

# MARITIME STRATEGIC EVALUATION FOR ISRAEL 2017/18

Chief editor: **Prof. Shaul Chorev**

Edited and produced by: **Ehud Gonen**



## Developments in the Fishery Management Policy of Israel

### *Dor Edelist*

#### **Background – the situation prior to 2017 and the new regulations, major players and factors affecting fishing and drivers of the regulatory change**

Israel has never been a maritime fishing empire. Like its neighbors in the Middle East, Lebanon, Syria and Cyprus, Israel has a small, narrow continental shelf and its fishery, especially by nets, has a multispecies nature, i.e. there are multiple target species. Approximately 80% of the fish consumed in Israel is imported and less than 5% of the fish consumption is supplied by local fishing. This figure is not expected to increase significantly, and in recent years has even fallen to 3%. Fish consumption in Israel is three times higher than local production, and only about one-tenth of this modest local production comes from fishing in the Mediterranean (~80% is freshwater aquaculture). Nevertheless, marine fishing still occurs in large sea areas and serves as a source of income for >1000 Israelis, and a source of leisure to >50,000 recreational fishers.

In 1937 the Mandatory Fisheries Ordinance of Israel was enacted and it is still used as a basis for the Israeli fishing regulations today. The 'Fishery officer' (usually the director of the Ministry of Agriculture's Department of Fisheries) is the responsible party for its enforcement and updating, and has extensive authority to change the ordinance. Nevertheless, very few changes were made over 80 years, the most prominent of which being the decision to freeze the fleet size in 1995.

The main commercial fishing methods in Israel are:

1. Bottom trawling (dragging nets across the seabed) – this method is responsible for most of the catch (Table 1), since about 90% of the Israeli shelf is a soft substrate of sand and silt that allows dragging of nets
2. Purse Seining for inshore pelagic species. Seining collapsed commercially in the 1980s due to Israel's trade agreements with Europe and the canning industry shifting to rely solely on cheaper imports.
3. Coastal artisanal fishing with stationary nets and bottom long-lines, the scope of which has also been significantly reduced in recent decades.
4. A small scale pelagic longline tuna and swordfish fishery (existing since 2000).
5. In addition, there is a growing recreational fishery in Israel with hook and line or by spear gun. The recreational fishery is booming, unlike the commercial methods, which have been in a severe crisis for decades.

Table 1 – Fishing Methods in Israel – Number of registered and active vessels as well as catch in tons

| Method              |                      | Number of licenses<br>(Licenses after the<br>reform) | Active Vessels                              | Catch in<br>Tons |
|---------------------|----------------------|--|---|------------------|
| Bottom Trawling     |                      | 31 (25)  | 16-17                                       | 1,421            |
| Purse Seine         |                      | 28   | 10-12                                       | 146              |
| GillTrammel<br>nets | Inshore<br>Artisanal | 436  | 80-130                                      | 435              |
| Longline            | Fishery              |  |   | 84               |
| SCUBA diving        |                      | 28   | 15-20                                       | 55               |
| Spear<br>Fishing    | Recreational         | 2,281**  | ~15,000 spears and<br>~50,000 pole and line | ~100             |
| Pole&Line           | Fishery              | 4,317**  |   | ~400             |
| Pelagic Longline    |                      | 15   | 5-10  | 17               |

\*\* Personal licenses according to the Fisheries Division (source: Edelist and Rilov, 2014).

The annual catch in Israel increased from about 2,000 tons per year in the 1950s to 5,000 tons in the mid-1980s, in line with an increase in the fishing effort, and since then has fallen to about 3,000 tons in recent years (Figure 1). This decline mirrors the collapse of purse seining followed by the collapse of coastal artisanal fishing, rendering bottom trawling as the main fish provider (Figure 1). This figure is expected to initially fall to ~2000 tons per annum since 2017 with the new legislation and subsequent decrease in fishing effort.

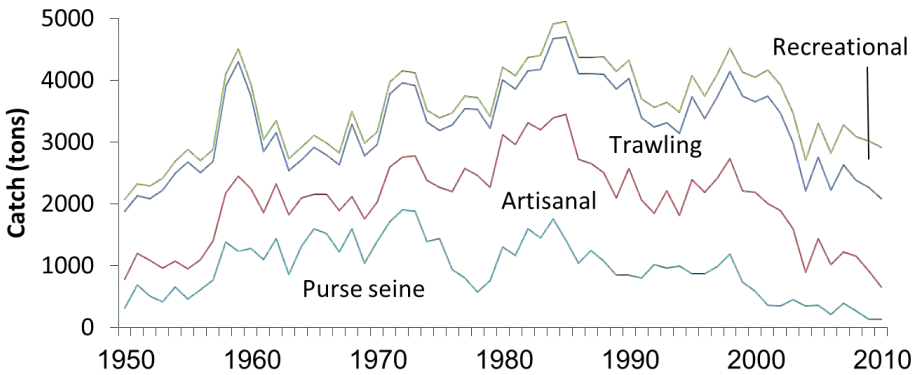


Figure 1 – Annual marine fishery catch estimates from the Israeli Mediterranean from 1950 to 2010, based on reports by the Dept. of Fisheries (Source: Edelist and Rilov, 2014).

The decline in the supply of fish occurred despite the advent of technology and due to a significant increase in operating costs, especially in fuel prices, fishing profits

---

were rendered marginal at best. It would wrong fishers to blame this entire decline on overfishing. The range of natural and mainly human factors that affect Israeli fisheries, and which contributed to these changes is very broad and includes:

1. Lessepsian Migration: The influx and establishment of Indo-Pacific species in the Mediterranean through the Suez Canal began in the 19th century and has completely transformed the Israeli continental shelf ecosystem, to the extent of dominance of migrant fish species. Lessepsian species comprise about half of the catch of bottom trawlers and 20-30% of the catch of other fishing methods. This is in addition to hundreds of species of invasive invertebrates – mollusks, crustaceans and of course, the emergence of large swarms of jellyfish since the 1980s. Although some of the migrant species are of economic value, many of them are considered pests, excluding local species and altering the entire food web. This unidirectional and irreversible process is changing the Mediterranean in an ever-increasing rate, and its scale is unparalleled in the world.
2. Damming of the Nile in Aswan in 1969 and the drying of Israel's coastal rivers – the south-eastern Mediterranean is one of the most oligotrophic marine areas in the world. As a result of this nutrient deprivation, the number of native species is significantly lower than in the Western Mediterranean, and some major commercial species of fish prevalent in the North and West Med., are missing from the Levant. The removal of the largest natural nutrient source, the Nile, has significantly reduced primary productivity and with it, the carrying capacity of the marine ecosystem for fish.
3. Global and regional climate change – Earth's oceans are heating up, and the warming of the eastern Mediterranean waters is one of the highest on record. Many indigenous species that are not adapted to high temperatures have disappeared from the Israeli coast or have decreased significantly. This is occurring in synergy with a regional process called Eastern Mediterranean Transient – the warming of the deeper water layers due to a shift in the source of deepwater creation from the Adriatic Sea to the Aegean Sea since in the early 1990s. This has led to the disappearance of psychrophilic fish such as hake from the catch (a mean of 100t per annum prior to 2000, and less than 10t per annum since).
4. Pollution – Before the Ministry of Environmental Protection was initiated in 1990, lax regulation and enforcement have rendered the Israeli Mediterranean ecosystem as a dumping ground for a host of toxic chemicals and substances, some of which severely damaged the coastal ecosystem and fish dwelling in it. Newer effluents are warm and saline brines from power plants and desalination facilities. Particularly striking are damages to Haifa Bay, which in the past was an important Israeli fishing ground. Various inshore and offshore development projects such as sand mining or marine dredging also negatively impacted on the fishing grounds. Conversely, underwater structures may function as artificial reefs and contribute to production;

however with no proper fishery management installed, they serve merely as fish attractors and thus facilitate overexploitation.

5. The State's Investment and involvement in Fisheries – The Department of Fisheries and Aquaculture of the Ministry of Agriculture and Rural Development is the body responsible for the management, monitoring, development and supervision of fishing in Israel. The involvement of the State of Israel in the management and support of marine fishing has declined sharply since the 1980s. Personnel was cut and neglected, the state's investment in fishery development decreased to zero, and over the past two decades, support for fishing equipment and boats has been reduced to near zero, except for a fuel subsidy to bottom trawlers. The lack of active fishing management and the lack of enforcement have contributed substantially to deterioration of the resource.
6. Overfishing – Over-capacity and Overexploitation – The fishing resources can be exploited through fishing effort (number of days at sea, number of boats, engine size and gear size) to a certain level, beyond which overfishing affects target species, typically in the short to medium time frame (months to years). Overfishing might also have a cascading effect which impacts the entire food web, and overfishing of certain species has probably caused a decrease in the fish size for some species (e.g. groupers). Except for a short experiment in 1998, there were no seasonal fishing bans in Israel before 2016. These bans are common throughout the Mediterranean during the breeding and recruitment seasons in the spring and summer respectively. While selective fishing impacts mainly the target species and mainly the larger specimens, nonselective fishing, such as bottom trawling has high bycatch and discarding rates and young specimens from both commercial and noncommercial species might be bycaught. Therefore, the cessation of trawling during the recruitment season is imperative. Trawling also damages habitats, especially when the nets are dragged across a rocky seabed and this has also occurred in Israel (although in a smaller scale than elsewhere). In shallow waters, the increase in more selective recreational fishing affects populations of rock-dwelling species such as groupers. With the decline in profitability, the commercial fishing effort and the number of jobs that the industry provided declined as well. Trawling effort, for example, has declined from about 6,000 fishing days per year in the 1990s to about 4,000 in the last decade and will probably fall to around 2,000 with the new regulations. Since 1995, the fleet size is frozen in Israel, and while the theoretical effort has remained the same, the actual effort has continued to decline. The number of active vessels in the Israeli fishing fleet is 3-4 times the number of registered vessels. This situation, called overcapacity, is very common in the world's fishing fleets today.
7. Economic, social and geopolitical changes – market forces determine fish prices and demand, and for a number of species, especially small pelagics, the lack of markets no longer justifies exploitation. Rising operational costs, such as wages and fuel, has had a significant impact on fishing in Israel in the past, driving some

methods of fishing to economic unfeasibility. Wars and security also affected fishing. Security areas closed for fishing permanently (such as Atlit) or temporarily (a number of firing zones) have limited fishing areas on the one hand, but serve as de facto marine reserves, where fish can grow and reproduce undisturbed. Piers, breakwaters, mariculture farms and oil&gas rigs and pipelines serve as artificial reefs that either exclude fishers and create a habitat and a source for fish distribution, or in the absence of protection from fishing facilitate their extraction and support overexploitation. Conservation is a relatively new player in the Israeli Mediterranean. Nature protection, or its absence, has also had a significant impact on fisheries, since no significant conservation zones or Marine Protected Areas were planned or established in Israel. As of 2016, after the SPNI campaign, conservation affects fishing more than any of the other factors do, as discussed in the present chapter.

Traditionally, the major players that influenced fishing and excluded fishers were: 1. The economy (through demand for fish, input costs and sea pollution) 2. Shipping (through species invasion and the Suez Canal) 3. Security (through borders and closed areas). In the last decade, Hydrocarbons joined in and recently, protection of the marine environment has become a crucial player in the management of fishing in Israel. In 2011, the Society for the Protection of Nature in Israel (SPNI) launched an extensive public campaign aimed at changing fishing in Israel. Although the declared goal of the campaign was to 'save the sea', help Mediterranean fisheries and improve fishing in the long run, in practice it reflected more of a desire to preserve nature than to increase the catch or profitability of fishing yields. The campaign ended with a series of lawsuits in the High Court of Justice, which forced the Department of Fisheries to make extensive changes to the fishing order, and in January 2017, new regulations were issued, including a number of very significant restrictions on all fishing methods in Israel. Simultaneously, the Nature and Parks Authority is promoting installation of a network large Marine Protected Areas over 20% of Israel's territorial waters. Although these areas will overlap military areas and shipping lanes and allow oil&gas drilling, production and conveyance, fishing is expected to be prohibited in them, and thus they are expected to displace yet more fishers from traditional fishing fields.

### **The regulatory change – what it means and how it is expected to affect fishing and the Israeli marine ecosystem.**

The new fishing regulations constitute a historic change in the perception of fishing by the State of Israel – from unregulated fishing, in which fishermen were free to fish almost wherever and whenever they wished, to a worldview that places more importance on conservation of marine nature. Moreover, the lax enforcement is expected to be sterner with transfer of this responsibility to the Nature and Parks Authority. The new regulations place fish wellbeing in the long run before the immediate welfare of the fishermen. They contain several components relevant to all fishing practices, such as updates to the

minimum landing size for several species. Mainly, it includes regulations relevant to each fishing method. Here are the main ones:

1. Bottom trawling: This method, criticized for its high discards and damage to benthic habitats, received the most severe restrictions. According to the new regulations, trawling is banned north of Dor, as well as shallower than 40 meters north of Bat Yam and 30 meters south of Bat Yam (25 meters at night), as well as in 11 areas surrounding the main rocky reefs in the south and center of the country. This means that nearly half of the trawling fields were eliminated. In addition, trawling is prohibited for up to three months (pending fishery officer's annual decision) during fish recruitment season, defined as May 1<sup>st</sup> to August 31<sup>st</sup>.
2. Coastal artisanal fishing, including longline and gillnets: Fishing is prohibited for up to two months (pending fishery officer's annual decision) during fish spawning season, defined as March 1<sup>st</sup> to July 1<sup>st</sup>. Benthic Longlines are restricted to 1500 hooks (Pelagic longlines for tuna were limited to 2,000 hooks and 60 km). A minimum mesh size for gillnets was set at 30 mm and the use of nets over 2 km is forbidden.
3. Fishing with SCUBA gear: The exclusion of about thirty fishers from this regulation has been revoked under the new regulations, and it is now strictly forbidden to fish with tanks. In addition, all fishers are now required to declare fishing as their official profession with the tax authorities and commit to proper book keeping in order to renew their fishing licenses.
4. Purse Seine: Fishing is prohibited during the breeding season, and less than 500 meters from the coast.
5. Recreational Fishing: Banned during the breeding season (except fishing from the shore with pole & line, permitted year round). Also, under terms of the personal fishing license a clause has been inserted which limits daily catch to a maximum of 5 kg or two fish.

In the long run, conservation by reduction of fishing effort is expected to allow for larger fish and a greater and more stable catch per unit effort; however it is paramount to understand that fishing is not a stable business – there will always be stronger seasons and stronger years, along with declines in weaker years and seasons. There are multiannual cycles for many species that hinge on factors other than fishing. In addition, changes to the ecology of the Israeli continental shelf ecosystem can never be undone, if only because of the accelerating process of bio invasion, which is more dependent on the expansion of the Suez Canal in Egypt, on climate change and on time itself than fishing. Benthic life in the vast areas closed to trawling is expected to recover within a few months to several years, judging by various studies from the world and the Mediterranean (see Demestre et al., 2008). There is no doubt that the current reform is a revolution that earns Israel a spot of honor on the list of countries preserving the marine environment, not only in the Mediterranean but worldwide. However, in terms of fisheries management, a number of

legislative mistakes were made in the new regulation, mostly because fishers were not involved in the process.

### **Expected aftermath and a number of recommendations to improve regulations**

With the introduction of the new regulations, a sharp decline in the fishing effort is expected, leading to a parallel decrease in the annual catch. Non-migratory species such as goatfish, shrimp and calamari are indeed expected to increase in the areas closed to trawling, although there will be no one to fish them out, and their share in the market will be taken by imports. In order to reduce the externalization of such costs (e.g. trawling where there are coral reefs and chopping down mangrove forests in order to dig ponds to grow shrimp in SE Asia ) and in order to allow shrimp fishing in Israel, the trawl areas in the south must be closed to a depth of 30 m and not changed to 40 m within 3 years as determined by the regulations. The recovery of benthic fish in the closed fields is expected to include some species that are valuable for the artisanal fishery, and this may be a boon to coastal fishermen. However, in the short term, the new regulations are hard on all fishermen and many will find it hard to continue fishing for a living, having to sit out the breeding season. A larger daily catch can be expected with the return to fishing after the moratorium, and considering the reduction in total fishing effort; but this does not appear to compensate for the loss of working days at the level of the total annual catch and, probably, fisher income. Proper bookkeeping is important in order to determine who is a true fisher, but entails further costs that fishermen have not borne so far. In order to avoid such severe loads on the weaker sectors, and to allow social justice to exist alongside environmental justice, and in order to maintain profitable commercial fishing in Israel, some of the regulations must be reconsidered.

It is important to note that none of the regulations involve compensation of any kind to fishermen (except for a decommissioning scheme for trawlers anchored in the Kishon), which reflects Israel's continued unwillingness to invest in fisheries. Since coastal fishing is interrupted during a strong fishing season (spring), fishermen are at least entitled to a fair discussion of compensation, or at least a shift in the ban to the weaker summer season, when jellyfish often prevent fishing. Compensation should also be discussed with the trawlers who sit out the summer. In addition, the prohibition on nets <30 mm in coastal fishing contradicts the findings of a recent study at Tel Aviv University, which shows that there is no connection between the size of the eye and the number of young specimens captured in gillnets. It is therefore advised to undo this regulation. Most importantly, we must establish an advisory committee with scientists and fishermen representatives to examine results of the new decisions and to advise of the necessary amendments to the management of Israeli fishing, so it can be run in a sustainable manner, both environmentally and socio-economically.



Before the 1980s, the most common jellyfish species along the Israeli Mediterranean shores was the cannonball jellyfish; A local species with a mild sting and small swarm size and density. Then everything changed when the Nomadic Jellyfish *Rhopilem nomadica*, Invaded the Mediterranean and Israel's beaches became plagued by its massive swarms and stinging tentacles. It has since spread throughout the entire eastern basin. This bioinvasion is particularly dramatic, as *R. nomadica* is the only organism that directly impacts all types of ecosystem services in the region:

1. **Supply services** are hampered when jellyfish swarms clog water intake pipes of coastal power plants and desalination plants, and when jellyfish clog fishermen's nets. Moreover, jellyfish harm fisheries also indirectly, as Jellyfish eat fish larvae and eggs in the plankton.
2. **Regulating services** that the coastal ecosystem provides are crippled as biodiversity decreases in the coastal pelagic habitat during swarms.
3. Most importantly, **Cultural services** such as tourism, recreation, bathing, swimming, surfing, diving etc. are devastated during summer swarms, as painful and potentially dangerous (but not yet fatal) stinging by the jellyfish excludes Israelis from the waters in the beginning the hot season. Swarms thus induce severe economic implications, but more importantly this disservice negatively impacts the mental and physical health of Israelis, as well as their identity and sense of place as a coastal nation.

Nomadic jellyfish have a complex life cycle, during which their larvae seek hard, clean substrate to settle on and metamorphose into a polyp stage. This is why if we wish to contest jellyfish domination, fishing adults out is not enough – we must also stop polluting the sea with solid waste and delve into research of building materials of marine structures such as breakwaters, jetties, wharfs etc.

