

Fish Rulers - the Bright and Dark Sides

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Mundus maris

Sciences and Arts for Sustainability asbl

Definitions of overfishing

Let's recall

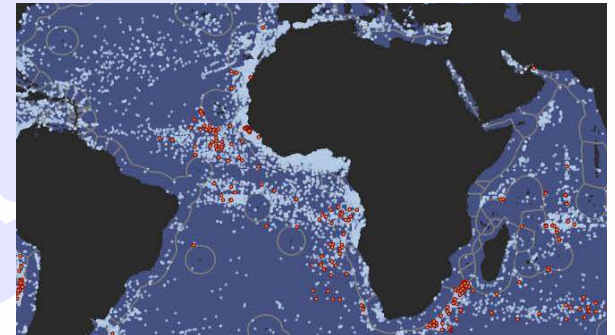
- **Growth overfishing** – catching them too small for MSY.
- **Recruitment overfishing** – too few young fish recruit into the fisheries because of decimated parent stock or e.g. degradation of nursery areas (e.g. mangroves...)
- **Economic overfishing** – level of effort is higher than needed for maximum economic rent ($>MSY$)
- **Ecosystem overfishing** – changes species composition and relations in the ecosystem, reducing resources in favour of non-resource species
- **Malthusian overfishing** – too many fishers chasing too few fish (e.g. for lack of alternative livelihoods)

Less fishing is key

The mostly **technical measures** at the heart of conventional fisheries management, such as:

- Mesh size limitations or other technical gear restrictions and
- Closed seasons during reproduction

have been ineffectual against over-capacity and technological creep.



Also, transnational organised crime in or with fisheries engage in fiscal fraud, corruption and any manner of illegal practices, incl. forced labour, drug and arms running.

“New” **combined responses**, incl. large MPAs, no subsidies, satellite surveillance, denial of insurance and market access to IUU vessels etc.

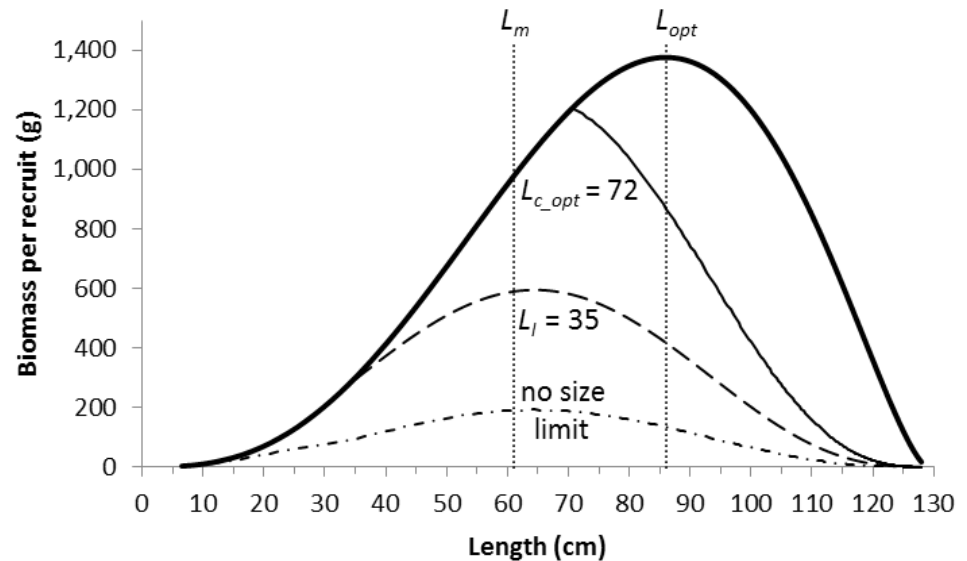
Still - size matters

Leaving alone juveniles (high numbers, small individual weight) **and**

Large mega spawners (small numbers, big individual weight, most important for reproduction of stock)

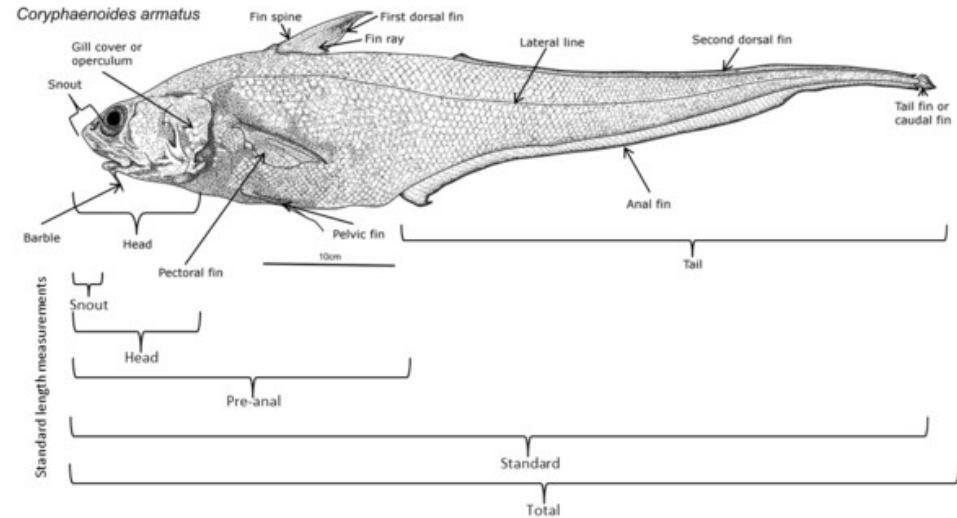
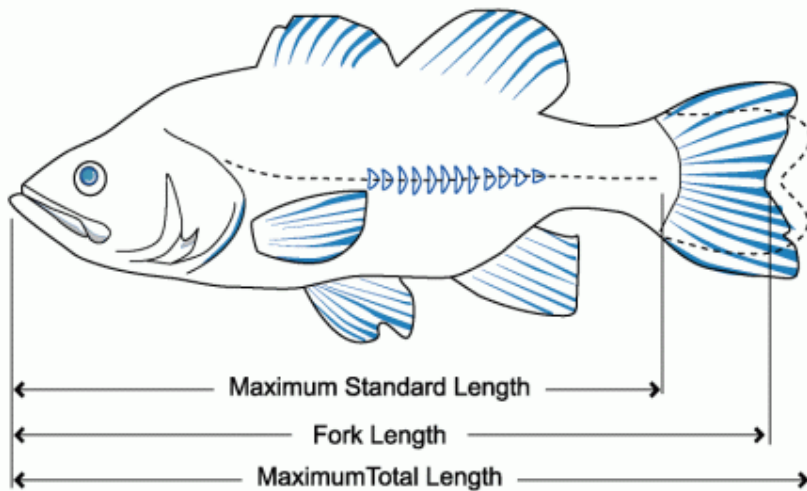
Focus fisheries on **optimum size classes** after first spawning (still large numbers & good individual weight)

Froese, R., 2004. Keep it simple. Three indicators to deal with overfishing. *FISH and FISHERIES*, 5:86–91.



Taking measurements

Measuring Fish Length



Looks easy, but isn't always clearcut. Proper measurements with clear indication of whether it is total length, fork length, standard length or some other metric is important for comparison and advice.

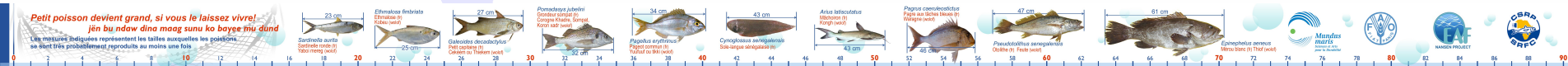
Drawings are from (left) www.fsl.orst.edu - (right) Wikipedia

Fish rulers for awareness (1)

The INCOFISH international research cooperation (2005-2008) coordinated by Froese & Opitz gave fish rulers a boost, developing several for Germany, Peru, Philippines etc.

Mundus maris picked up the idea for science outreach

- Peru through IMARPE colleague Jesus Gerardo Rujel Mena with ruler "Chikipez" in the North and South (2010).
- Developing teaching aids on the ecosystem approach to fisheries for FAO with emphasis on Senegal and Gambia (2011-12).



Fish rulers for awareness (2)

Work with fish mongers in Senegal 2012-2013

- Few Lesser African Threadfin (*Galeioides decadactylus*) landed were juveniles.
- Cassava croaker (*Pseudotolithus senegalensis*), catfish (*Arius latiscutatus*), Sompat grunt (*Pomadasys jubelini*) and white grouper (*Epinephelus aeneus*) had significant shares of juveniles in the catches in October 2013.
- Fish mongers under contract with (mostly) Chinese and Korean firms were reluctant to do something, also because in some cases legal min. size was <Lm.



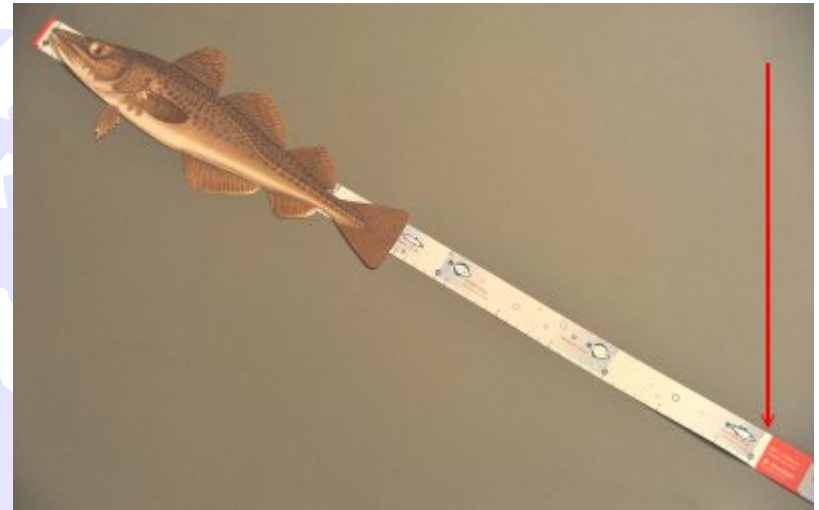
Fish rulers for awareness (3)

- Work with Greek FishBase Consortium member Aristotle University Thessaloniki to produce a fish ruler for a big EU awareness campaign to curb overfishing and “let the babies become parents” starting in 2014.
- Responding to demands of fishers in Hann and other landing sites in Senegal in 2016.
- FishBase contains currently 8,399 maturity records for 2,938 species.



Turning the concept on its head

- Despite the fact that overfishing has been formally outlawed as a result of the reformed European Common Fisheries Policy (CFP) cod (*Gadus morhua*) can be legally landed at 35 cm, while its L_m is estimated at 68 cm.



- In the draft regulation determining legal minimum sizes for Mediterranean fish and invertebrate species, the draft leaves the sizes unchanged from 2006 even though several are below L_m as recorded in FishBase and only one out of 169 Med. stocks complies with the requirements of the CFP (Froese et al. 2016)
- This flies in the face of the Commission's own campaign to protect juveniles (Size matters / La taille, ça compte!...), but where legal sizes trump biologically more meaningful sizes.

Some homework

- It would be helpful to have more studies of L_{mat} and maximum length with location and temp. in FishBase;
- Different length measurements (total, fork, standard) make L_m and L_{max} determination more difficult;
- Introducing clearly marked estimates based on empirical equations or approximately $1/2 L_{max}$ for r-strategists and at least $1/2 L_{max}$ for k-strategists (long lived) or rather $2/3$ for salmon and sharks could support use by wider publics interested in responsible purchasing.
- A further improvement would be the popularisation of the estimates of L_{opt} , which would satisfy consumer demand and improve the economics of the fishery.

**I'm still a baby,
let me live and grow**



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**Thanks for your
attention**

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During the discussion

In response to the talk, the discussion generated the following amendments:

- In the light of consumption patterns e.g. of live reef fish, often from Pacific islands, in Asia an additional form of overfishing should be considered: **targeted fishing of rare species.**
- It might be sufficient, in first approximation, to assume about **1/2 L_{max} for all but the longest-lived deep sea fish species as the minimum size at capture** to ensure sustaining populations.