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UPDATE OF THE FISHERIES CATCH RECONSTRUCTION OF CORSICA (FRANCE), 1950-2010

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MATERIAL AND METHODS

The original reconstruction published by Le Manach et al. (2011) covered the 1950-2008 time-period. Here, we update these results to 2010 and provide a more detailed taxonomic and sectorial breakdown, as needed for the global database of the *Sea Around Us*.

ARTISANAL AND INDUSTRIAL FLEET

In the original report (Le Manach *et al.* 2011), the spiny lobster fishery was treated separately. Here, we considered that that the spiny lobster fishery was a sub-sector of the artisanal trammelnet fleet, as it appears that spiny lobsters are targeted by this fleet and therefore do not constitute a sector on their own. However, we still updated the catches of spiny lobsters independently, as we believed that our numbers were more accurate than those reported to FAO in the GFCM dataset of FishStat (FAO 2012).

Furthermore, the bottom trawl fleet was considered as artisanal in Le Manach et al. (2011). Here, we re-allocated it to the industrial sector (i.e., which uses gears operated with engines; Martín 2012), in order to remain consistent with other reconstructions

To update the catches of the artisanal trammelnet fleet (excluding spiny lobsters) and industrial bottom trawl fleet, we carried forward the CPUE and subsequent catch time-series estimated by Le Manach et al. (2011). Note that the FishStat database was updated between the original reconstruction and the current update, therefore, we substituted the total catch from 1970 to 1992 used by Le Manach et al. (2011) and substituted it with the total catch (minus spiny lobsters) reported to FAO in the 2012 version of FishStat.[1] Finally, we added back to the trammelnet sector the catches of spiny lobsters (Le Manach *et al.* 2011), which we updated to 2010 by carrying forward the 2004-2008 average (i.e., 70 t, *versus* 20 t and 0 t reported to FAO, respectively). Indeed, it seems that the spiny lobster fishery has not recovered from over-exploitation, and catches are still reported to be low in anecdotal reports (Anon. 2010).

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[1] The 1970-1992 data originally used and published in Le Manach et al. (2011) were around 30% lower than the data used here. This is due to *a posteriori* changes in the FAO database, but also (to a lower extent) to the use of different filters in the present update. For example, here, we included sardines and anchovies, whereas they were excluded in the original reconstruction (Le Manach *et al.* 2011). This resulted in a steeper decline in CPUE over-time, therefore, updated catches in the 1950s and 1970s are higher than previously published.

For the taxonomic breakdown, we proceeded in two steps:

- For the 1950-1969 time-period, we applied the 1970-1974 FAO taxonomic breakdown. This resulted in a fairly high proportion of sardines (27%), but small pelagic catches were reported to be high in early years (see Le Manach *et al.* 2011), so this assumption seems reasonable.
- For 2001-2008 and 2010, we applied the 2000 taxonomic breakdown to the entire catch.[2]

By-catch of the trammelnet fleet
The reference used in the original reconstruction was a paper published by Rocklin *et al.* (2009), which estimated that 8.3% of the catch was deteriorated by dolphins and discarded at sea. Due to the lack of complementary information, we assumed that this deteriorated by-catch was making the majority of the trammelnet by-catch, and therefore used a 10% discard rate throughout the time-period. However, we acknowledge that this is a rather conservative assumption. We also used the data published by Rocklin *et al.* (2009) to estimate the taxonomic breakdown, i.e., 25.2%, 19.3%, 8.7%, 5.4%, 4.8%, 3.0%, 3.0%, 2.7%, 2.2%, 1.7%, 1.1%, 1.1%, 1.0%, and 20.8% of *Mullus surmuletus*, *Pagellus erythrinus*, *Phycis phycis*, *Spicara maena*, *Spondyliosoma cantharus*, *Oblada melanura*, *Diplodus vulgaris*, *Diplodus sargus*, *Serranus scriba*, *Zeus faber*, *Sciaena umbra*, *Symphodus tinca*, *Serranus cabrilla*, and other fishes, respectively (proportions of deprecated species provided by Rocklin *et al.* 2009).

By-catch of the bottom trawl fleet
The protocol used here is slightly different that the one previously published by Le Manach *et al.* (2011), in order to account for deteriorated catch of commercial species, which are often kept for subsistence purposes. To do so, we assumed that 50% of the 40% of total by-catch used in Le Manach *et al.* (2011) were such deteriorated catches (further assumed to be retained in 80% and discarded in 20% of cases). We therefore assumed that the remaining 50% of the bycatch were of non-commercial value (and discarded), i.e., *Spicara* sp., various crustaceans, various molluscs, *Raja* sp. *Capros aper*, *Micromesistius poutassou*, *Scyliorhinus* sp., and various other demersal fish (29.1%, 11.0%, 11.0%, 4.8%, 4.1%, 3.4%, 3.4%, and 33.1%, respectively; see Le Manach *et al.* 2011).

Recreational sector
To update the catches by recreational fishers, we simply moved our 2008 anchor points to 2010. Indeed, the number of tourists and residents likely only marginally increased over the 2008-2010 period, so this assumption did not have much impact on our results.

For the taxonomic breakdown of this sector, we assumed that seabreams, common dentex, groupers, pandoras, wrasses, and other fishes (including large pelagics) were making 30%, 15%, 10%, 10%, 10%, and 25%, respectively, based on personal observations, discussions with locals, and anecdotal information found of internet fora.

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[2] The number of taxa in the FAO database dropped from around 17 to one in a few years, so by doing so, we were able to increase the number of taxa for the recent time-period.

Total marine fisheries totaled almost 125,000 tonnes over the 1950-2010 period, regularly decreasing from almost 3,000 tonnes in 1950, to just over 1,300 tonnes by 2010 (Figure 1A). Overall, reconstructed catches are 4.9 times higher than the catches officially reported to FAO, which is largely explained by the complete and quasi absence of official data until the late 1960s and after the mid-1990s, respectively. However, even between these two periods, official FAO data only accounted for 53% of the total catch (Figure 1A).

From 1950 to 2010, landings of the artisanal trammelnet fleet contributed 37% of the total catch (over 46,000 tonnes; decreasing from around 2,000 tonnes in 1950 to around 300 tonnes in 2010), while discards contributed almost 4% (4,600 t). The industrial bottom trawl fleet came second in terms of total catch, with 28.5% of the total catch (24% of landings and 5% of discards). Catches of this sector increased from 0 tonnes in 1950 to a peak of almost 1,500 tonnes in 1975, and then regularly decreased to an average of less than 400 t·year^{-1} by the end of the 2000s. Lastly, the recreational sector contributed 30% of the total catch (over 37,000 tonnes; around 600 t·year^{-1} on average).

Overall, *Sardina pilchardus* was the most commonly caught species in Corsica, with 9.8% of the total catch (mostly during the 1950s, 1960s and 1970s), just ahead of *Diplodus* spp., with 9.7% (around 120,000 tonnes each). *Palinurus elephas*, *Dentex dentex*, *Mullus surmuletus*, *Pagellus erythrinus*, Labridae, *Epinephelus* spp., *Pagellus* spp., *Ostrea edulis*, and various other species of fish and invertebrates (including 59 determined taxa), represented 6.7%, 4.8%, 4.2%, 3.5%, 3.1%, 3.1%, 3.0%, 2.7%, and 49.5%, respectively (Figure 1B).
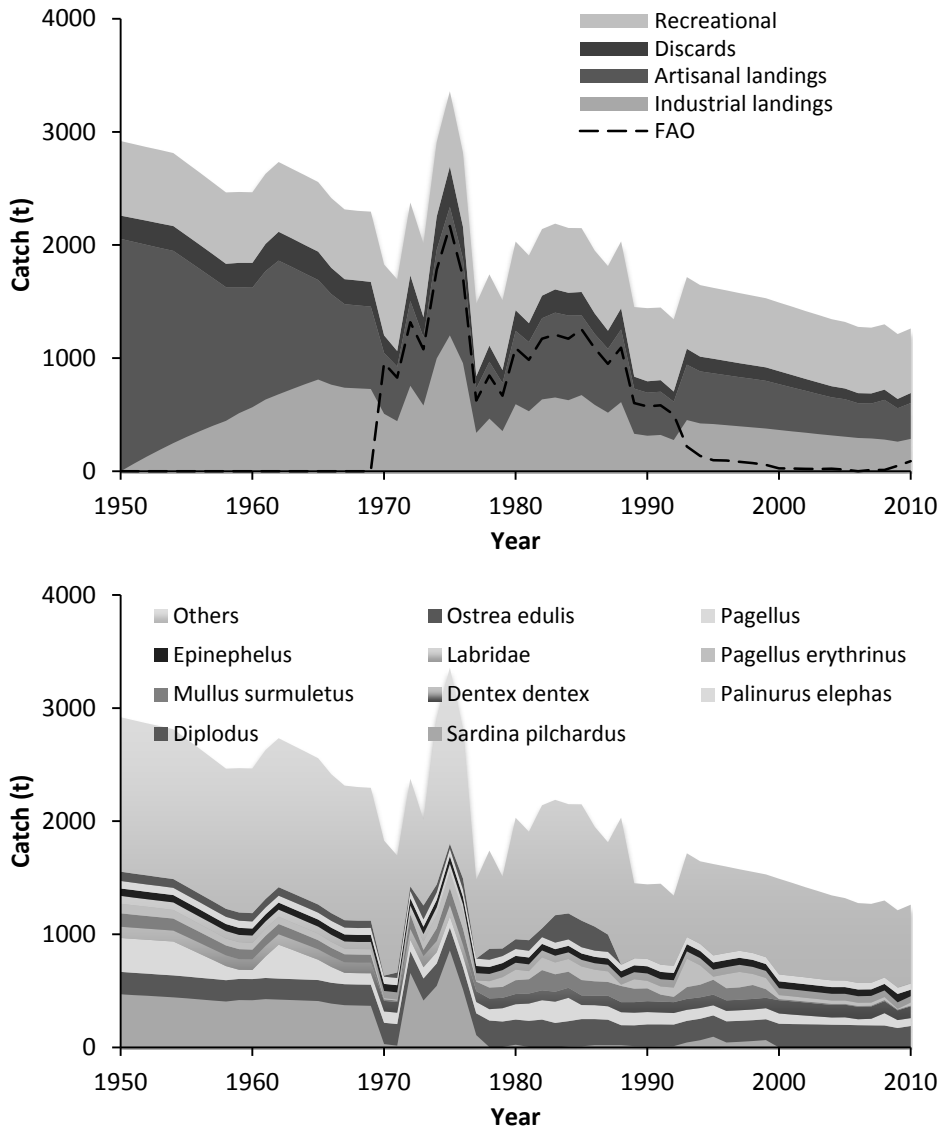
Figure 1. Total reconstructed catch by A) sector (compared to the official data supplied to FAO; dashed line), and B) by species, 1950-2010.

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