Department of Biology

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To: The Members of the European Parliament, Committee on Fisheries
From: Les Watling, Professor of Biology, University of Hawaii, USA
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On 18 September 2013, I attended the Committee on Fisheries debate on the revised fisheries policy regarding the proposed regulation on deep_sea fishing in the Northeast Atlantic. This topic is of great interest to me because I have been studying the deep-sea fauna of the North Atlantic Ocean for 25 years, using research submarines and remotely operated vehicles for almost 500 hours on the bottom viewing and sampling the animals, and I have been participating in two working groups at ICES in order to help develop better management practices for the deep sea, including both fish and habitat. Last Tuesday I heard a number of statements about the state of the science that left me wondering where some Members of the Fisheries Committee were getting their information. In fact, only one Member indicated that she had checked some of the assertions being made using the web site of ICES itself. ICES is after all the authoritative body advising the European Union on all aspects of fisheries.

I am writing to you today because good governance depends on good information, in this instance on good scientific information. Let me summarize briefly for you what I consider to be the critical elements.

**What Fish are Deep-Sea Fish**: Species considered to be deep-sea fish in Europe are included in Annex I (24 spp.) and II (22 spp.) of EC Regulation 2347/2002[1]. This list will be modified under the new regulations. The deeper below 300-400 m a fish lives, the more likely it is that it will live for more than 20 years, produce fewer young, have lower resilience and therefore be more highly vulnerable to ecosystem disturbances such as fishing[2].

**Depleted Fish Numbers and Fisheries Management**: Landings data for the main deep-sea fish being caught in the Northeast Atlantic are summarized in WGDEEP reports[3]. Ten species, including blue ling, black scabbardfish, and roundnose grenadier are assessed in detail. The landings of all species have declined by about 80% since the early to mid-1990s[4]. In 2003, management measures were imposed in the form of Total Allowable Catch (TAC) for seven species with a corresponding drop in landings. However, in the years 2002-2011 catches exceeded the approved level for 50% of the species even though the approved TAC was as much as 75% higher than recommended by scientific advisory panels[5].

**Observer Coverage, Discards and Catch Estimates of Unreported Species**: Each nation is required to develop an adequate observer plan for assessement and management of deep-sea stocks[6]. According to the French OBSMER report, only 16% of recent deep-sea fishing trips conducted by French vessels had observers on board. For the most part observed trips were in ICES zone VIa with a small number in zone Vb[7]. I do not know the state of affairs regarding observers for vessels from other nations, but 16% coverage is not likely to be "adequate."

Some bycatch species are being monitored by ICES because they could be in serious trouble. Baird's smoothhead (also called slickhead), for example, is a large species that lives about 38 years, has moderately low reproductive output, is rated as having low resilience, and is highly vulnerable[8]. Landings data show that this species has undergone precipitous declines in ICES zones VI, VII and XII, with

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recent values as low as 6% of the maximum in 2002. It is likely this species is seriously depleted, and is perhaps a candidate for the IUCN Red List.

**Are Deep-Sea Fish Stocks Sustainable and Have They Reached MSY (Maximum Sustainable Yield)?** By the late 1990s all deep-sea stocks in the Northeast Atlantic were seriously depleted resulting in the application of TACs for the seven most commonly caught species in the hope of stabilizing the catch. Now the catch for most species has leveled off at 10-20% of the highest numbers[9]. MSY is a concept created by a policy advisor in the US State Department in 1949 and it was not based on any scientific data[10], but it lead to the idea that fish stocks contained un-used "surplus production," extra biomass that could be taken with no consequence to the ecosystem, and that this surplus production could be harvested at a level that would allow the stock to replenish itself. But to do that, good life history data are required. Unfortunately, not only do we not know what we need to know, very little information about any deep-sea species was gathered until long after the landings began to decline[11].

No scientific document, in particular from ICES, mentions that deep-sea fisheries have reached MSY. The June 2012 Communication to the Council concerning Fishing Opportunities for 2013,[12] states that several stocks are depleted, the advice for most stocks is that they should not be allowed to expand, and that because of data limitations MSY cannot be applied to deep-sea stocks. Abundance estimates are based on industry catch data and should be interpreted with much caution. While these data may be accurate, they are also biased numbers, that is, a fishing boat captain does not go where there are no fish, unlike fisheries research cruises where sampling is random. The areas being fished could be contracting because the last remaining fish are collecting themselves in a smaller area in order to increase the possibility of reproducing with the result that the landings per unit effort "appear" to be going up. This is a classic scenario for a species that is about to finally collapse[13] and it was the crucial mistake made in Atlantic Canada as the cod populations were collapsing[14].

**Environmental Impacts of Trawling on the Deep-Sea Bottom Communities**: Much of the claim about damage done to the deep-sea bottom communities has to do with the overall weight of the trawl doors and the subsequent force applied to the bottom. Recent technological developments have focused on decreasing fuel consumption by making the gear lighter and the mesh size wider in order to reduce the resistance of the net as it is pulled through the water. This new trawl gear will, however, still adversely impact deep-sea organisms and habitats because the deep-sea fauna, especially sponges and sea fans[15], adapted to a low-current environment[16], cannot resist the strength of towed trawl gear, however "light" or slow it may be, just as a human, standing firm, cannot resist the force of an oncoming car, even if it is moving at 5 km per hour.

Deep-sea organisms can be very old. Most living corals are at least 100 years old, many are as much as 800 years old, and some have been estimated to be more than 4000 years old[17]. This fact means that deep-sea communities damaged by trawls will recover slowly, if at all, as seen for old-growth forests on land.

I have also heard the claim that it is ok to trawl on sandy or muddy bottoms because "nothing lives there." Nothing could be further from the truth. In the deep-sea the muddy bottoms are the best studied and they harbor more species than the rocky areas.[18] Many of these species are food for bottom foragers such as the roundnose grenadier. Muddy and sandy areas also are home to large and fragile species such

as sea urchins, sea cucumbers, sponges, black corals, sea pens, anemones and hydroids. And, as was demonstrated recently in the Mediterranean, mud that is stirred up by bottom trawls can travel long distances, causing problems for animals not directly impacted by the trawl.[19]

Most of the statements made here are in a Declaration of Support sent to deep-sea biologists around the world. More than 300 have signed the statement, indicating their agreement with these details[20]. In addition, seventy-five scientific studies address the impacts of bottom trawls on deep-sea communities and not one suggests that this is an acceptable fishing technique[21].

I hope that this information will help you with your deliberations. I have provided references because I think it is important that you know that my statements are not my opinions, but are statements of fact as things currently exist.

You may have other questions that I have not dealt with here. If so please feel free to send me an e-mail with whatever questions you have and I will try to get back to you quickly with an answer, or a lead on where to find information. I do think it is important that you look at some ICES reports in order to develop an understanding of how far we have come regarding our ability to understand this unique ecosystem, but also how far we have yet to go…

The deep sea is an amazing repository of diverse life forms. I hope that you will see that this amazing habitat needs to be protected. The amount of fish being taken from this place is really quite small, but the environmental damage is staggering. The deep sea should be looked at as a library, containing a history of the wonders of life on our planet, not as a marginal place that can be destroyed in order for a few people to collect a measly few tonnes of mostly inedible fish. Our society has largely condemned the routine burning of tropical rainforests. For all the same reasons we should also condemn the widespread destruction of deep-sea bottom communities.

With best regards,

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[1] European Union Council Regulation 2347/2002.

[2] For life history analysis with depth: Drazen and Haedrich (2012). Resilience values are from Fishbase.org, calculated according to the method of Musick, J.A. 1999,. Criteria to define extinction risk in marine fishes,. Fisheries 24(12):6-14. Vulnerability values are from Fishbase.org, calculated according to Cheung, W.W.L., T.J. Pitcher and D. Pauly, 2005. A fuzzy logic expert system to estimate intrinsic extinction vulnerabilities of marine fishes to fishing. Biol. Conserv. 124:97-111.

[3] ICES WGDEEP REPORT 2012. ICES ADVISORY COMMITTEE, ICES CM 2012/ACOM:17. Report of the Working Group on the Biology and Assessment of Deep-sea Fisheries Resources (WGDEEP).

[4] See various species reports in WGDEEP 2012 above.

[5] Villasante, S. et al. 2012. Sustainability of deep-sea fish species under the European Union Common Fisheries Policy. Ocean and Coastal Management 70:31-37.

[6] See Article 8, paragraphs 1 and 2 of EU Council Regulation 2347/2002. The paragraphs state: "1. Each Member State shall assign scientific observers to the fishing vessels for which a deep-sea fishing permit has been issued in accordance with a sampling plan as provided for in paragraph 2. Paragrah 2. Each

Member State shall prepare a sampling plan for the deployment of observers and sampling at port that shall ensure collection of representative data that are adequate for the assessment and management of the deep-sea fish stocks.

[7] See note 5.

[8] Data from Fishbase.

[9] ICES WGDEEP, 2012.

[10] Finley, C. and N. Oreskes, 2013. Maximum sustainable yield: a policy disguised as science. ICES Journal of Marine Science 70: 245-250.

[11] Haedrich, R., N.R. Merritt, N.R, O'Dea. 2001. Can ecological knowledge catch up with deep-water fishing? A North Atlantic perspective. Fisheries Research 51: 113-122.

[12] http://ec.europa.eu/fisheries/cfp/fishing_rules/tacs/info/com_2012_278_en.pdf

[13] Walters, C.J. and S.J.D. Martell. 2002. Stock assessment needs for sustainable fisheries management. Bull. Mar. Sci. 70:629-638.

[14] Walters, C.J. and S.J.D. Martell. 2004. Fisheries Ecology and Management. Princeton University Press. See Fig. 4.1 for the overly optimistic projections made by fisheries scientists for 10 years leading up to the final collapse.

[15] Deep sea images, see C. Nouvian, Abysses volume or numerous web pages.

[16] Gage, J. and P.A. Tyler. 1992. Deep-Sea Biology: A Natural History of Organisms at the Deep-Sea Floor. Cambridge University Press.

[17] See Watling et al., 2011, Biology of deep sea octocorals, Advances in Marine Biology vol. 60: 41-122, for ages of deep sea octocorals, and Roark et al., 2009. Extreme longevity in proteinaceous deep-sea corals. Proceedings of the National Academy of Sciences 106: 5204-5208.

[18] See Rex, M. and R. J. Etter. 2010. Deep-Sea Biodiversity: Pattern and Scale. Harvard University Press.

[19] Puig et al. 2012. Ploughing the deep-sea floor. Nature 489: 286-289.

[20] Available from me by e-mail.

[21] Available from me by e-mail.