

RECONSTRUCTION OF SYRIA'S FISHERIES CATCHES FROM 1950–2010: SIGNS OF OVEREXPLOITATION

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Background. The global community infers trends in fisheries through the catch data assembled by the Food and Agriculture Organization of the United Nations (FAO) from its member countries. Thus, inferences depend on the quality of the member country data, and hence their national data collection systems. Syria's national catch data are assembled from market assessments (market sales) from a subset of fish markets, therefore exclude non-commercial landings and direct sales that by-pass markets. Furthermore, discards are also not accounted for. Our goal was to provide comprehensive estimates of Syrian marine catches for 1950–2010 by fishing sectors plus major discards, using a catch reconstruction approach.

Materials and methods. Catches were estimated from 1950–2010, by industrial (large-scale commercial), artisanal (small-scale commercial), recreational (small-scale non-commercial), and subsistence (small-scale non-commercial) sectors, plus major discards. We reviewed published literature, grey literature, and unpublished data from local experts to obtain a first comprehensive estimate of total Syrian catches (landings + discards).

Results. The reconstructed catch for 1950–2010 (including reported data) is nearly 170 000 t, which is 78% more than Syria reports to the FAO. By 2010, reconstructed catch was over 2 times the reported data. The reconstruction added 74 000 t of unreported catches, consisting of 38 600 t of artisanal-, 16 000 t of industrial-, 4000 t of recreational-, and 3000 t of subsistence catches, plus around 12 000 t of discards. Syrian fisheries are dominated by the artisanal sector (67% of total catch, including discards), while industrial, recreational and subsistence catches account for 29%, 3%, and 2%, respectively. Discards accounted for 7% of total catch.

Conclusion. Our reconstructed catch estimates for Syria provide a comprehensive account of total removals by Syria for 1950–2010. This study also supports other observations that the state of the fisheries is declining due to overexploitation, as suggested by the observed increase in fishing effort, declining CPUE and the amount of juvenile fish in catches. More effective management measures are needed to ensure Syrians can benefit more from their local fisheries.

Keywords: Eastern Mediterranean, fisheries statistics, industrial fisheries, artisanal fisheries, subsistence fisheries, recreational fisheries, unreported catches, discards

INTRODUCTION

Fisheries have been providing coastal populations with nutritional resources for millennia; however, with the onset of industrialization in the last century, these resources have increasingly been exploited faster than they can regenerate (Pauly et al. 2002). Global fish catches increased throughout the 1960s and 1970s, mostly due to increased sophistication of fishing vessels and gears, and global spatial expansion (Swartz et al. 2010), peaked around 1990 (Watson and Pauly 2001), and thereafter were thought to 'stabilize' (Anonymous

2010). It is important for countries to understand the history of their fisheries resource exploitation, to provide a baseline for understanding the future potential of these resources.

The Syrian Arab Republic, here referred to as 'Syria', became a charter member of the United Nations in 1945 and achieved independence from France in 1946. Syria's population, which was 3.5 million in 1950, increased to 21 million by 2010,** the majority of which lives in a narrow strip of land between the Mediterranean Sea and the coastal mountain range.

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** www.indexmundi.com/syria/population.html.

Syria borders the Levantine Basin of the eastern Mediterranean Sea, which extends from southern Turkey to Egypt (Fig. 1). The continental shelf is narrow (1–10 nautical miles wide) and measures approximately 960 km², while Syria's Exclusive Economic Zone (EEZ) measures approximately* 10 000 km².



Fig. 1. The Exclusive Economic Zone (EEZ) and shelf area (to 200 m depth) of Syria

Fisheries catches in the eastern Mediterranean are much lower than the western Mediterranean due to lower nutrient availability and the absence of a mixing mechanism such as upwelling. The Nile River had traditionally been the main source of nutrient input into the eastern Mediterranean, but since the construction, in 1970, of the Aswan Dam in Egypt, only a fraction of the previous nutrient-rich discharge reaches the Mediterranean. Hence, pelagic catches in Syria were noticeably reduced from the late 1960s onwards due to the Aswan Dam completion (Anonymous 2004).

The productivity of Syrian marine waters is low in comparison to neighbouring Turkish and Lebanese waters (Kelleher 1996, Saad 1996, Jony and Rees 2005). Some evidence of overexploitation exists in the form of the high proportion of juvenile fish in fisheries landings, thus likely suggesting both growth and recruitment overfishing (Ricker 1975, Pauly 1984).

Seafood consumption is low in the country, estimated to be approximately 1 kg·person⁻¹·year⁻¹ (Kelleher 1996). This low rate is attributable to the scarcity of the resource, combined with high fish prices, as luxury hotels and the affluent portion of the population drive up prices.

Some Mediterranean countries such as Syria, Turkey (Ulman et al. 2013), and Israel (Cacaud 2005) have not ratified the United Nations Convention on the Law of the

Sea (UNCLOS). Although Syria has not signed UNCLOS, they have declared an Exclusive Economic Zone (EEZ), via customary international law (Anonymous 2009, Anonymous 2011).

The Food and Agriculture Organization of the United Nations (FAO) reports marine fishery landings** supplied to them by each member country in the form of time-series data from 1950 to the present, which are used to derive and report on global trends and patterns (Anonymous 2010, 2014). However, the data provided to FAO are not inclusive of all fishery removals, as they do not, or only partially, account for small-scale commercial and non-commercial catches in many countries (Zeller et al. 2011a, 2011b, 2015, Abudaya et al. 2013). The objective of this study is to provide a comprehensive estimate of total Syrian marine wild capture fishery removals through a catch reconstruction approach (Zeller et al. 2007).

Syria's fisheries. The data reported by FAO on behalf of Syria consist of annual marine landings averaging about 750 t·year⁻¹ in the 1950s, increasing to 1500 t in 1987, followed by an increase to almost 3700 t in 2005. The last part of this increase was due to the introduction of two dozen new large trawlers in 1994 (in addition to already active smaller trawlers), which found new grounds to exploit (i.e., spatial expansion; Swartz et al. 2010), and not due to healthier fish biomass (Saad 1996). The presently reported study examines total catches, which are defined as landings (i.e., retained catch) plus discards.

For the present study, Syria's fisheries were divided into four fisheries sectors:

- Industrial (large-scale commercial);
- Artisanal (small-scale commercial);
- Subsistence (small-scale non-commercial, principally to feed oneself or one's family); and
- Recreational (principally fishing for leisure or for sport).

The only vessels assigned to the industrial sector are bottom trawlers, which range from 10 to 27 m in length (Margetts 1968, Saad 1996, 2010). The majority of fishing vessels belong to the artisanal sector, which also includes approximately 14 small purse seiners which have been in operation since the 1950s. The subsistence and recreational sectors are thought to be small in Syria, with low catches and catch rates.

In line with the global approaches of the *Sea Around Us****, we define 'industrial' as 'large-scale, commercial' fisheries. Generally we accept each country's definition of industrial or large-scale. If a country does not have such a definition, we utilise a regionally equivalent definition. However, the general definition relates to larger vessels that are capital intensive in terms of acquisition, maintenance and operating costs. Furthermore, we define as 'industrial' all vessels whose gears are dragged or actively moved across the seafloor or through the water column using engine power, irrespective of vessel size. Thus, all trawl gears are industrial by nature, in line with Martin (2012).

* www.seaaroundus.org/data/#/eez/760.

** www.fao.org/fishery/statistics/en.

*** www.seaaroundus.org.

The annual Catch Per Unit of Effort (CPUE), in $t \cdot \text{boat}^{-1} \cdot \text{fishing day}^{-1}$, declined steadily beginning in the mid-1980s, with another substantial decrease in 1995 (Kelleher 1996). The second decline in CPUE was likely due to the addition of about two dozen trawlers to the industrial fleet. From 1986 to 1998, the steady increase in fishing effort allowed catch levels to appear stable (Kelleher 1996). The government of Syria viewed the decline in CPUE to be reflective of overfishing and imposed management measures such as the restriction of fleet capacity to protect Syrian marine resources from further degradation (Marttin et al. 2006).

Unfortunately, taxonomic clarity in collected data has never been a priority, making species- and stock-specific trends difficult to interpret. Most of the continental shelf area of Syria is rocky with a steep slope, leaving less than a quarter of the shelf suitable for trawling, thus restricting the space available for fishing. Therefore, the small area suitable for trawling (an area of approximately 30 km² off Latakia-Jeble) has been fished repeatedly over the last few decades, and has long been considered over-exploited.

Industrial fisheries. Bottom trawlers have been banned since 1966 from operating in coastal waters (e.g., within 12 nautical miles) in summer months for conservation purposes (Margetts 1968), but this was not deemed sufficient to protect the spawning seasons of the main targeted demersal taxa such as red mullet (*Mullus barbatus*), flat-head grey mullet (*Mugil cephalus*) and seabream (Sparidae), most of which spawn later in the year.

Three new state-owned, 100 t steel trawlers were added to the fishing fleet in 1977 by the General Establishment of Fisheries, based out of Latakia (Villegas 1983, Lamendour 1983). Due to the low selectivity of the fine mesh size used, large quantities of undesirable fish and unmarketable sizes were caught (1996). These trawlers caught between 300–500 kg \cdot day⁻¹, and were banned from operating in territorial waters as of 2005 (Ministerial Decision n0:15/T, dated: 19/4/2004, Saad 2010) due to a rapid decline in European hake (*Merluccius merluccius*) landings. According to reported data, hake landings peaked in 1997 at 300 t and declined by about 75 percentage points by the late 2000s.

In 1994, licensing was made available to the public for the first time to bottom trawl for hake, just 1–5 nautical miles outside of Syria's territorial sea,* where bottom trawling was allowed. Prior to this, bottom trawling was restricted to government vessels and fishery co-operative organizations. Initially in 1994, there were 14 new 'offshore' bottom trawlers (Kelleher 1996) which had increased to 24 by 2007, and had a combined catch of 1500–2000 t annually in the late 2000s (A. Saad, unpublished data). The encouragement for this 'new' fishing fleet was based on incorrect assumptions regarding the productivity of the offshore waters (Kelleher 1996).

Artisanal fisheries. *Feluccas* are the standard artisanal fishing vessels and have small diesel engines ranging from

4–15 kW (Villegas 1983, Saad 1996). There were 1000 fishers and 200 fishing vessels in 1955, which increased to about 500 vessels by 1960 (Margetts 1968), and continued to increase steadily after that. By 1996, the government began to restrict entry of new artisanal boats, and capped the total number of operational artisanal vessels at 1850.

A variety of fishing gears are used in this mixed-species fishery, including trammel nets for bottom fishing, longlines (Villegas 1983), gill nets, shore seines, cast nets, feathered troll lines, small purse seines, bottom-set nets, and handlines (Saad 1996). Just like the industrial fishery, the artisanal fishery also commonly uses small mesh sizes. The two most important taxa targeted by this sector are hake and red mullet, which together represent 45% of total artisanal catches (Marttin et al. 2006).

The purse-seine fleet is considered part of the artisanal sector due to vessel lengths under 12 m, and targets small pelagics such as round sardinella (*Sardinella aurita*). Approximately 16 purse seines have been in operation since 1950. Each of these vessels operates for 7–12 h per day, 8–12 days per month, five months per year, and catches between 500–800 kg \cdot trip⁻¹. These vessels use a mesh size of 14 mm (Kelleher 1996), and hence are responsible for catching substantial amounts of juvenile fish. Even in the early period, the average length of most fish landed was reported to be "very small" (Margetts 1968).

Artisanal catches have been much harder to track until a sub-sampling procedure was initiated in 2004, since this sector is large and varies greatly with locality (Saad 1996).

Recreational/subsistence fisheries. Recreational fishing is defined here as fishing primarily for pleasure without the intention for commercial sale. Subsistence fishing is defined here as catch for self- or family-consumption, as fish prices are high in Syria.** Since the reported data only include commercial sectors, the amount of fish caught for pleasure and/or self-consumption has gone unreported. In Syria, a license is required to fish recreationally either from a boat or the shore (Gaudin and De Young 2007). The recreational fishing sector is limited to angling, and is to use a maximum of three hooks per fishing line. In 2006, 148 marine recreational licenses were issued.

Catch statistics. Data reported by the Food and Agriculture Organization (FAO) on behalf of Syria were used as the reported baseline data from 1950–2010. The officially reported data are an estimation of landings based on sales records from some of the larger fish markets. Therefore, catches either utilized without sale (e.g., consumed directly) or sold at locations other than the main markets (including direct sales), along with discards are missing from the official data.

Fishery statistics started to be collected monthly from fish market managers in April 1965 (Margetts 1968). Data collection has been constrained due to the large number of unmonitored landing sites, the large number of artisanal fishers, catches being landed at all hours, and the wide range of sites where fish are sold (Margetts 1968), which includes

* In Syria, these 'new' trawling grounds lie just outside their territorial sea and vessels engaging in this fishery are referred to domestically as the 'distant water fleet', but will be referred to here as the 'offshore industrial fleet'.

** <http://stats.oecd.org/glossary/detail.asp?ID=2600>

many pre-arranged direct sales to regular buyers, such as hotels, which thus falls outside the enumeration system.

MATERIALS AND METHODS

The reconstruction of total fisheries catches for Syria for the 1950–2010 time period was undertaken following the catch reconstruction approach in Zeller et al. (2007).

Taxonomic breakdown of reported data. Landings data reported by FAO on behalf of Syria consist of highly aggregated taxonomic groups; from 1950–1972, all catches were presented as one miscellaneous marine fish category (i.e., ‘marine fishes nei’, defined as ‘marine fishes not elsewhere identified’), despite fish being sold in the market by species. From 1973–1999, the taxonomic resolution improved and the landings data were separated into 14 distinct taxa; from 2000–2010, the breakdown improved again, finally covering a total of 34 marine taxa.

See Tables (1–4) for details on the sectoral and taxonomic categories that were applied to the reported FAO data, the final species composition, years applied, and the references used to determine the improved composition.

Table 1
Taxonomic composition applied to reported FAO ‘marine fishes nei’ data for Syria, and assigned to the artisanal sector, for 1950–1971

Catch category		Share [%]
Common name	Scientific name	
Round sardinella	<i>Sardinella aurita</i>	18.0
European hake	<i>Merluccius merluccius</i>	11.0
Little tunny	<i>Euthynnus alletteratus</i>	8.0
Red mullets	Mullidae	8.0
Atlantic mackerel	<i>Scomber scombrus</i>	7.0
Pandoras nei	<i>Pagellus</i> spp.	6.7
Gurnards	Triglidae	6.0
Barracuda	<i>Sphyraena sphyraena</i>	5.0
Leerfish	<i>Lichia amia</i>	4.0
Greater amberjack	<i>Seriola dumerili</i>	3.0
Groupers and seabasses	Serranidae	3.0
Sharks and rays	Sharks, rays, chimaeras	3.0
Green tiger prawn	<i>Penaeus semisulcatus</i>	2.1
Karuma prawn	<i>Marsupenaeus japonicus</i>	2.1
Speckled shrimp	<i>Metapenaeus monoceros</i>	2.1
Atlantic horse mackerel	<i>Trachurus trachurus</i>	2.0
Grey mullets	Mugilidae	2.0
Pargo breams nei	<i>Chrysolephus</i> spp.	2.0
Rabbitfish	Siganidae	2.0
Seabreams	<i>Diplodus</i> spp.	2.0
Blue crab	<i>Callinectes sapidus</i>	0.7
Dolphinfish	<i>Coryphaena hippurus</i>	0.3

Derived from reported FAO mean values from 1976–1978, with small adjustments in order to account for a few important taxa which were not reported during these years; Also note that a modified version of this breakdown (i.e., excluding the crustaceans) was also used for the years 1972–1975; This modification was made as 1972 was the year that ‘marine crustaceans nei’ began being reported; nei = not elsewhere identified.

For example, to disaggregate the tonnage of FAO’s umbrella ‘marine fishes nei’ category to individual taxa that were assigned to the artisanal sector, an average percentage of occurrence was taken from the taxonomically more refined FAO landings data from 1976–1978, and then applied to the ‘marine fishes nei’ landings data for 1950–1971. This average breakdown was modified in order to account for a few important taxa which were not reported during these years (Table 1). To disaggregate the artisanal ‘marine fishes nei’ catches for the years 1972–1975, the crustaceans were removed from the taxonomic breakdown in Table 1 and the percentages renormalized. This was done because ‘marine crustaceans nei’ are reported by the FAO starting in 1972 and thus are already accounted for during 1972–1975 (see Table 2 for disaggregation of this category).

To assign reported FAO ‘marine fishes nei’ landings to more detailed individual taxa for the industrial sector, for 1950 to 1966, a taxonomic composition was derived from Farina (1957) (Table 3). ‘Marine fishes nei’ reported industrial landings for 1969–1976 were disaggregated using the same breakdown as for ‘demersal percomorphs nei’ (Table 2).

The data reported by FAO on behalf of Syria were allocated to either industrial (large-scale commercial) or artisanal (small-scale commercial) fishing sectors by first separating bottom trawl catches (considered industrial) from the rest of the data. To do this, the number of operational trawlers was first multiplied by their annual catch rates (Table 4, see below for details) to derive estimated average total annual trawler catches, from 1950 through 2010.

Fishing sector allocation. In addition to the traditional smaller trawlers operating in the waters of Syria since the early 1950s (Table 4, but note that trawling operations were suspended from 1967–1968; Anonymous 1983) so no catches were assigned to the industrial sector during this period), there were 17 larger offshore trawlers being introduced in 1994 (Kelleher 1996), with a catch of 2 t · vessel⁻¹ · trip⁻¹, operating three trips · month⁻¹ for 12 months · year⁻¹ (Saad 1996). This resulted in a combined assumed total catch of 1350 t · year⁻¹ (i.e., 79.4 t · trawler⁻¹ · year⁻¹), which was used as the estimate of total offshore trawler catch for 1994–2005. The number of offshore trawlers increased to 22 in 2006–2007 and trawler catch was estimated at 1746 t · year⁻¹. In late 2007, the number of offshore trawlers increased once more to 24 trawlers, with a catch rate of approximately 96 t · trawler⁻¹ · year⁻¹ (for the two new trawlers only), resulting in a total assumed trawl catch of 1938 t.

In order to remain conservative, we assumed that catches by the smaller trawlers (Table 4) were included in reported data. However, as not all catches taken by the offshore trawlers were accounted for in official data, we assumed that 500 t · year⁻¹ of reported data were allocated as reported large-scale catches for 1994–2004 (i.e., small coastal and large offshore trawlers combined), which increased to 1000 t · year⁻¹ from 2005 through 2010 (A. Saad, unpublished data). The remaining trawler catches (deemed unreported) will be discussed below. The indus-

trial reported catches were allocated the same taxonomic composition as the data reported by FAO, except in the case of ‘demersal percomorphs nei’ and ‘marine fishes nei’ which were further disaggregated as described above (Tables 2 and 3).

Finally, reported catches from the artisanal sector were derived by subtracting the reported large-scale catches (as derived in the paragraph above) from the total catches reported by FAO on behalf of Syria.

Unreported catches. Beginning in 2004, the captains of some trawlers, and between 10% and 20% of the artisanal sector were surveyed (Table 5), and as of 2008 the small-scale pelagic seiners were included in the survey.

These estimates of total Syrian marine landings were averaged to 6200 t·year⁻¹ for 2008–2009, which was used as an anchor point to derive unreported catch amounts. The period after the introduction of the new ‘offshore fleet’ was adjusted according to their annual catches.

Thus, for 1950–1993, total unreported landings were likely in the order of 53% of reported landings. This declined slightly to 52% for 1994–2005, dropped to 31% for 2006, increased again to 47% for 2007, jumped to 96% for 2008–2009, and finally equalled 98% for 2010. These are assumed to be total unreported commercial catches.

Unreported industrial landings. The likely unreported industrial (i.e., large-scale) catches were obtained through subtraction of the reported industrial catches (as assigned above) from the estimated total industrial catches as derived via Table 4. The same taxonomic breakdown used for ‘demersal percomorphs nei’ was applied to unreported large-scale catches (Table 2).

Unreported artisanal landings. First, the derived percentages of unreported landings as derived above (based on Table 5) were applied to the FAO reported data to determine total unreported catches for the 1950–2010 period.

Next, the industrial unreported catch amounts as derived above were subtracted from the total unreported catches to determine unreported artisanal catches. A slightly modified version of the taxonomic breakdown as applied to disaggregate the reported FAO data allocated to the artisanal sector (i.e., Table 1), was used to breakdown the unreported artisanal catches by taxa from 1950 through 1978 (Table 6). Beginning in 1979, the same reported individual catch percentages as the FAO reported data were used.

Recreational and subsistence catches. To conservatively account for recreational and subsistence catches, we assumed that these two sectors amounted to the equivalent of 5% of total reported and unreported commercial landings. For 1950, we assumed that 80% of the combined recreational/subsistence catches represented the subsistence sector, and 20% the recreational sector. In 2010, the opposite was assumed, with 20% being subsistence, and 80% recreational. Percentages were interpolated for intervening years. The taxa allocated to these catches were mullet (Mullidae, 40%); bonito (*Sarda sarda*, 30%); common pandora (*Pagellus erythrinus*, 20%); and seabream (Sparidae, 10%).

Discards. A 1957 FAO report (Farina 1957) suggested that 60% of total catches during two months of commercial trawl surveying were discarded due to being undersized. In another report, in 1983, all fish under 7 cm in length, and most of the fish under 10 cm in length, were discarded (Villegas 1983), resulting in 30%–60% of discards from the commercial trawling sector. Here, for the industrial sector, a 60% discard rate was applied in 1950, which was linearly reduced to 45% by 1983 (i.e., the mean value from Villegas 1983). It was then assumed that discarding practices continued to decline and the discard rate was set to 20% in 2010.

Table 2

Taxonomic disaggregation of aggregated FAO categories (see Tables 1 and 3 for ‘marine fishes nei’) for Syria

FAO category	Common name	Scientific name	[%]
Demersal percomorphs nei ¹	European hake	<i>Merluccius merluccius</i>	28
	Seabreams and porgies	<i>Diplodus</i> spp.	26
	Mulletts	Mugilidae	16
	Seabasses and groupers	Serranidae	13
	Rabbitfish	Siganidae	9
	Barracuda	<i>Sphyraena sphyraena</i>	8
Marine crustaceans nei ²	Green tiger prawn	<i>Penaeus semisulcatus</i>	30
	Japanese prawn	<i>Marsupenaeus japonicus</i>	30
	Speckled shrimp	<i>Metapenaeus monoceros</i>	30
	Blue crab	<i>Callinectes sapidus</i>	10
Marine molluscs nei ³	European flying squid	<i>Todarodes sagittatus</i>	40
	Common squid	<i>Loligo</i> spp.	30
	Common cuttlefish	<i>Sepia officinalis</i>	20
	Common octopus	<i>Octopus vulgaris</i>	10
Sharks, rays, skates, etc. nei ⁴	Angel shark	<i>Squatina squatina</i>	50
	Smooth-hound shark	<i>Mustelus mustelus</i>	50

¹ Based on Saad (1996); ² Based on Beckman and Farina (1956); ³ Based on trawl surveys (Farina 1957); ⁴ Based on Anonymous 2012; nei = not elsewhere identified.

Table 3
Taxonomic composition applied to reported FAO 'marine fishes nei' data, and assigned to the industrial sector, for 1950–1966 for Syria

Catch category		Share [%]
Common name	Scientific name	
Goatfish	Mullidae	13
Surmullet	<i>Mullus surmuletus</i>	12
Lizardfishes	Synodontidae	11
Red mullet	<i>Mullus barbatus</i>	11
Common pandora	<i>Pagellus erythrinus</i>	6
Bogue	<i>Boops boops</i>	5
Piper Gurnard	<i>Trigla lyra</i>	5
Smooth-hound	<i>Mustelus mustelus</i>	5
Common dentex	<i>Dentex dentex</i>	4
European flying squid	<i>Todarodes sagittatus</i>	4
Gilthead seabream	<i>Sparus aurata</i>	4
Spiny dogfish	<i>Squalus acanthias</i>	4
Angelshark	<i>Squatina squatina</i>	3
Common cuttlefish	<i>Sepia officinalis</i>	3
Barracuda	<i>Sphyraena sphyraena</i>	2
Comber	<i>Serranus cabrilla</i>	2
Guitarfish	Rhinobatidae	2
Common eagle ray	<i>Myliobatis aquila</i>	1
Common octopus	<i>Octopus vulgaris</i>	1
Penaeus shrimps	<i>Penaeus</i> spp.	1
Thornback ray	<i>Raja clavata</i>	1

Based on catch composition of trawl surveys from Zone B (Farina 1957).

Species which were reported to be discarded were anglerfish (Lophiidae), angelfish (Pomacanthidae), dogfish (Squalidae), and skates (Rajidae) (Beckman and Farina 1956); these species were assumed to make up 95% of the discards, in equal proportion. The remaining 5% of discards were allocated to target species, specifically European hake (28%), seabreams and porgies (26%), mullets (16%), seabasses and groupers (Serranidae, 13%), rabbitfish (Siganidae, 9%), and European barracuda (*Sphyraena sphyraena*, 8%), to represent substantially undersized fish or unmarketable fish as a result of being crushed, bruised, broken or otherwise spoiled from the trawling process.

RESULTS

The reconstructed total marine fisheries catches for Syria for the 1950–2010 period were estimated at almost 170 000 t (Fig. 2, Appendix Table A1), gradually increasing from 1 200 t · year⁻¹ in the early 1950s to an mean value of 1900 t · year⁻¹ in the 1970s and 1980s. Catches then increased more sharply from 2600 t in 1990 to a peak of just over 7000 t in 2008. Reconstructed total catches were 78% higher than the data reported to FAO by Syria for the entire time period of 1950–2010 (Fig. 2a), mostly attributable to previously under-reported catches from the artisanal sector and catches from the offshore industrial fleet.

Industrial catches grew over time, from approximately 550 t · year⁻¹ in the early 1950s to over 1900 t · year⁻¹ in the late 2000s. Artisanal catches also increased from about 550 t · year⁻¹ in the early 1950s to over 4000 t · year⁻¹ in the late 2000s, and dominates total catches in Syria (Fig. 2a).

Table 4
The number of trawlers and their catches, including total trawlers catches by year from 1950–2010 for Syria

Year	No. of trawlers	Catch [t]	No. of small trawlers	Catch [t]	Offshore fleet	Catch [t]	Total trawler catch [t]
1950–1954	10	—	—	—	—	—	350
1955	10 ¹	—	—	—	—	—	350
1956–1958	10	—	—	—	—	—	350
1959–1962	9	—	—	—	—	—	315
1963–1966	8 ²	—	—	—	—	—	280
1967–1968	0	—	0	—	—	—	—
1969–1970	2	10	6 ²	60	—	—	70
1971–1972	—	—	5	50	—	—	50
1973–1974	—	—	4	40	—	—	40
1975–1976	—	—	3	30	—	—	30
1977–1989	3 ³	138	2 ⁴	40	—	—	178
1990	3 ³	129	2 ⁴	40	—	—	169
1991	3 ³	130	2 ⁴	40	—	—	170
1992	3 ³	124	2 ⁴	80 ⁶	—	—	164
1993	3 ³	179	2 ⁴	80 ⁶	—	—	219
1994	3 ³	157	2 ⁴	80 ⁶	17 ⁵	1350 ⁶	1547
1995	3 ³	112	2 ⁴	80 ⁶	17 ⁵	1350 ⁶	1502
1996–2005	3 ³	138	2 ⁴	80	17	1350	1528
2006–2007	—	—	—	—	22	1746	1746
2008–2010	—	—	—	—	24 ⁶	1938	1938

Bold numbers indicate data-sourced anchor points; ¹Beckman and Farina (1956); Villegas (1983); ²Margetts (1968); ³True catch amounts were mean values for the 1990–1995 period (Kelleher 1996, Saad 1996); ⁴Villegas (1983) and A. Saad (unpublished data); ⁵Kelleher (1996); ⁶A. Saad (unpublished data).

Table 5 FAO reported total catches compared to survey results (A. Saad, unpublished data) for total catches from 2004–2010 for Syria

Year	FAO [t]	Survey [t]
2004	3077	4100
2005	3677	4600
2006	3395	4460
2007	3381	4980
2008	3212	6300
2009	3107	6100
2010	2956	5870

Table 6 Taxonomic disaggregation applies to unreported artisanal catches for 1950–1978 for Syria (modified from Table 1)

Catch category		Share
Common name	Scientific name	[%]
Round sardinella	<i>Sardinella aurita</i>	20.7
European hake	<i>Merluccius merluccius</i>	13.0
Red mullets	Mullidae	9.8
Little tunny	<i>Euthynnus alletteratus</i>	7.5
Atlantic mackerel	<i>Scomber scombrus</i>	6.6
Pandoras nei	<i>Pagellus</i> spp.	6.6
Gurnards	Triglidae	5.7
Barracuda	<i>Sphyraena sphyraena</i>	4.6
Leerfish	<i>Lichia amia</i>	3.4
Groupers and seabasses	Serranidae	3.0
Greater amberjack	<i>Seriola dumerili</i>	2.8
Sharks and rays	Sharks, rays, chimaeras	2.8
Rabbitfish	Siganidae	2.0
Atlantic horse mackerel	<i>Trachurus trachurus</i>	1.9
Pargo breams nei	<i>Chrysoblephus</i> spp.	1.9
Green tiger prawn	<i>Penaeus semisulcatus</i>	1.8
Karuma prawn	<i>Marsupenaeus japonicus</i>	1.8
Speckled shrimp	<i>Metapenaeus monoceros</i>	1.8
Seabreams	<i>Diplodus</i> spp.	1.7
Blue crab	<i>Callinectes sapidus</i>	0.6

nei = not elsewhere identified.

Recreational catches were low, but increased slightly over the time period from approximately $9 \text{ t} \cdot \text{year}^{-1}$ in the early 1950s to about $240 \text{ t} \cdot \text{year}^{-1}$ in the late 2000s, while subsistence catches increased from $35 \text{ t} \cdot \text{year}^{-1}$ in the early 1950s to about $65 \text{ t} \cdot \text{year}^{-1}$ in the late 2000s (Fig. 2a). Discards, as estimated here doubled over the time period, from about $200 \text{ t} \cdot \text{year}^{-1}$ in the early 1950s to about $400 \text{ t} \cdot \text{year}^{-1}$ in the late 2000s.

Total catches in Syria were dominated by the artisanal sector with almost 67%. Industrial, recreational, and subsistence catches accounted for 29%, 3%, and 2%, respectively, while discards represented 7% of the total reconstructed catch (Fig. 2a). The major taxa caught in Syria were: European hake (10%), round sardinella (7%), little tunny (6%), European barracuda (6%), *Sardinella* spp. (6%), Atlantic mackerel (6%) and *Diplodus* spp. (5%; Fig. 2b, Appendix Table A2).

DISCUSSION

The main reason for the difference between reconstructed total catches and reported data lies in the limitations of the statistical data collection methods that have historically been employed in Syria. There is no system in place for the government to monitor landings directly from fishing boats, or for each vessel to be responsible for reporting their marine catches. Instead, fisheries data are collected from a subset of fish market sales, with no adjustment mechanism established to reliably raise these estimates to country-wide total catches. This un-adjusted data sampling and reporting scheme results in considerable under-reporting of actual catches by Syrian fisheries. The survey scheme implemented in 2004 (A. Saad, unpublished data), and the material and methods presented in the presently reported study can provide more comprehensive insights into necessary adjustment factors and sampling improvements that may allow future data for Syria to become more accurate and comprehensive.

Landings data made available to the FAO were historically presented as highly aggregated taxonomic categories (e.g., ‘marine fishes nei’). Here, we improved the data taxonomically by further breaking down the categories into more detailed taxonomic levels. The catch data could be further improved if catches were recorded (and reported to FAO) (Marriott 2014) to species, genus, or at least family level, so that clearer trends and patterns could be detected. For local common names see Appendix Tables A3 and A4.

During the mid-late 1980s, catches appeared to remain stable, but this was due to a steady increase in the fishing effort. Fish catches have been increasing since the early 1990s, but this increase was due to a spatial expansion and increased effort of the offshore trawling fleet, which was associated with a decline in the Catch per Unit of Effort (CPUE), and did not reflect more abundant fish stocks. Spatial expansions have been driving global fisheries, and are an indicator of unsustainable fisheries (Swartz et al. 2010). Both the artisanal and industrial fisheries stocks of Syria are considered overexploited (Kelleher 1996), and steady increases in fish prices have offset the declining CPUE. Many artisanal fishers blame the industrial fishers for the decline in their individual catches; for example, some artisanal fishers have argued that with the introduction of the state-owned GEF trawlers in 1978, coastal fishers had to stop using trammel nets to target red mullet, as these species disappeared from their previous fishing grounds (Villegas 1983). It has also been suggested that the reason bottom trawling was prohibited in territorial waters in 2005 was due to the negative impact these new trawlers were seen to have on hake populations.

The artisanal fisheries are considered to be also engaged in overfishing as evidenced by low catch rates, a high proportion of juvenile fish in the landings, as well as small profit margins (Kelleher 1996). Fishing was only deemed economically viable due to the high prices fish obtain in the markets, diesel fuel subsidies, and the nation-wide ban on the importation of fish products (Kelleher 1996).

Given the negative impact that the industrial offshore trawlers have had on target fish stocks, the government

should consider decreasing, and eventually phasing out industrial bottom trawling all together. Small-scale fisheries should be prioritized, as a much larger proportion of people depend on them for their livelihoods; they use less fuel and thus have a smaller ecological footprint (Pauly 2006a, 2006b) and also have much lower discard rates (Sumaila et al. 2001).

While some management measures, such as entry and gear restrictions, have been successful in limiting effort, other measures such as minimum mesh sizes and closed seasons have proven ineffective due to a lack of effective monitoring and enforcement. The catching of juvenile fish, which may be close to 50% of total catches (Kelleher 1996), should be avoided, as these fish have not had a chance to reproduce. If increasing minimum mesh sizes of nets were rigorously enforced, the catch of juvenile fish could be reduced, but obviously at the expense of total catch.

In 2008, the government planned to phase out fuel subsidies over a five-year period, as they represented 15%–25% of the nation's Gross Domestic Product.* This measure was very unpopular and has since stalled. Since fuel constitutes a large portion of cost to fishing vessels, masking the true cost of fishing through fuel subsidies encourages overcapitalization and thus overfishing of the resource (Sumaila et al. 2008).

In the neighbouring eastern Mediterranean region, other fisheries catch reconstructions demonstrated similar general reporting trends, with reported data generally only including landings from the commercial fisheries. For example, Turkey's catch reconstruction showed that only the industrial and some artisanal catches are recorded, whereas unmonitored and unreported recreational catches were found to be substantial, catching more than the artisanal sector for several species in some areas such as the Dardanelles

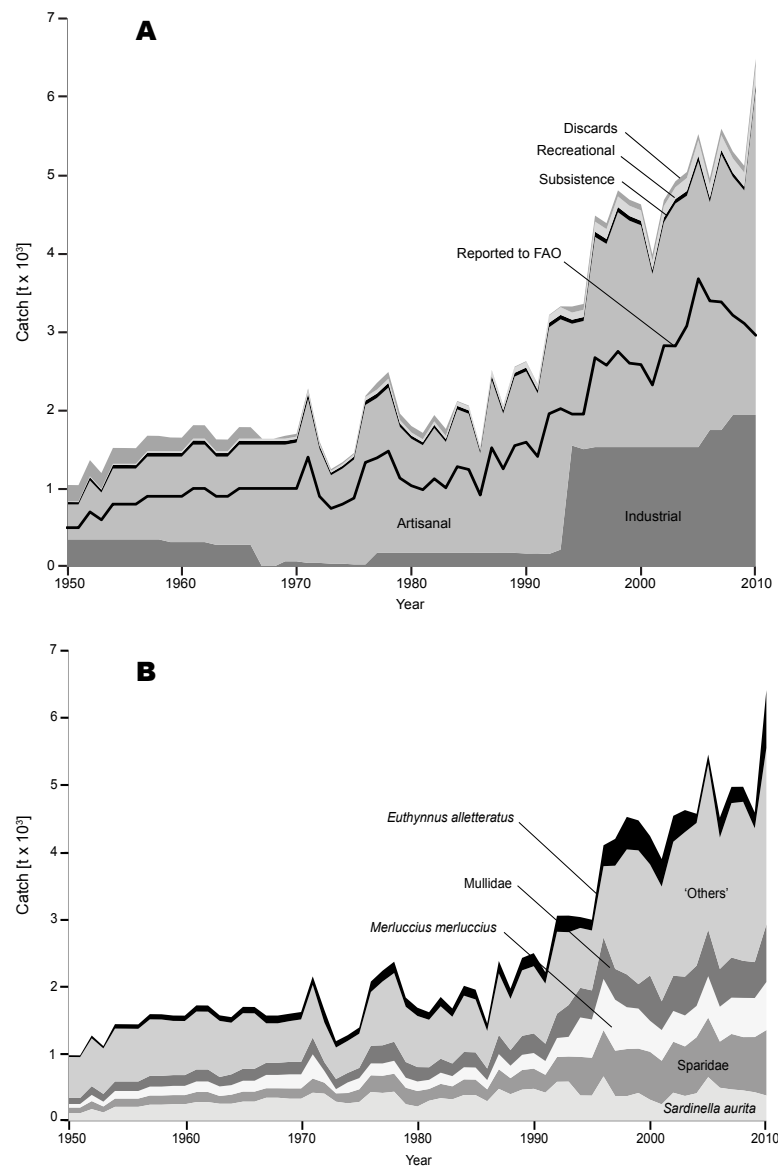


Fig. 2. Reconstructed total catches for Syria from 1950–2010, by (A) fishing sector plus discards, with data reported by FAO on behalf of Syria overlaid as a black line; and (B) main taxa, with 'other' representing 58 additional taxa

* www.iisd.org/gsi/news-item-types/news?page=7

(Ulman et al. 2013). Cyprus's catch reconstruction revealed that only the commercial catches were reported, and that all catches from the Turkish northern part of the divided island (accounting for about half the total catches) were not included in the data reported on behalf of Cyprus to the FAO since the division of the island in 1974 (Ulman et al. 2015). In the Gaza Strip, only the industrial fisheries landings were found to be reported for, and after the inclusion of artisanal and subsistence catches into the statistics, the reconstructed total catches were 2.3 times the data reported to FAO (Abudaya et al. 2013). Israel's discards from their bottom trawling sector and the growing popularity of the recreational sector accounted for the majority of their previously unreported catches, which equated to approximately 30% more than the data Israel reported to FAO (Edelist et al. 2013). To the south of Syria, Lebanon's catch reconstruction showed that just under half of the artisanal catches were accounted for in the reported data, and with the inclusion of unreported subsistence and recreational catches, the reconstructed total catches were 2.4 times the data reported to FAO*. Thus, substantial under-reporting of actual total catches is a common and consistent pattern in countries around the Mediterranean (see also Coll et al. 2014), as well as elsewhere (Zeller et al. 2011a, 2011b, 2015).

Our reconstructed catch estimates for Syria's marine fisheries provides a first comprehensive baseline account of likely total fishery removals for 1950–2010. This study also supports other observations that the state of the fisheries is indeed declining due to overexploitation, as suggested by the observed increase in effort, declining CPUE and the amount of juvenile fish in catches. The declining state of the marine resources is a common occurrence in the region, as well as in the whole of the Mediterranean (Pauly et al. 2014), and emphasis should be placed on rebuilding local stocks along with improving the effectiveness of management control measures, so that Syrians can benefit more from their local fisheries now and into the future.

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Appendix Table A1

FAO reported landings [t] versus reconstructed total catch [t] for Syria,
1950–2010, and reconstructed catch by sector

Year	FAO landings	Reconstructed catch	Industrial	Artisanal	Subsistence	Recreational	Discards
1950	500	1050	350	450	32	8	210
1951	500	1040	350	450	31	8	208
1952	700	1360	350	750	43	12	207
1953	600	1200	350	600	37	11	205
1954	800	1520	350	900	48	15	204
1955	800	1520	350	900	47	16	202
1956	800	1520	350	900	46	16	200
1957	900	1680	350	1060	51	19	199
1958	900	1670	350	1060	51	20	197
1959	900	1650	315	1090	50	20	176
1960	900	1650	315	1090	49	21	175
1961	1000	1810	315	1240	54	24	173
1962	1000	1810	315	1240	53	25	172
1963	900	1630	280	1130	47	23	151
1964	900	1630	280	1130	46	24	150
1965	1000	1790	280	1280	51	27	149
1966	1000	1780	280	1280	50	28	148
1967	1000	1640	0	1560	49	29	0
1968	1000	1640	0	1560	48	30	0
1969	1000	1670	70	1490	48	30	36
1970	1000	1670	70	1490	47	31	36
1971	1400	2300	50	2120	64	45	25
1972	1000	1610	50	1460	44	32	25
1973	745	1250	40	1130	33	25	20
1974	800	1340	40	1220	35	28	20
1975	876	1450	30	1340	38	31	15
1976	1332	2190	30	2040	56	48	14
1977	1390	2350	178	1980	57	51	85
1978	1477	2490	178	2110	59	55	84
1979	1133	1940	178	1590	45	43	83
1980	1036	1780	178	1440	40	40	83
1981	984	1690	178	1360	38	39	82
1982	1123	1920	178	1570	42	46	81
1983	1009	1730	178	1400	37	42	80
1984	1278	2160	178	1810	46	54	78
1985	1242	2100	178	1750	43	53	77
1986	917	1580	178	1260	32	40	75
1987	1519	2550	178	2180	51	67	74
1988	1251	2110	178	1770	41	56	72
1989	1547	2590	178	2220	49	71	70
1990	1591	2650	169	2300	49	74	65
1991	1409	2360	170	2020	43	67	64
1992	1954	3230	164	2860	57	94	60
1993	2019	3360	219	2900	58	98	78
1994	1950	3790	1547	1550	56	99	539
1995	1950	3710	1502	1550	53	99	509
1996	2670	4760	1528	2530	69	134	504
1997	2574	4680	1528	2470	66	134	490
1998	2750	4810	1528	2600	66	140	475
1999	2600	4680	1528	2490	62	139	461
2000	2581	4640	1528	2470	60	140	447
2001	2322	4240	1528	2100	53	129	433
2002	2823	5000	1528	2830	61	157	419
2003	3060	5230	1528	3070	62	168	405
2004	3077	5360	1528	3210	62	175	390
2005	3677	5750	1528	3590	64	192	376
2006	3395	5120	1746	2730	54	170	414
2007	3381	5650	1746	3260	58	193	398
2008	3212	7070	1938	4390	70	247	423
2009	3107	6840	1938	4190	64	242	406
2010	2956	6570	1938	3950	59	235	388

Appendix Table A2

Reconstructed total catch [t] by major taxa in Syria, 1950–2010

Year	<i>Merluccius merluccius</i>	<i>Sardinella aurita</i>	<i>Euthynnus alletteratus</i>	<i>Sphyraena sphyraena</i>	<i>Sardinella</i> spp.	<i>Scomber scombrus</i>	<i>Diplodus</i> spp.	Other
1950	54	113	32	28		28	7	784
1951	54	113	32	28		28	7	782
1952	90	171	56	42		49	13	942
1953	72	142	44	35		38	10	860
1954	107	200	68	50		59	16	1020
1955	107	200	68	50		59	16	1018
1956	107	200	68	50		59	16	1017
1957	125	229	80	57		70	19	1096
1958	125	229	80	57		70	19	1095
1959	129	235	83	58		72	20	1057
1960	129	235	83	58		72	20	1055
1961	146	264	95	66		83	23	1134
1962	146	264	95	66		83	23	1133
1963	132	241	86	59		75	20	1016
1964	132	241	86	59		75	20	1014
1965	150	270	98	67		85	23	1093
1966	150	270	98	67		85	23	1092
1967	179	321	120	74		105	29	810
1968	179	321	120	74		105	29	810
1969	191	308	114	77		100	46	838
1970	191	308	114	77		100	46	837
1971	259	427	164	106		143	52	1153
1972	177	294	109	72		95	39	821
1973	164	178	59	57		51	81	657
1974	118	204	69	46		125	27	749
1975	127	223	78	51		138	26	810
1976	275	177	155	98	205	135	100	1043
1977	277	184	160	98	210	140	94	1192
1978	289	193	168	103	218	147	98	1271
1979	232	107	136	85	143	120	113	1000
1980	220	96	122	80	121	110	108	925
1981	210	122	112	71	170	104	105	801
1982	256	139	143	86	202	103	127	863
1983	222	127	125	81	181	92	115	790
1984	270	147	147	96	217	112	137	1039
1985	264	146	145	96	216	113	136	988
1986	202	119	114	83	165	88	104	706
1987	338	176	188	120	273	142	173	1137
1988	274	150	156	96	223	113	141	961
1989	328	176	185	121	272	140	173	1194
1990	338	180	194	124	280	147	178	1214
1991	298	162	168	109	247	109	157	1110
1992	412	211	239	145	339	184	218	1485
1993	425	217	251	150	350	191	224	1548
1994	556	43	161	392	338	123	302	1870
1995	543	43	160	385	336	118	288	1836
1996	732	115	311	450	550	116	354	2136
1997	760	73	399	433	300	239	309	2169
1998	609	65	465	449	292	306	330	2292
1999	566	76	452	488	338	282	310	2167
2000	373	67	415	371	251	360	249	2558
2001	360	52	409	383	197	179	277	2382
2002	345	88	386	360	334	309	295	2880
2003	355	69	327	396	305	393	252	3132
2004	375	94	136	433	320	424	176	3403
2005	279	136	141	325	518	254	156	3943
2006	298	70	297	317	426	360	151	3198
2007	345	119	241	376	352	514	188	3515
2008	406	273	317	468	360	599	266	4383
2009	390	257	332	471	340	548	234	4272
2010	436	271	449	422	362	396	263	3967

The 'Others' grouping includes 58 additional taxa.

Appendix Table A3

List of Syrian marine fishes, by English name, scientific name, and Syrian name,
as incorporated into FishBase (Froese and Pauly 2015)

English name	Scientific name	Syrian name
Angelshark	<i>Squatina squatina</i>	Zemezma
Annular seabream	<i>Diplodus annularis</i>	Skalline
Asymmetrical goatfish	<i>Upeneus asymmetricus</i>	Sultani yahoudi
Atlantic horse mackerel	<i>Trachurus trachurus</i>	Eseifer
Atlantic lizardfish	<i>Synodus saurus</i>	Shkarmie
Atlantic mackerel	<i>Scomber scombrus</i>	Skambri
Atlantic pomfret	<i>Brama brama</i>	—
Axillary seabream	<i>Pagellus acarne</i>	Salamourra
Bastard grunt	<i>Pomadasyus incisus</i>	Kostara
Black seabream	<i>Spondylisoma cantharus</i>	Al rayes
Blacktip grouper	<i>Epinephelus fasciatus</i>	Lokkos sakhri
Bluespotted seabream	<i>Pagrus caeruleostictus</i>	Farfoura (ferride)
Blue whiting	<i>Micromesistius poutassou</i>	Migrat
Bogue	<i>Boops boops</i>	Ghobos
Bonito	<i>Sarda sarda</i>	Balamida
Boxlip mullet	<i>Oedalechilus labeo</i>	Bouri shelan
Brown comber	<i>Serranus hepatus</i>	Diab
Brushtooth lizardfish	<i>Saurida undosquamis</i>	Shkarmie
Bullet tuna	<i>Auxis rochei</i>	Balamida
Chub mackerel	<i>Scomber japonicus</i>	Skambri
Comber	<i>Serranus cabrilla</i>	Diab
Common dentex	<i>Dentex dentex</i>	Farride (bassas)
Common dolphinfish	<i>Coryphaena hippurus</i>	Lambouka
Common eagle ray	<i>Myliobatis aquila</i>	Bahlak
Common guitarfish	<i>Rhinobatos rhinobatos</i>	Shelf
Common pandora	<i>Pagellus erythrinus</i>	Jarbide- om riche
Common seabream	<i>Pagrus pagrus</i>	Sarghous
Common two-banded seabream	<i>Diplodus vulgaris</i>	Sarghous
Common sole	<i>Solea solea</i>	Mousa
Common torpedo	<i>Torpedo torpedo</i>	Ra'ad (kahrbaai)
Dolphinfish	<i>Coryphaena hippurus</i>	Lambuka
European anchovy	<i>Engraulis encrasicolus</i>	Om hanak
European barracuda	<i>Sphryaena sphryaena</i>	Sfernae
European hake	<i>Merluccius merluccius</i>	Merlan
European pilchard	<i>Sardina pilchardus</i>	Sardine kecher
False scad	<i>Caranx rhonchus</i>	Eseifer assoid
Flathead grey mullet	<i>Mugil cephalus</i>	Bouri aftess
Forkbeard	<i>Phycis phycis</i>	Kherray
Garfish	<i>Belone belone</i>	Arafida
Gilthead seabream	<i>Sparus aurata</i>	Kjaj
Goldband goatfish	<i>Upeneus moluccensis</i>	Sultani yahoudi
Golden grey mullet	<i>Liza aurata</i>	Bouri dehban
Greater amberjack	<i>Seriola dumerili</i>	Jarou-antias
Grey triggerfish	<i>Balistes capriscus</i>	Menfakh
Grey wrasse	<i>Symphodus cinereus</i>	Omcheffe
Haifa grouper	<i>Hyporthodus haifensis</i>	Hanbache
Large-eyed dentex	<i>Dentex macrophthalmus</i>	Bahlak
Leerfish	<i>Lichia amia</i>	Aerian
Little tunny	<i>Euthynnus alletteratus</i>	Balamida aarida
Madeiran sardinella	<i>Sardinella maderensis</i>	Sardine a'arid
Mediterranean horse mackerel	<i>Trachurus mediterraneus</i>	Eseifer
Morocco dentex	<i>Dentex maroccanus</i>	Freidneh
Painted comber	<i>Serranus scriba</i>	Hadad

Table continues on next page.

Table 2 cont.

English name	Scientific name	Syrian name
Parrotfish	<i>Sparisoma cretense</i>	Zellkh
Picarel	<i>Spicara smaris</i>	Zammour mabroum
Pink dentex	<i>Dentex gibbosus</i>	—
Pompano	<i>Trachinotus ovatus</i>	Arian (at'out)
Redcoat	<i>Sargocentron rubrum</i>	Souri-naylon
Red mullet	<i>Mullus barbatus</i>	Sultani ramli
Red pandora	<i>Pagellus bellottii</i>	Jarbide
Redbanded seabream	<i>Pagrus auriga</i>	Asfoura
Round sardinella	<i>Sardinella aurita</i>	Sardine mabroum
Saddled seabream	<i>Oblada melanura</i>	Manouri
Salema	<i>Sarpa salpa</i>	Salban
Sand sole	<i>Pegusa lascaris</i>	Mousa
Sand steenbras	<i>Lithognathus mormyrus</i>	Marmour
Sharpsnout seabream	<i>Diplodus puntazzo</i>	Sarghous
Silvery pout	<i>Gadiculus argenteus</i>	—
Skipjack tuna	<i>Katsuwonus pelamis</i>	Belamida om kecher
Smooth-hound shark	<i>Mustelus mustelus</i>	Kalb albahr
Spanish mackerel	<i>Scomberomorus commerson</i>	Ghazal
Spiny butterfly ray	<i>Gymnura altavela</i>	Bakra
Sprat	<i>Sprattus sprattus</i>	Sardine
Swordfish	<i>Xiphias gladius</i>	Abou monkar
Surmullet	<i>Mullus surmuletus</i>	Sultani sakhri
Thicklip grey mullet	<i>Chelon labrosus</i>	Bouri chelan
Thinlip grey mullet	<i>Liza ramada</i>	Bouri toubar
Thornback ray	<i>Raja clavata</i>	Bakra
Tripletail	<i>Lobotes surinamensis</i>	Moista
Twaite shad	<i>Alosa fallax</i>	Sardine kecher
White grouper	<i>Epinephelus aeneus</i>	Lokkos ramli
White seabream	<i>Diplodus sargus</i>	Sarghous
Yellow-mouth barracuda	<i>Sphyraena viridensis</i>	Sfernae
Zebra seabream	<i>Diplodus cervinus</i>	Asfoura

Appendix Table A4

List of Syrian marine invertebrates, by English name, scientific name and Syrian name, as incorporated into SeaLifeBase*

English name	Scientific name	Syrian name
Blue crab	<i>Callinectes sapidus</i>	Saltaoun azrak
Common cuttlefish	<i>Sepia officinalis</i>	Habbar (kalamari)
Common octopus	<i>Octopus vulgaris</i>	Akhtabout
European flying squid	<i>Todarodes sagittatus</i>	Lolligo
Green tiger prawn	<i>Penaeus semisulcatus</i>	Kraides namer akhdar
Japanese prawn	<i>Penaeus japonicas</i>	Kraides iabani
Penaeid shrimp	<i>Penaeus kerathurus</i>	Kraides malek (gambri kabeer)
Persian conch	<i>Strombus persicus</i>	Mahar faresi
Purple-dye murex	<i>Murex brandaris</i>	—
Speckled shrimp	<i>Metapenaeus monoceros</i>	Karaides arkat

* www.sealifebase.org.