Report of the third meeting of the Ad Hoc GFCM/ICCAT Working Group on Sustainable Bluefin Tuna Farming/Fattening Practices in the Mediterranean. Rome, 16-18 March 2005. FAO Fisheries Report. No. 779. Rome, FAO.

28 Greenpeace France. Greenpeace s'oppose aux fermes d'elevage de thons rouges en Mediterranee et en baie de Banyuls. 5 January 2006.

29 Lleonart and Majkowski, 2005. Summary report on bluefin tuna capture fishing for farming/fattening in the Mediterranean. GFCM/ICCAT Working Group on sustainable Tuna Farming/Fattening practices in the Mediterranean. Rome, 16-18 March 2005.

- There is a huge investment in the development of tuna ranching. It would be naïve to think that these farms have been built to be under-used;
- The reported farming capacity exceeds by almost 60% the Total Allowable Catches adopted by ICCAT;
- The reported faming capacity exceeds by more than 25,000 tonnes the catch levels recommended by ICCAT scientists [30].

## 3.3. Tuna ranching production

The real amount of tuna farmed in the Mediterranean is a question mark and it has to be estimated using several sources and calculations. The FAO has tried to improve the information about this activity by carrying out national survey reports. Going through them it is very clear that huge information gaps exist, some of them affecting the very basic data. The FAO notes for instance that "little information is provided in regards to the volume of bluefin tuna introduced into the cages" [31].

In order to restrain illegal and non-reported catches, all ICCAT Contracting Parties importing bluefin tuna must request that tuna entering their markets is accompanied by a certificate called Bluefin Tuna Statistical Document (BTSD), validated by the authority of the exporting country [32]. The document, in force since 1993, requires mandatory reporting of the area of capture, flag of the fishing vessels, quantity and type of products, shipping ports, etc.

Twice a year, importing countries have to report to the ICCAT Commission a summary of imports based on the BTSD they had received. Any country re-exporting bluefin tuna must attach the original BTSD they received at the time of the import together with the re-export document. Despite being mandatory, the BFSD has not been submitted to the Commission by several countries, particularly some European countries [33].

Table 4. Annual trends in Japanese imports of Mediterranean farmed BFT by country of shipment. Estimated whole weight at the time of harvest from the farms for export to Japan is used.

| Year | Spain | Croatia | Malta | Italy | Turkey | Libya | Tunisia | Cyprus | Greece | Others | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1997 | 261 | | | | | | | | | | 261 |
| 1998 | 1456 | 103 | | | | | | | | | 1559 |
| 1999 | 3346 | 277 | | | | | | | | | 3622 |
| 2000 | 5806 | 664 | 16 | | | | | | | | 6487 |
| 2001 | 5839 | 1349 | 842 | 115 | | | | | | | 8146 |
| 2002 | 6006 | 3190 | 2311 | 1640 | 1405 | | | | | 5 | 14558 |
| 2003 | 5381 | 4220 | 3623 | 969 | 1770 | 518 | 24 | 5 | | 43 | 16553 |
| 2004 | 7433 | 4377 | 5024 | 755 | 2356 | 88 | 935 | 408 | | 18 | 21395 |
| 2005* | 4251 | 3034 | 3314 | 620 | 3125 | | 1413 | 958 | 587 | | 17301 |

* data only for the first half of the year

Information sourced from Matsumoto T. 2005. [34]

30 See footnote 14.
31 Lovatelli, 2005.
32 ICCAT Recommendation [02-10].
33 Miyake, 2005. Summary report on international marketing of bluefin tuna. GFCM/ICCAT Working Group on sustainable Tuna Farming/Fattening practices in the Mediterranean held in Rome, 16-18 March 2005.
34 Matsumoto T. 2005. National report of Japan submitted to SAC/ GFCM.

The consulting company Advanced Tuna Ranching Technologies SL (ATRT) [35] has also tried to estimate tuna farming production in the Mediterranean Sea, and the data they provided are used later to try to estimate the amount of bluefin tuna fished to supply the tuna farms.

## 3.4. A nightmare for scientists

One of the difficulties to properly manage the bluefin tuna fishery in the Mediterranean Sea has historically been the lack of quality of data reported by fishing countries, both about their total catches as well as about some basic parameters, such as size composition of the catch, location, gear and fishing effort.

The expansion of tuna ranching has exacerbated these difficulties, as both scientists and ICCAT have recognised on several occasions. According to the ICCAT Scientific Committee "it has been noted that the practice of fish fattening has become increasingly prevalent in the Mediterranean and this practice has probably led to deterioration in the collection of catch statistics". ICCAT notes that "There was general agreement within the Committee that bluefin tuna farming operations in the Mediterranean Sea have significantly affected data collection, especially Task I and Task II (size) statistics, and consequently the quality of stock assessments" [36].

The "unknowns" introduced by tuna ranching activities include: the size composition of the tuna that is introduced in the catches; where and when have they been caught; how many fish die during the transport and transfer operations [37]; or how much fish grow during the farming process. These essentially represent a loophole in the management of the fishery - a loophole that is being exploited by the industry.

## 3.5. An open door for IUU fishing [38]

The number of countries and companies involved in tuna fishing and ranching, the complex web of subsidies and investments, and the extent of trade activities that take place before and after the farming operations make the business of tuna ranching a perfect network to make control virtually impossible under the current management system.

The companies that own the tuna farms usually have their own or affiliated fishing fleets or tug boats. Vessels flagged to different countries may provide fish to the same farm, in a country different to that of the fishing vessels. Re-flagging of fishing vessels is not an uncommon practice. There is a pre-farming trade that involves the country the fishing vessel is flagged to, the country that flags the tug vessel and the country where the tuna farm is placed. A post-farming trade also exists, from the farming country to a third one.

For example, off the coast of Libya French fishing vessels may fish together with vessels re-flagged to Libya, their catches transferred to a Spanish flagged tugboat, which supplies the tuna to ranches in Malta. A complex web exists between the different operators in the industry.

The problem of IUU fishing and its links to the tuna ranching industry is further reviewed in section 4 of this report.

35 The Advanced Tuna Ranching Technologies SL (ATRT) is a farming consulting company based in Spain that releases reports signed by the "Tuna Ranching Intelligence Unit". Its reports are based on data provided by the tuna farming sector and/or from direct observations and have shown a very good knowledge of the industry. As the World Wildlife Fund has commented "WWF considers it as highly credible because of the quality of the evidence furnished and the high level of the analysis developed. WWF has already confirmed from other sources some of the issues contained in the report. The study made by ATRT uncovers a great deal of previously unreported information, it being a unique collection of evidence (hard to gather for anyone from outside the sector) which according to WWF strengthens the repeated demands for urgent action made by the conservation organisation to remedy this scandalous situation".

36 ICCAT Report 2004-2005 (II) - Vol II.

37 There is a certain -and unknown- percentage of fishes that die during purse seining operations. The quantity of dead fishes has not been scientifically estimated. Some countries report only a 1-2% in the meanwhile others refer to a 15% (Lleonart J., Majkowski, J., 2005)

38 Illegal, Unreported and Unregulated fishing.

# 4 Pirate fishing for tuna

The tuna ranching business depends directly on its source of live fish: purse seine fishing [39]. As we will see, growing exports of farmed tuna from the Mediterranean region do not match the catches reported by purse seiners, which are even decreasing in many cases. Illegal purse seining is therefore on the rise and is connected to the tuna ranching business.

Real catches of tuna in the Mediterranean are clearly higher than what is reported to ICCAT. In turn, the quota itself exceeds the level that ICCAT scientists recommended as sustainable. What way is this to manage a fishery?

The tuna ranching industry is very well integrated and organised and is largely responsible for a rate of overexploitation that is plundering one of the most valuable fisheries resources in the Mediterranean region. Organised illegal fishing has a name: it's called pirate fishing.

## 4.1. The tangle of pre-farming trade [40]

All tuna ranching countries in the Mediterranean import bluefin tuna caught by other countries to stock their farms and most countries catching bluefin tuna are also engaged in their transport from the fishing ground to the farming place [41].

Table 5. Information reported to ICCAT about pre-farming trade [42]

| Country of origin → / Country of destination for farming | Algeria | Croatia | Cyprus | France | Greece | Italy | Libya | Malta | Spain | Tunisia | Turkey |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Algeria | | Croatia | | | | | | | | | |
| Croatia | | | | | | | | | | | |
| Cyprus | | | | | | | | | | | |
| France | | Croatia | Cyprus France | | Greece | Italy | | France | France Spain | | |
| Greece | | | | | Greece | | | | | | |
| Italy | | Croatia Italy | | | | Italy | | Italy Malta | Italy | | |
| Libya | | | | | Libya | | Libya | Malta | Libya | | Turkey |
| Malta | | Malta | | | | Malta | | Malta | Malta | | |
| Spain | | Croatia | | | | Italy | | | Spain | | |
| Tunisia | | Croatia | | | | | | | | | Turkey |
| Turkey | | | | | | | | | | | Turkey |

Information sourced from Lleonart and Majkowski, 2005. [41]

39 The amount of bluefin tuna from trap fisheries used for farming is minimal.

40 The pre-farming trade refers to trade activities that happen before the ranching activity starts, and involves the country the fishing vessel is flagged to, the country that flags the tug vessel and the country where the tuna farm is placed. A post-farming trade also exists, from the farming country to a third one.

41 Lleonart J., Majkowski, J., 2005. Summary report on bluefin tuna capture fishing for farming/fattening in the Mediterranean. FAO Fisheries Report No. 779. Rome.

42 Table 5 lists the countries that provided information to ICCAT. Fishing countries must report which countries their fishing vessels "export" tuna towards to be fattened. Farming countries must report which fishing countries they "import" their tuna from. Each cell in the table contains the reporting country.

Unfortunately, Governments in the region are providing contradictory and incomplete information about pre-farming trade operations. This may be understood through the information shown in Table 5. In only four cases has consistent information been provided by both the importing and exporting country. For instance, Cyprus and France both declare that French vessels provide fish to be farmed in Cyprus. But Libya and Tunisia did not declare that they provided fish to Turkish farms, while Turkey declares imports from both countries [43]. Croatia, Cyprus, Greece, Italy and Spain, all report that they farm tuna supplied by French vessels, however France reports sending its catch to only three of those countries for farming [44].

### *Too many countries involved and too little reliable information*

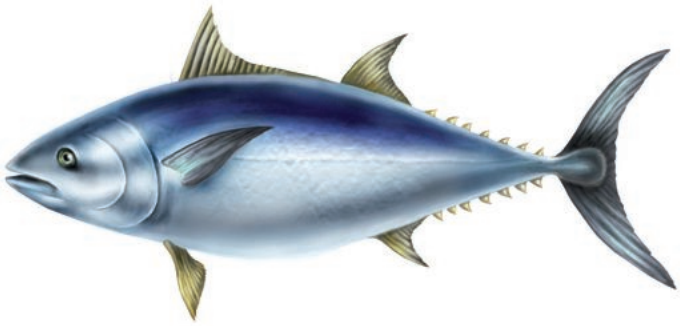
The source and destination of bluefin tuna from fishing ground to farm is becoming increasingly complex. Until five years ago, Spanish farms were supplied with tuna from Spanish and French fleets fishing in the western Mediterranean [45]. Now, Spain is supplied by at least five countries, from as far away as Libya. Similarly, local fishing vessels supplied all the tuna to stock ranches in Turkey and Croatia in the first few years that the industry developed, but they are now supplied with tuna from a range of foreign fleets ,[46,47].

Other tuna ranching countries rely entirely on foreign fishing fleets to stock their farms, for example both Malta and Cyprus report that all their farmed tuna comes from foreign fleets; for Malta it is supplied by Italian and Libyan vessels, and for Cyprus the tuna come from French and Spanish vessels fishing in the eastern Mediterranean.

Until 2001, almost all the production had been exported from the farming country to the market. But in recent years, some countries export the fish through third countries to Japan (i.e. Turkey to Japan through Spain) [48]. Between EU countries, fish movements are not considered as international trade. However, in many occasions the fish moves between EU and non EU countries and these imports are not recorded.

- **Pre-farming trade amongst countries is complex and the information from official sources is inconsistent;**
- **It is not surprising that, more than ever, it has been impossible for scientists to diagnose the state of the fishery.**

43 It must be noted that Turkey does not have a specific fishing quota, being a part of 1100 tones allocated to "other countries" by ICCAT. Nevertheless, Turkey reported 3300 tones in 2003 to the FAO.
44 Lleonart and Majkowski, 2005.
45 Lovatelli, A. 2005.
46 Lovatelli, A. 2005.
47 Tudela and García. 2004. Tuna farming in the Mediterranean: the bluefin tuna stock at stake. WWF Mediterranean Program.
48 Lovatelli, A. 2005.



## 4.2. High technology to find the last tuna

Currently more than 255 purse seiners are able to fish bluefin tuna in the Mediterranean. France, Italy, Croatia and Turkey have more than 20 vessels each [49].

Fast profits coming from the tuna ranching business have brought a lot of money into the fishery: new and bigger fishing boats, storage plants, and even new airports to export the tuna, have been built. The detection of tuna schools is critical for purse seiners to quickly increase their catches. This is why the more efficient Mediterranean tuna fleets are equipped with modern fish detection systems. But this is not all: virtually every single fishing group owns and/or charters small airplanes to find the schools of tuna. During the fishing season, over 50 aircrafts fly over the Mediterranean waters spotting tuna. They do it even in June, when it is not allowed [50].

[49] Lleonart, J and Majkowski, J. 2005. This number is underestimated, as Algeria and Tunisian vessels are not included.

[50] Reported by ATRT and WWF.

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## Table 6. Vessels involved in bluefin tuna fishing in the Mediterranean and fishing operations.

| Country | Number and type of vessels | Home Ports | Search strategy | Areas of operation | Season of operation | Duration of towing operat. |
|---|---|---|---|---|---|---|
| Croatia | 63 purse seiners, not necessarily all active (29 in 2001 and 31 in 2002) | | Cooperation among vessels and visual observations from the vessels | Adriatic Sea | March to October | 3 to 20 days |
| France | 38 purse seiners | Gulf of Lions | Aerial search and cooperation among vessels including Spanish ones | all Mediterranean areas | June to October | 1 to 12 hrs |
| Greece | 1 purse seiner authorized to fish for bluefin; 1 fishing vessel authorized to transport bluefin; 2 tug vessels authorized to transport bluefin | Neapoli, Veion and Pireaus | | | | |
| Italy | 87 purse seines (in 2001 and 2002) | | No aerial search, but cooperation among vessels is possible, but not recorded. | Mediterranean | March to October | |
| Libya | 5 purse seiners | Tripoli | Cooperation among vessels | Libyan waters | Summer | |
| Malta | Vessels used for the transport of bluefin include commercial tug vessels, fishing trawlers and multi-purpose fishing vessels | Valletta | | Ionian Sea | 27th April to 15th July | Usually a few days to about a week |
| Morocco | 200 artisanal boats used for handling (also one trap in the Mediterranean and purse seiners are used) | | | | Handline: June to September Trap: June to October. | |
| Spain | 6 purse seiners (150 GRT, 1200 HP and 38 m in length) | L'Ametlla de Mar (Tarragona) | Aerial search and cooperation among vessels | Levante area of Spain (Balearic Island, Murcia and Tarragona): 37º-42º N/ Coast 0.4º E | April to October | Up to 20 days |
| Turkey | Over 100 purse seiners (28 in 2002 and 50 in 2003 which are over 32 meters) | Istanbul, Izmir, Trabzon, Bandýrma and Canakkale | Fish finder, sonar, bird radar and cooperation among vessels | Mediterranean including the Aegean Sea | Mediterranean: 1 May to 15 July Aegean Sea: 16 Aug. to 1 May | 3 days to 3 weeks |

Information sourced from Lleonart J. and Majkowski, J. 2005. [51]

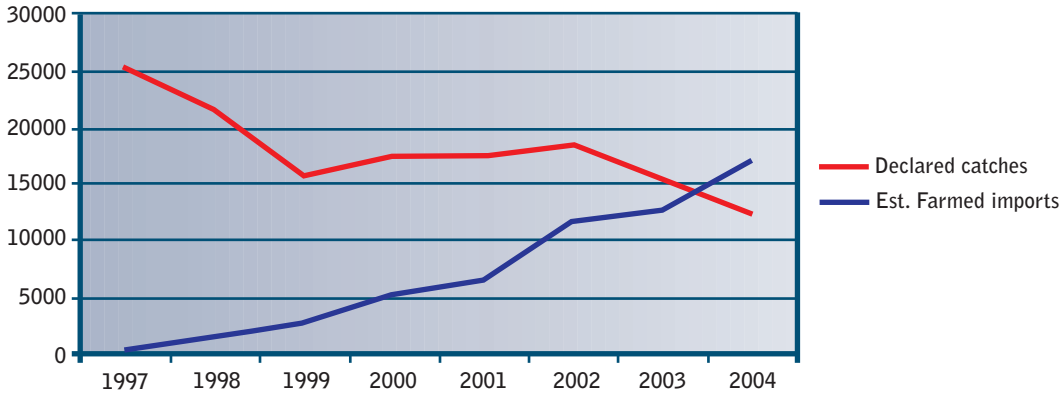
51 Lleonart J. and Majkowski, J. 2005. Summary report on bluefin tuna capture fishing for farming/fattening in the Mediterranean. FAO Fisheries Report No. 779. Rome.

## 4.3. Figures do not match

Dr. P. Miyake has done laudable research on tuna trade [52]. His studies are based on different sources, including imports recorded by the Japanese custom services and imports of farmed tuna recorded through the Bluefin Tuna Statistical Documents (BTSD). His calculations are made using some standardized conversion factors and are an attempt to calculate the quantity of fish really caught for farming [53].

It is interesting to compare what purse seining fishing countries declare to have caught with the estimated tuna that entered to the farms and has been exported to Japan. In Graph 1 it is clear that trends do not match at all.

### Graph 1: Contradictory trends in bluefin tuna catches and ranching




Elaborated from ICCAT and Miyake, 2005 [52]

**While exports of farmed tuna to Japan -and therefore inputs for tuna farming- grow, declared purse seine catches decrease. There is only one way to explain that: unreported -and overall illegal- catches are increasing.**

As scientists have stated, under-reporting has been a matter of concern since 1998. Unreported catches come mainly from the Mediterranean and not from the East Atlantic, since the Mediterranean is where most purse seine catches are from, and this gear seems to be the main responsible for misreporting.

## 4.4. Misreporting catches

Some of the main purse seine fishing countries including Italy, France, Turkey and Tunisia reported a lower catch in 2002 or 2003 than in 1997, although their fleets have industrialized or developed since then. Libya did not submit data to ICCAT at all from 2002-2004.

France, Italy and Turkey, have traditionally been the main purse seine countries, and all three are reporting lower catches than in the past. They are followed by Tunisia and Spain, and while Spain has reported an increasing catch, Tunisia has reported a decrease. Additionally, Libya is a fishing country, however for a number of years it has not reported any catch to ICCAT.

In view of their decreasing catch reporting, and taking into account the size and evolution of their fleets in recent years, it seems clear that France, Italy, Turkey, Tunisia and Libya may be the main countries responsible for under-reporting the catch of bluefin tuna.

52 Miyake, P. 2005.

53 The amount of tuna that enters a tuna farm, in weigh, is different that the amount of tuna that is taken out, as the tuna has been fed for several months, and this fact poses some difficulties in terms of control. It is accepted that there is a 25 per cent hypothetical increase in meat weight during the farming (less mortality loss).

In many cases, Mediterranean purse seine fleets have been developed in parallel to the growing farming capacity. Table 7 shows the development of purse seine fishing fleets, at the same time that scientists have been expressing their concerns over the recognised excessive fishing pressure over the bluefin tuna population. Increasing fishing capacity and technology have exacerbated the problems faced by the species.

## Table 7. Evolution of main purse seine fleets targeting bluefin tuna in the Mediterranean

| | |
|---|---|
| **Algeria** | In 2001, an investment company focused on business opportunities in fisheries, Union-Pêche, announced the launching of a project to build an entire purse seining fleet (20 vessels) aimed at tuna fishing for farms, worth 20 million $. This in spite of a modest quota (1500 t) allocated to Algeria by ICCAT only since 2003. According to Algerian ICCAT delegation, 19 purse seiners (4 of which are specialized) were already operative in 2003. |
| **Croatia** | The number of active purse seiners fishing for bluefin tuna increased from 19 in 1999 to 31 in 2002. Captures are based on immature animals, with the average mean size strongly decreasing in the last few years (from 24,2 kg in 1999 to only 8,2 kg in 2002). Croatia stocks most of its fattening cages with small tuna specimens ranging on average between 8-35kg/fish. |
| **Cyprus** | In 2003, 33 multi-purpose vessels were licensed for fishing operations, among which 14 vessels reported bluefin catches. |
| **France** | France is currently the most important supplier of live tuna to Mediterranean farms (especially, the Spanish ones). With a local industrialised fleet of 40 purse seiners based in the Gulf of Lions. In the last years French purse seines have extended their operations to the South of Malta as well as to the waters off Libya and Cyprus. According to ATRT, French vessels have re-flagged to Libyan flag. |
| **Greece** | The Ministry of Agriculture of Greece reported that in the context of advanced plans to initiate tuna farming activities in the country, authorizations will be issued to national vessels to capture and transport bluefin tuna. |
| **Italy** | A total 72 purse seiners are licensed to catch BFT in the Mediterranean. According to official statistics, 86% of their catches were devoted to farming in 2002. Italian quota is distributed among vessels. The catch capacity of many vessels is much higher than its quota. |
| **Libya** | In 2003, an industrial fishing vessel flying the French flag, with a fishing capacity of some thousand tones per year, was operating in Libyan waters in the context of a charter agreement between the EU and Libya. Catches by this vessel were supposed to be counted against the quota allocated by ICCAT to Libya, which amounted to only 1286 t (less than half the total fishing capacity of this vessel alone). |
| **Spain** | Spain has 6 modern purse seiners based in the Mediterranean, which captured a total 1453 t of tuna in 2001. 70% in weight of this catch was destined to farming. |
| **Tunisia** | In 2003, 53 tuna purse seiners engaged in tuna fishing along the Tunisian coast. This fleet is responsible for 96% of total tuna catch. In recent years most Tunisian catches were towed to tuna farms in Spain. Since 2003 Tunisian farms are active. |
| **Turkey** | Fishing effort doubled in just one year, from 28 purse seine units targeting tuna in 2002 to 50 in 2003. Bluefin tuna catch in 2002 amounted to 2300 t, 1400 of which were transferred to farms. It is important to stress here that Turkey is a contracting party to ICCAT only since August 2003 and that there is no quota for bluefin tuna allocated from ICCAT to this country for the whole period 2003-2006. |
| | Elaborated from WWF and ICCAT sources. |

## 4.5. Reefers laundering bluefin tuna catches?

Most of the bluefin tuna caught and farmed in the Mediterranean Sea is frozen and shipped onboard refrigerated cargo vessels or reefers. Weeks or months later, these reefers unload their cargo to be sold in Japan or other countries.

Tug boats are employed to transport the tuna from the fishing ground to the ranching cages. It can take several days for the tugboats to arrive to the fishing area so tunas may be kept inside the purse seine net for hours or days until the tugboat arrives. During these transfer operations from the purse seine net to the final fattening cages, a certain -and unknown- quantity of tunas die. It's suspected that these dead tuna that can not be used for ranching are transferred to reefers and exported, possibly without being reported. All of this happens on the open sea, without observers onboard.

The ATRT report raises doubts about the activity of these vessels and even suggests that trading companies are looking for ways to launder illegal catches through third countries: "most of the IUU bluefin tuna caught in the Mediterranean, enters Japan via inspection-friendly fast-growing Chinese and Southeast Asian countries where tuna meat is processed, packed and shipped under a different denomination product such as ready-to-consume frozen sashimi tuna" [54].

The activity of reefers is a matter of concern in many fisheries and one of the main ways in which illegal catches are laundered worldwide. These problems are not new to ICCAT. In 2004 the government of Japan presented information to ICCAT about two reefers [55] engaged in tuna laundering activities. The data presented by the Japanese Government suggests that up to 18,000 tonnes of pirate-caught bigeye tuna in the Atlantic may have been laundered in this way in 2003 and were not reported anywhere. This would be up to 21% of the 85,000 tonnes declared catch of bigeye tuna in the Atlantic Ocean in 2003. There is no reason to believe that the activity of reefers engaged in the transport of bluefin tuna caught in the Mediterranean Sea does not pose the same problems in terms of control of fishing activities. Japan advises that parties should "work together to ensure compliance to the catch limits and other conservation and management measures. Especially, to eliminate laundering activities through at sea transhipment, ICCAT should establish measures to monitor and properly regulate transhipment" [56].

## 4.6. What may be the real figures?

The real amount of tuna ranched in the Mediterranean is an almost impossible question to answer, as is the real amount of tuna caught to provide live tuna for the ranches. Both industry and Governments are failing to fulfil their obligations to provide accurate statistical data to ICCAT, which is resulting in widespread under-reporting of catches in the region. This lack of effective controls in the region together with illegal practices such as re-export of Mediterranean bluefin tuna through third countries are resulting in catch levels above those reported, and very clearly much higher than the amount of tuna that can be legally caught. Illegal and unreported fishing in the Mediterranean region is rampant.

54 Advanced Tuna Ranching Technologies. 2005. The tuna ranching intelligence unit. Special November 2005/ICCAT Sevilla Spain meeting edition.

55 The "Lung Yuin" and the "Suruga No1" were accused by Japan accused to "launder" pirate-caught tuna. These two vessels had received tuna from some 50 longliners in the Atlantic and were inspected in the port of Shimizu (Japan). The Lung Yuin was transporting tuna caught by 25 Taiwanese longliners and 3 Vanuatu longliners. It turned out that all 28 vessels had submitted false information to the Japanese authorities: false names, wrong fishing areas, and other incorrect information. In the case of the Suruga No1, it was also proved that the bigeye tuna it was transporting, reported as having been caught in the Indian Ocean had in reality been caught in the Atlantic. Japan informed that these were not isolated activities but a widespread phenomenon.

56 ICCAT Annual Report 2004-2005. Volume I.

ICCAT is well aware of these problems: "The reported catch for 2004 is 26,961 t, but it is incomplete and substantial revisions are expected. A substantial amount of additional unreported catch that was not in accordance with the Commission's recommended allocation scheme has previously been recorded through the Bluefin Tuna Statistical Document program. Unfortunately, the Committee is no longer confident that this system provides an adequate basis for estimating total unreported catch levels since the markets for "sashimi" have expanded beyond that of Japan and since not all countries are reporting to the program". [57]

It is impossible to provide accurate figures for almost every aspect of the eastern bluefin tuna fishery. In table 8 we summarise some of the information that will then be used to estimate real catches in the region.

**Table 8. Bluefin tuna input into the Mediterranean ranches and catches by some selected fleets and areas**

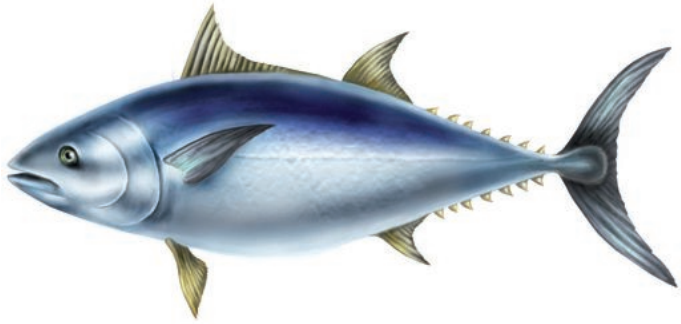
| Year | Estimated BFT input to ranches | Declared PS catches BFT-E[2] | Declared PS catches non-Mediterranean[3] | Total declared BFT-E[4] |
|---|---|---|---|---|
| 2002 | 11500 | 18340 | 883 | 33111 |
| 2003 | 25400 | 15260 | 2266 | 29791 |
| 2004 | 25130 | 1227 | 1510 | 26961 |
| 2005[5] | 28450 | - | - | - |

[1] Estimated input into Mediterranean tuna ranches. ATRT, 2005.
[2] Declared purse seine (PS) catches of the east bluefin tuna stock according to ICCAT. 2005. Most of these catches are taken to the tuna cages for ranches purposes.
[3] Declared PS catches in the BFT-E, excluding Mediterranean. ICCAT. 2005. These catches are not used for ranching.
[4] Total declared catches of east bluefin tuna. ICCAT. 2005. Includes not only PS but also other gears.
[5] Most of these data are not available yet for 2005.

Elaborated from ATRT and ICCAT sources.

An estimation of the real catch levels can be obtained by using the estimated input of bluefin tuna to the ranches according to the information elaborated by ATRT, and an estimate of the amount of tuna that is not used for ranching purposes, such as tuna caught by other gears or tuna caught by purse seiners in the Atlantic Ocean (See Table 9).

[57] ICCAT Report 2004-2005 (II) - Vol II.



| Table 9. Estimated "real" bluefin tuna catches in 2004 and 2005 | | |
|---|---|---|
| | 2004 | 2005 |
| Estimated BFT input to the tuna farms[1] | 25130 | 28450 |
| Declared PS catches non-Mediterranean[2] | 1,510 | 1,510[4] |
| Catch Non PS[3] | 14,683 | 14,683[5] |
| TOTAL | 41,323 | 44,643 |

[1, 2] See table 8.

[3] Catches other than PS catches: Total declared BFT-E catches less total declared PS catches.

[4] As no data is available yet, 2004 levels are used.

[5] As no data is available yet, 2004 levels are used.

Elaborated from ATRT, ICCAT and Lovatelli, 2005.

Based on ICCAT and ATRT data, we come to the conclusion that over 40,000 t of bluefin tuna have been caught in the Mediterranean in 2004 and 2005. In 2005 fleets operating in the region may have fished more than 12,000 tonnes (37.5%) over the legal limit and exceed by 18,000 tonnes (69%) the scientifically recommended maximum catch level.

This high level of piracy in the region is threatening the tuna fishing population and has to be eliminated if the northern bluefin tuna stock is to have any chance of recovery.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# 5 Other environmental threats of tuna farming

## 5.1. Feeding tuna in the farms.

The tuna ranching period extends for approximately 6-7 months in most cases, and in some cases, like Croatia, even more. During this period, tuna are usually fed 6 days a week. The very high amount of fish needed to feed the tuna is itself a matter of concern. The WWF Mediterranean Programme has estimated that in 2004 alone, 225,000 tonnes of bait were thrown to the Mediterranean Sea to feed caged tuna, most of it coming from western Africa, the North Atlantic and America [58].

This large quantity of fish required to feed the tunas for long periods poses a number of environmental risks, namely:

### Introduction of diseases

A large percentage of the species used as bait are imported from outside the region. The bait is not processed and therefore is a potential source of diseases to local fish populations. In some cases, tuna are fed almost exclusively on imported fish, for example Turkey imports over 95 percent of the fish used as feed in tuna farms. The imported fish originates from many different regions, including Africa, North and South America, and Northern Europe, [59,60]. WWF own sources indicate that round sardinella (Sardinella Aurita) used as bait has been primarily originated in West African fishing grounds. In the case of Spanish farms, contracts between tuna ranchers and local fishermen to provide small fish for feed were broken in favour of cheaper fish from other countries when oversupply of the Japanese tuna market reduced profits.

A recent report by the WWF Mediterranean Programme [61] highlighted the risk of introducing diseases to local fish populations, as occurred in tuna fattening activities in Australia in the past [62]. This could greatly affect local fishermen, putting at risk important local fish stocks such as anchovy and sardine. From a precautionary point of view, this risk is unacceptable. Despite this recognised risk, in the Mediterranean Sea no specific measures to avoid such risks have been taken [63].

### The use of local small pelagic fish

Not only imported fish are being used to feed tuna, but some countries report the use of pelagic species (e.g. sardines) from local fisheries. In the case of Spain, tuna farmers reached agreement to purchase small fish as feed from local fishermen's associations that had been opposing their farming operations [64]. Libyan tuna ranches rely mainly on locally sourced fish to feed the tuna, with only 30% being imported .

58 Tudela, S. 2005. Risk on local fish populations and ecosystems posed by the use of imported feed fish by the tuna farming industry in the Mediterranean. WWF Mediterranean Program.

59 Lovatelli, A. 2005

60 Oray, I.K. and Karakulak, F.S. 2003.

61 Tudela, S. 2005.

62 In 1995 and 1998-1999 the Australian population of pilchard (Sardinops sagax), was affected by two mass mortality episodes. The agent responsible was found to be a previously unknown herpesvirus (PHV), thought to be exotic to Australian sardines. There is a consensus that points to the introduction of thousands of tonnes of imported, untreated bait in the marine environment by the tuna farming industry as the most likely origin of the PHV in Australian waters.

63 It is interesting to note that Denmark has banned the use of trash fish (including whole baitfish) in marine aquaculture. Australia -a world's leading farmed tuna producer- has established standards and restrictions - including interim importation prohibitions- to prevent infectious diseases from imported fish, although the effectiveness of such measures are a matter of discussion.

64 Tudela, S. and García, R. 2004.

farmers reached agreement to purchase small fish as feed from local fishermen's associations that had been opposing their farming operations . Libyan tuna ranches rely mainly on locally sourced fish to feed the tuna, with only 30% being imported [65].

Several problems are associated with this activity. First, it is possible that catches destined for the ranches do not go through the local markets - and are therefore undeclared- posing difficulties for the management of these local fisheries. Annual consumption figures of 4,500 tonnes of anchovy have been reported in the case of a single tuna ranch in Croatia. These catches were taken from the Adriatic Sea, where the local anchovy stock is already under tremendous pressure, and is currently in a state of recovery after experiencing a collapse [66]. In other cases, concerns have been raised by cetacean specialists that this demand for small fish is leading to the harvest of species that were not commercially fished before. This is the case of round sardinella (Sardinella aurita) in the Alboran Sea, where increasing fishing for this species may put at risk one of the healthiest common dolphin (Delphinus delphis) populations in the Mediterranean[67].

### More pressure on the coastal area

Usually tuna ranching cages are located close to shore. This way, they come into conflict with activities such as navigation, artisanal fishing and tourism. Throughout the Mediterranean region, tuna ranchers and purse-seiners are finding themselves in conflict with small scale and traditional fishermen, coastal communities, tourism operators and conservation groups due to the expansion and impacts of their industries [68].

The Malta, tourism operators have complained about increasing tuna ranching activities around the coast, arguing that pollution originated from these facilities is having a negative impact on their business. In Spain, local fishermen have blamed their dwindling catches on the pollution from tuna farms and the presence of the tuna themselves, being large predators, scaring small pelagic shoals.[69]

In the farms, the emphasis on maximising production results in high levels of waste, as tuna farming is a very inefficient activity in terms of food production (up to 25 kg of bait, made of fish, may be required to produce just one kg of tuna) [70]. This large polluting potential provides a threat to the adjacent ecosystems, which in some cases are sensitive habitats such as seagrass meadows.

## 5.2. The privatisation of a common resource

Dr. S. Tudela has clearly identified the implications of tuna farming in terms of privatisation of a common resource and unfair competition amongst fleets.

65 Lovatelli, A. 2005.
66 Santojanni et al, 2003. "Trends of anchovy (Engraulis encrasicolus, L.) biomass in the northern and central Adriatic Sea". Sci. Mar., 67 (3): 327-340.
67 Sociedad Española de Cetáceos. 2005. Alarmante regresión del delfín común en Andalucía oriental.
68 Tudela, S. and García, R. 2004.
69 Tudela, S. and García, R. 2004.
70 Lovatelli, A. 2005.

"We are witnessing, de facto, a whirl wind privatisation of resource use, and, as a result, of the benefits obtained. This has led most of the benefits to get concentrated in the hands of the tuna fattening units and the associated large-scale tuna seiners. The live tuna required by the fattening units can only be supplied by the seiners, which means that this gear is monopolizing the fishery. This is to the detriment of the other traditional fleets, such as longliners and other hook-and-line techniques. These could not dream of competing for the resource against technologically advanced industrial fleets, with large catching capacities, capable of searching large areas of the sea with acoustic and aerial surveillance methods" [71].

The owners of the tuna ranches are becoming the owners of the Mediterranean bluefin tuna. A new economic power, in most cases of local origin allied with Japanese companies, has burst forcefully onto the social and economic scene in the Mediterranean.

The model is clear: appropriation of a common property resource (tuna) and the use of the public marine domain by a few businessmen who are a powerful lobby to the public administration. This is resulting in the tuna population being exploited well beyond its limits in order to maximize short-term profits.

The victims (apart from the bluefin tuna population) will be the traditional fleets fishing for tuna in the region, which are technologically less advanced, and incapable of supplying live tuna for the fattening units. A clear case of social injustice in the use of a common property natural resource.

# 6 The economics of bluefin tuna depletion

Tuna ranching is a highly profitable industry, a fact that explains the huge amount of money invested in the Mediterranean region for its development. These investments have usually taken place in the form of joint ventures between local entrepreneurs and foreign investors, mainly from Japan, but also from Australia.

However, not only is tuna farming a very profitable activity but it is well known that it has received large public subsidies. Unfortunately, for most countries in the region it is very difficult to get information about this financial support. This information gap includes the level of subsidies granted by the European Union, as well as those granted by its Member States individually.

As the consultancy company Advanced Tuna-Ranching Technologies SL. (ATRT) puts it, "European Union subsidies ($34 million since 1997) coupled with Japanese and Australian heavy investments in different Mediterranean countries have encouraged greater bluefin tuna catches ... leading to the virtual commercial extinction of the Northern Blue Fin tuna in the Mediterranean". [72]

Clearly enough, the expansion of tuna ranching is not only the result of investments by local self-made businessmen. In the case of the EU, large European public aids have contributed to both the uncontrolled development of these farming activities as well as the increase in the capacity of the fleets that supply them with wild fish.

## 6.1. The EU subsidising IUU fishing

Not much information exist about public aids granted to the tuna farming sector, which include both aids to the modernisation of the purse seine fleet and aids to the development of aquaculture that have been allocated to tuna ranching. An estimate of the total amount of public funding that has contributed to the spectacular growth of the tuna farming

71 Tudela, S.Grab, cage, fatten, sell. Samudra, July 2002.

72 Advanced Tuna Ranching Technologies. 2005.

industry during the last few years carried out by WWF results in **at least 19-20 million euros of public funds having been allocated to the different stages of the whole fish-and-farming productive cycle.**[73]

### Aid allocated to fleet renewal

Despite the well known situation of overexploitation of the eastern bluefin tuna population that we have described in previous sections, the Mediterranean EU purse seine fleet fishing for tuna has been modernized with the support of EU subsidies during the last years.

The powerful French purse seine fleet (composed by 40 high-tech vessels) has been renewed 85% during the last 10 years [73]. The Spanish purse seine fleet, comprising six vessels, has been completely renewed with subsidies in recent years. Between 2000 and 2002 five of these vessels have been fully renewed, increasing gross tonnage (GT) and horse power (HP) [74] by a factor of two or three compared to the old vessels they replaced [75] . The Italian case is more difficult to assess as public information regarding this topic is largely unavailable. However, taking into account that Italy received the third highest allocation of EU funds to fleet modernisation and that in the period 2000-2001 this segment of the fleet increased its total GT by 22.88 % and its total HP by 19.70%.it is reasonable to think that part of that public money has reached the tuna purse seine sector [76].

### Aid allocated to development of aquaculture

Through European Union financial aid for the fisheries sector, tuna farming companies have received funds generally allocated to the aquaculture sector, including to the modernization of the aquaculture sector, building of processing and storage capacity, purchase of auxiliary vessels and research.

## 6.2. Japanese investments

While the Japanese Government has been one of the strongest advocates of measures to fight illegal, unreported and unregulated fishing in the meetings and working groups of ICCAT, Japanese private companies have been one of the major financial investors behind the expansion of the bluefin tuna industry in the Mediterranean Sea.

Japan has a role to play in virtually anything that has to do with tuna worldwide. It's by far the largest tuna market in the world, and its importance is even bigger when it comes to the most appreciated tuna species, such as bluefin tuna. Major Japanese companies are involved in the Mediterranean tuna fattening business, either directly or through subsidiaries.

73 Tudela, S. and García, R. 2004.

74 The Gross Tonnage (GT) and Horse Power (HP) are measures of the capacity of a fishing vessel, and generally the higher these magnitudes are, the more fish it will be able to catch.

75 The vessel Leonardo Brull II is an illustrative example. This 241 GT and 1.320 HP purse seiner has received 705,728 of European Union financial aid for its construction (total cost of over 2 million) replacing the former Leonardo Brull, which had less than half the tonnage and horsepower.

76 Tudela, S. and García, R. 2004.

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In fact, the active cooperation of Japanese importers with local operators is fundamental to the tuna ranching business. As the ATRT states "two tuna trading giants are reckoned to control over sixty percent of all tuna imports into Japan". Along with three other tuna Sogo Soshas [77] (Sojitz, Itochu and Mitsui) they are the Mitsubishi Corporation and the Maruha Group.

The role of these companies is in fact well known to managers. At the ICCAT meeting held in November 2003, it was noted that the rapid development of blue fin tuna ranching operations by non-ICCAT members in the Mediterranean Sea was supported by the active cooperation between Japanese importers and local operators. On March 8, 2004, a letter was sent by the ICCAT Chairman to the Japanese Foreign Minister Yoriko Kawaguchi, requesting Japan to take appropriate measures not to encourage the expansion of bluefin tuna ranching operations in ICCAT non-member countries (Israel, Egypt and other countries).

# 7 Recommendations

It is clear that without immediate action, the future of the bluefin tuna is in jeopardy in the Mediterranean Sea. Key to restoring the population are protecting key sites where tuna congregate to breed and to feed, improving management of the fishery over the whole Mediterranean, and closing the "loophole" of tuna ranching.

## 7.1. Marine Reserves

Marine reserves are a tool for conservation of the marine environment and species, which are firmly rooted in the concepts of sustainability and precaution. Marine reserves are areas of the sea that are fully protected from damaging human activities - like national parks in the sea.

Marine reserves are by definition closed to fisheries but the establishment of a network of marine reserves can benefit fisheries in a number of ways. Marine reserves enable exploited populations to recover and habitats modified by fishing to regenerate. As unexploited areas, marine reserves act as valuable reference areas that can be used to help understand the effects of fishing outside and inform management decisions, so underpinning the ecosystem approach to marine management.

Although migratory species do not spend all their time in any one area, they can be protected by marine reserves at critical sites such as breeding grounds, much as we create protected areas in estuaries and wetlands to protect the breeding habitat and food source of migratory birds. Large-scale marine reserves are needed to protect the tuna in their breeding grounds like the Balearic Islands and give these great fish a chance to recover.

## 7.2. Precautionary management

Mismanagement is rife in the bluefin tuna fishery in the Mediterranean. Countries are not complying with their international obligations, and not even basic data is available to be able to assess the state of the stock. Misreporting and under-reporting are widespread in the region. Governments in the region have not only allowed the increase of fishing effort on an overexploited species, but have greatly contributed to it. At present, the tuna fishing industry in the Mediterranean is digging a grave, not only for the bluefin tuna, but also for the many fishermen who depend upon it.
Governments party to the International Commission for the Conservation of Atlantic Tunas must establish mandatory rules and comply with the existing ones, particularly in relation with their reporting requirements.

77 Trading companies

Urgent measures to be approved by ICCAT include:

- a substantial reduction in the bluefin tuna quota as part of a long term tuna rebuilding program set on a precautionary basis;
- a new minimum landing size that matches the sexual maturity of the species;
- an expansion of the closure of the fishery to guarantee a strong, immediate and enforceable decrease in the fishing effort on the population;
- an independent observers scheme both on board tuna fishing vessels and in the farms to record and report the catch. This is vital to ensure that under-sized fish are not caught and the quota is not exceeded, and that the information needed to sustainably manage the fishery is available. The Mediterranean tuna fishing industry has clearly demonstrated that without independent management they do not follow the rules or report the true nature and extent of their catches;
- submission of accurate fishing and farming information to ICCAT on a regular basis, and public access to that information;

Finally, the expansion of tuna ranching must be stopped until the northern bluefin tuna population recovers, and the fishery is properly managed. At present, tuna ranching provides a barely regulated loophole that is exploited by those within the industry who value short-term gain over the survival of the tuna population and the future of the fishery.

Unless these steps are taken, time is running out for the northern bluefin tuna in the Mediterranean.

With a network of large-scale marine reserves protecting their breeding and feeding grounds, and a well-managed fishery in the Mediterranean, both the bluefin tuna and the many fishermen who depend upon them will have a future.

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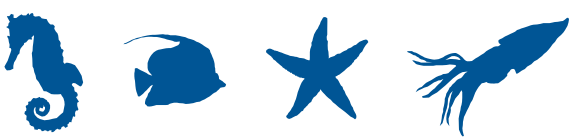


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# Where have all the tuna gone?

## How tuna ranching and pirate fishing are wiping out bluefin tuna in the Mediterranean Sea

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