Date: 15th March 2024

To postmottak@fiskeridir.no; in response to the Fiskeridirektoratet Consultation letter on regulations prohibiting the capture of steinbiten (wolffish) in the Saltstraumen Marine Protected Area (MPA).

We welcome this initiative to limit the catching of steinbiten in the entire Saltstraumen MPA. It is long overdue to restrict fishing in the MPA because this deliberate killing of wildlife is contrary to the idea of "protection" of biodiversity.

However, this is only a half-measure because it does not limit catching of steinbiten when fishing for other species. **According to the precautionary principle, a full ban on fishing is required until it can be shown that non-targeted fishing either never catches steinbiten or that so caught fish will survive if released.**

We understand that it is Norwegian government policy to apply the precautionary and polluter-pays principles. There is no data or monitoring of any fish populations, their food webs and habitats (e.g., kelp forests) in the MPA. Thus these principles should be applied until there is evidence that activities will not negatively impact the marine life in the MPA.

Local people believe the fish populations have been declining. This is very likely to be true because there is unlimited recreational tourism fishing inside the MPA. This is contrary to the intention of protection, but the declaration of the area as "protected" acts to attract more fishing than would be otherwise the case. Thus, the lack of fishing restrictions leads to a perverse effect where the MPA suffers more killing and injuring of marine wildlife (including fish but also birds and crustaceans) than places outside the MPA.

There is more litter reported from this MPA than any other location in northern Europe by scuba divers (Appendix). If fishing is allowed in the MPA, and it is accepted that accidental loss of fishing lines, lures and weights is inevitable, then the polluter-pays principle means that fishermen should have to pay levy to cover the full costs of removing this litter by professional scuba divers. Such a levy may have the added benefit of reducing fishing in the MPA.

To obtain data on fish abundance and size, local fishermen could be given a zero-cost permit to fish and report catch for monitoring purposes.

We agree that the effect of the proposed ban will not be significant on the fishery. However, while the assumption that the catch of fish will be reduced if a small area is closed to fishing seems plausible, it is false. There is no evidence from anywhere in the world that the creation of an MPA reduced fishing catch of any kind. In contrast, fisheries regulations outside MPA often reduce catch.

We provide 46 examples in scientific publications from 25 countries showing that fisheries benefited from increased catch and/or body size after creation of MPA (Table 1). This is because stock recover in the MPA and spillover outside the MPA, providing a more sustainable fishery in the long run because fishing captures the overflow (like earning interest on the capital investment).

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A complete ban on fishing and damage to marine habitats would not reduce fishing catch. This is s small area and there are many places around the fjord where people can and do fish from the shore and boats. Should there be concerns in this regard, then the ban could be reviewed in ten years time in the light of data on fish catch in the area.

Thus, a ban on all fishing in the MPA would be true to the claim of "protection", and contribute to more sustainable fisheries and scientific understanding of the ecological effects of fishing in the region. It would contribute to Norway's commitments under the Convention on Biological Diversity to protect 30% of its seas by 2030. Such protection is false if a place is called protected and then exemptions made for killing marine wildlife and damaging habitat (e.g., sand removal).

A suspension of fishing in the MPA would have multiple benefits over the present embarrassing situation: (1) recovery of fish stocks and larger fish, (2) no further lost fishing gear littering the MPA, (3) increased scientific and local knowledge of the effects of fishing and the natural functioning of regional ecosystems, and (4) greater respect and appreciation of marine life by tourists.

We further remind the Fiskeridirektoratet that we requested a ban on fishing next to our research cameras on 14th April 2023 and have yet to receive a reply. The above ban would also solve this issue.

Research by Nord university and/or IMR could determine if the abundance or maximum size of fish increases or not in the MPA after the fishing ban. This would provide the evidence to show that fishing has or has not impacted cod, saithe, halibut, lemon sole and perhaps other species in the area. At present, local opinion is that over-fishing is happening but there are no data to support or contradict this view. However, that nearly 12 tons of fishing hooks, lines and weights have been removed by divers suggests heavy fishing pressure, ghost fishing (e.g. birds entangled in lost lines) and littering of the MPA which may be illegal.

On behalf of the Ecology Group of Nord University

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Table 1: Examples of observed benefits to fisheries due to Marine Protected Areas in order of year of publication. Only real-world, non-theoretical examples were included. + increase, * undocumented, ~ no difference in target species abundance (e.g., fishery catch) before-after or inside-outside MPA, so protection is without cost, **spillover reported (but may be inferred in other cases). MPA age is years established at the time of the study cited.

From Costello MJ. 2024. Economic benefits of MPA to fisheries and tourism. *Scientia Marina* 88 (1). https://doi.org/10.3989/scimar.05417.080 (in press).

Benefits to fisheries	Location	Authors	Age	Catch	Body size
Increased fishery catch and body size					
Fishermen noted increased spillover** up to 2 km from MPA, larger catches and larger fish. Increased CPUE and catch per unit area (CPUA).	Kenya	McClanahan and Mangi 2000	9	+	+
After 3 years, 5 times increase in kaikoso clams (*Andarra* spp.) in adjacent fished areas and a 200 % increase in CPUE. After 5 years, 7 times increase.	Fiji	Tawake et al. 2001	4	+	+
CPUE of all fish and CPUE and length of common pandora, *Pagellus erythrinus*, and red mullet, *Mullus surmuletus*, increased close to the reserve boundary.	Spain	Stelzenmüller et al. 2007	24	+	+
Despite high fishing effort, fish yields within 500 m of the MPA increased continuously during the study period. Increased fish size in areas between the reserve and fished zones.	Spain	Stobart et al. 2009	19	+	+
Mean annual net benefit of 10 % of the catch in weight for lobster *Palinurus elephas*, despite reserve protection.	Spain	Goñi et al. 2010	20	+	+
Increased CPUE inside the periodical closures. Fish larger in catches from closures and Acanthuridae were significantly more abundant. Fish FID decreased.	Vanuatu	Januchowski-Hartley et al. 2014	6	+	+
Recovery of cod stock following MPA and reduction of fishing effort in wider area	Kattegat, Sweden	Bergström et al. 2022	12	+	+
Increased abundance and size of groupers outside MPA	Mediterranean, Israel	Frid et al. 2022	4	+	+
Increased fishery catch only					
Both U.S. National Monuments in the Pacific show that catch and CPUE are higher for long line fisheries since expansions began.	Hawai'i	Lynham et al. 2020	14	+	~
35 % reduction in fishing area compensated by a 225 % increase in total catch for spiny lobster (*Panulirus interruptus*) after 6 years.	NE Pacific, USA	Lenihan et al. 2021	9	+	~
Spillover** was detected up to 1 km beyond the reserve for small herbivorous fishes (Acanthuridae and Scaridae). Despite concentrated fishing pressure, fish abundance outside the reserve showed no decrease.	Mozambique	da Silva et al. 2015	9	+	*
Fishermen claim higher catch in fishing grounds adjacent to the MPA and fish close to the MPA boundary. Increased CPUE on nearby fishing grounds.	Isle of Man	Bradshaw et al. 1999	10	+	*

Increase in target fish in adjacent fishing grounds. Increase in catch rates.	Madagascar	Grandcourt et al. 2001	12	+	*
In adjacent areas after 5 years catches increased 46 % - 90 %, depending on fishing gear, and biomass of commercial reef fish doubled.	Saint Lucia	Roberts et al. 2001	6	+	*
2/3 increase in CPUE in adjacent fishery grounds, fishery now sustainable.	Red Sea, Egypt,	Galal et al. 2002	7	+	*
Landing volumes of snow crabs (*Chionoecetes opilio)* increased from 59 t in 1980 to 196 t in 1999. CPUE increased more than 4 fold.	Japan	Yamasaki 2002	19	+	*
Increased CPUE for hogfish (*Lachnolaimus maximus)* related to decreasing distance from the reserve.	Turks and Caicos Islands	Tupper and Rudd 2002	10	+	*
10-fold increase in fish catch by weight and 10 fold increase in CPUE for line fishing since reserve creation.	Philippines	Maypa et al. 2002	20	+	*
Catch rates of trammel netters were 33 - 50 % higher inside the trawl exclusion area compared with outside.	Italy	Whitmarsh et al. 2002	12	+	*
Increased catch after 5 years for commercial species. Increased CPUE and double total catch for cod (*Gadus morhua*). Increased larval export from scallops (*Placopecten magellanicus*).	Atlantic USA	Gell and Roberts 2003	9	+	*
Biomass of bignose unicorn fish (*Naso vlamingii)* increased by a factor of 40 outside the reserve (200 - 250 m). Hook-and-line CPUE for *N. vlamingii* 45 times higher within 200 m of the reserve.	Philippines	Russ et al. 2003	20	+	*
Increasing CPUE near the MPA for 4 km, declining as increasing distance from the MPA, including spillover**.	Atlantic USA	Murawski et al. 2004, 2005	10	+	*
Catches increased by 27 % outside the Sumolin reserve and 41 % outside the Apo reserve. Total fishery catch either sustained or enhanced.	Philippines	Alcala et al. 2005	31	+	*
Increasing lobster CPUE and CPUA within 2 km of MPA	Spain	Goñi et al. 2006	16	+	*
Catch rates higher near the reserve by a factor of 1.1 - 2.0.	Philippines	Abesamis et al. 2006	23	+	*
Increased spillover** beyond MPA boundaries for 2.5 km.	France, Spain	Goñi et al. 2008	8	+	*
A general pattern of decreasing fish biomass from within MPA to fished areas consistent with biomass spillover.	France, Spain	Harmelin-Vivien et al. 2008	34	+	*
Increased CPUE and IPUE (income per unit effort) close to the MPA border. Increased resilience of fish assemblages against fishing and human impacts within 2 km.	Spain	Stelzenmüller et al. 2008	34	+	*
Threefold increase in the density of mollusc juveniles, black murex snail (*Hexaplex nigritus*), found in fished areas at the downstream edge of the reserve.	Mexico	Cudney-Bueno et al. 2009	7	+	*
5 fold increase in yellow tang (*Zebrasoma flavescens*) within MPA. Density in boundary sites less than 1 km from the nearest MPA nearly as high as within MPA.	Hawai'i	Williams et al. 2009	10	+	*

Higher fishery yields within 500 m of the MPA when compared with areas more than 1 km away.	France, Spain	Forcada et al. 2009	20	+	*
CPUE of target species and marketable catch increased by 2 – 4 % per year, over at least 30 years.	Southern Europe	Vandeperre et al. 2011	37	+	*
Reserves covering 28 % of the local reef area produced half of all juvenile recruitment to fished reefs within 30 km.	Australia	Harrison et al. 2012	19	+	*
Reduced flight initiation distance (FID), increased CPUE.	Philippines	Januchowski-Hartley et al. 2013	29	+	*
CPUE in the MPA vicinity immediately increased. This continued after 5 years, doubling pre-MPA CPUE after 10 years.	South Africa	Kerwath et al. 2013	23	+	*
Density of adult king scallops (*Pecten maximus*) declined threefold with increasing distance from the reserve boundary.	U.K.	Howarth et al. 2015	7	+	*
Adult snapper (*Pagrus auratus*) within the MPA contributed 11 % of juveniles to surrounding areas with no decreasing trend up to 40 km away.	New Zealand	Le Port et al. 2017	37	+	*
Relative abundance of snapper (*Pagrus auratus*) increased within the MPA despite increased fishing effort.	Australia	Harasti et al. 2018	13	+	*
Increased diversity of rockfish larvae in plankton	California, USA	Freeman et al. 2022	12	+	*
Increased body size only					
Larger spiny lobsters (*Jasus edwardsii*) were caught adjacent to the reserve.	New Zealand	Kelly et al. 2002	27	~	+
Lobster spillover** from MPA were larger	North Sea, Norway	Thorbjørnsen et al. 2018	9	~	+
Average size of red hind grouper (*Epinephelus guttatus*) increased by 34 %. Sex ratio decreased to 4 females per male.	Virgin Islands USA	Beets and Friedlander 1999	9	*	+
Record size catches of red drum (*Sciaenops ocellatus)*, black drum (*Pogonias cromis*) and spotted sea trout (*Cynoscion nebulosus*) in adjacent areas to the reserve.	Atlantic USA	Roberts et al. 2001	41	*	+
Spillover**, density and modal size of *N. vlamingii* increased outside the reserve within 200 – 300 m.	Philippines	Abesamis and Russ 2005	22	*	+
Spillover reported only					
Spillover** of finfish species between the closed area and fished area with time lags ranging from 1 – 3 years.	Atlantic Canada	Fisher and Frank 2002	15	*	*
Larval export** from the mussel, *Perna perna*, increased from reserves, enhancing recruitment in nearby fished areas within several km.	South Africa	Pelc et al. 2009	34	*	*
Uncertain effect on fisheries					
Fishing activity decreased 82% in the MPA without any negative effect of industrial pelagic fishery catch in the region.	Mexican Pacific	Favoretto et al. 2023	5	~	~
36% decline in catch after closure of 33% of the area to fishing but no decline in CPUE	Great Barrier Reef, Australia	Fletcher et al. 2015	9	~	*

The majority of fishermen (85 %) perceived no effect of marine reserves on their catch.	Seychelles	Cinner et al. 2014	46	*	*
Since MPA designation 23 % of recreational fishermen felt the number of fish caught had improved, 32 % considered it the same, 17 % felt it had declined and 28 % could not say.	Australia	Martin et al. 2016	9	*	*
Initial analysis of a decline of fish catch of 14% not supported by second analysis	Gulf of Mexico, USA	Smith et al. 2006, 2007	4.5	-	*

Appendix 1. Evidence of excessive fishing litter

Scuba divers record collected marine debris at https://www.diveagainstdebris.org/
More debris is recorded in Saltstraumen MPA then anywhere else in northern Europe! Only beaten by Greece.

From the scuba diving club

" *"Vi har passert 10 tonn. Vi leverte 469 kg i år + ca 100 kg brukbare sluker som vi har solgt. Det meste er registrert i filstruktur og økonomiregnskapet. Jeg har bare ikke prioritert å sette opp tabell på antallet.»*

In addition, NORD&NE scuba dive centre recorded the following

"have registered 1.603 kg from 2014 to 2022 in the Project PADI AWARE Debris database. This year we are around 100+ kg, not all is in the database yet.
2014: 125,5 kg
2015: 150,5 kg
2016: 184,2 kg
2017: 128,1 kg
2018: 201,5 kg
2019: 159,3 kg
2020: 167,7 kg
2021: 268,5 kg
2022: 218 kg
2023: ≈ 100+ kg
2024: 93 Kg in two months
And this is guiding divers and picking up what little we can over and over again during the same dive route day after day. One bid reason we have less this year is that we have not been at Ørneset at all almost. Since we started referring the shore fishermen to that place we have been trying to avoid to dive there. Not to be in the way, but mostly it was so much fishing lines that is was dangerous for bring guest there. On my way down from the start down to 18 m i had to cut 7 lines the first 3 min of the dive."
