BOTTOM TRAWLING

POSITION STATEMENT

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[1]This paper focuses only on bottom-tending mobile trawl gear as the most destructive fishing gear impacting benthic habitats. WWF is aware of the potential impacts of demersal longline entanglement and other lost fishing gear, however these will be dealt with separately.

WWF's mission is to conserve nature and ecological processes, while ensuring the sustainable use of renewable resources. As such, WWF supports fishing which is sustainably managed, adequately regulated and effectively enforced, and which does not damage sensitive habitats, ecosystems, biodiversity or populations of non-target species. The practice of bottom trawling can cause significant and irreversible harm to fragile benthic ecosystems and species, raising questions about its environmental sustainability. Can bottom trawling be environmentally sustainable and if so, under what conditions?

What is bottom trawling?

The term "bottom trawling" or "dragging" can be used to describe either a gear type or a practice. WWF uses the term "bottom trawling" to describe the practice of towing or dragging a trawl net, pelagic or otherwise, in continuous or occasional contact with the bottom.

Bottom trawling is intended to catch fish and other target species found near the ocean floor (such as shellfish and groundfish), but also entraps everything moveable and breakable in its path, including sponges, corals and countless other non-target species.

Mid-water trawl nets designed to target pelagic fish stocks can be used to target fish stocks living close to the seafloor, sometimes in contact with the ocean floor or with species living on it, damaging fragile ecosystems such as corals and sponges. Bottom trawls often include 'rockhopper' or roller gear, with wheels on the leading edge of the net, designed to permit trawling in rocky and reef habitats without damaging the nets.

Some bottom trawling gear and dredging nets are designed for small-scale operations in shallow water. Bottom trawls designed for large operations in deep water may have nets wider than 50 metres and be equipped with large, heavy doors, weighing up to several tonnes that are designed to drag wide swaths across the ocean floor or sides of seamounts. For some vulnerable ocean floor areas, all bottom-contact fishing gear (longlines and pots, as well as trawls) can be damaging, especially as they can be used in areas too deep or inaccessible to trawls.

The effects of bottom trawling

As inshore fisheries become more depleted and fishing vessels develop greater technological capacity, fragile and biologically complex habitats once avoided or unreachable by trawlers are at increasing risk as fishers move into deeper waters and more sensitive benthic environments.

Deep sea ecosystems comprise more than 60% of the Earth's surface, and are the main reservoirs of (yet undiscovered) global biodiversity (Danovaro *et al*. 2004, Waide *et al*., 1999). Unregulated bottom trawling thus poses a much more serious threat to the world's biodiversity than previously thought.

Deep sea corals are much less familiar to the public than are tropical corals, even though deep sea corals are "no less spectacular from a biological, ecological, and even aesthetic standpoint" (Witherell and Coon 2001). Like their tropical counterparts, these cold water coral communities serve as breeding, spawning and nursery areas for many fish species, and provide habitat for a variety of species, commercially exploited and otherwise. Research has also revealed that in sandy and muddy bottoms, biological communities exist that are just as unique and complex as their coral counterparts. Much though is still unknown about the deep ocean – but we now know enough to know that extreme care must be taken if serious and irreparable damage to these slow growing and sensitive habitats is to be avoided.

Bottom trawling can do irreversible damage not only to benthic ecosystems and habitats located along parts of continental shelves and associated deep canyons as well as seamounts and ocean ridge systems, but also to populations of the fish species targeted as well as to non-harvest species. The practice removes most species from its path, homogenises habitat and reduces complexity. It has been shown to reduce species diversity and create disturbances that can lead to dominance by detrimental predatory scavenger species (McConnaughey*, et al., 2000*). Deep sea corals and other species tend to be long-lived and slow-growing, with some having been dated at 5,000–8,000 years old. A single pass of heavy trawling equipment can destroy such benthic structures, such as was found to be occurring in Norwegian waters prior to the trawling ban introduced in 2003. Coral re-growth can take hundreds of years. Even for soft bottom communities, the severe disruption can, in some cases, make it extremely difficult for recovery to their previous habitat complexity and species composition.

Many benthic fish species, such as orange roughy (*Hoplostethus atlanticus*), share the traits that make them particularly vulnerable to over-fishing: individuals are slow to mature and reproduce (with some individuals living to 120 years or older) and populations aggregate around seamounts for spawning – an attractive and profitable target for bottom trawlers. These populations are extremely sensitive to severe decline in the face of over-harvesting of aggregations, requiring decades or even centuries to rebuild, if ever.

The international legal framework for regulating bottom trawling

Under the United Nations' Law of the Sea (UNCLOS), responsibility for the management of marine living resources differs according to its location. Coastal states have the responsibility to explore, exploit, conserve and manage the living resources found in the water column within their exclusive economic zones (EEZs), out to 200 nm from their coastal baselines. They also have sovereign rights to explore and exploit resources, including sedentary living species, on and within their continental shelves past 200 nm, out to 350nm. Under UNCLOS, all states have the right to fish on the high seas – the 64% of the oceans outside of EEZs, although this 'freedom' is constrained by equivalent obligations to cooperate to ensure the conservation and management of living marine resources and to protect and preserve the marine environment. More recent agreements have further elaborated fishers' opportunities and obligations, the most notable being the 1995 UN Fish Stocks Agreement. Regional fisheries management organisations (RFMOs) have been established to allow interested states to collaboratively manage highly migratory and straddling fish stocks.

Governance gaps and management limitations do still remain, however, relating to both demersal[1] and pelagic species. At present, of the 11 RFMOs with management responsibilities[2], only five have the legal competence within their mandates to regulate bottom trawling[3]. Some of these have begun to take measures for addressing and mitigating the ecosystem effects of various fishing methods. As yet, however, most of these measures are still insufficient to adequately protect ocean floor ecosystems, particularly when it comes to establishing networks of marine protected areas (MPAs). Additionally, many areas of the ocean are still not even covered by RFMOs with the legal competence to manage bottom trawling. For these unregulated areas, the threats from bottom trawling are even greater.

[1] Dwelling on or near the bottom.
[2] ICCAT, IATTC, IOTC, NEAFC, NAFO, CCAMLR, GFCM, SEAFO, WCPFC, CCSBT, NASCO. For full names see acronym list at the end of this document
[3] CCAMLR, NEAFC, NAFO, SEAFO and GFCM

In response to growing community concern at the growing impact of bottom trawling on vulnerable ecosystems in high seas areas, the UN General Assembly (UNGA) took a major step towards improved oceans governance and management in 2006. The 2006 Fisheries Resolution urges states to protect vulnerable marine ecosystems from destructive fishing practices and builds on resolutions adopted at the World Summit on Sustainable Development (WSSD) and the Convention on Biological Diversity (CBD) COP 7 in 2005. The key paragraphs of the 2006 UNGA Fisheries Resolution (numbers in parentheses) cover:

1. *Competent RFMOs* are to regulate high seas bottom fisheries to implement international law, the precautionary principle and ecosystem approaches – by the end of 2008 (OP83), and to assess whether such fishing would have significant impacts and, if so, only allow further bottom fishing if such impacts can be prevented (OP83A). In doing this, they are to identify vulnerable marine ecosystems and whether bottom fishing would have significant impacts on either those ecosystems or on the sustainability of target stocks (OP83B). and to close to bottom fishing areas where vulnerable marine ecosystems do, or are likely to, occur unless measures to prevent such impacts are in place (OP83C) – and to make those measures public (OP84). Meanwhile, RFMO member states are to prevent continued bottom trawling by vessels flying their flag in areas where vulnerable marine ecosystems are encountered (OP83D).
2. *Where no competent RFMO exists*, states are urged to expeditiously negotiate one and, meanwhile, adopt interim measures to give effect to OP83 (A-D) – by the end of 2007 (OP85), by which date, flag states are to cease authorizing bottom trawling in such unregulated areas unless they have adopted their own equivalent measures (OP86) and, if so, to make public lists of their vessels authorized to bottom fish and measures adopted (OP87).

In adopting its 2006 Fisheries Resolution, the UNGA took an enormous step forward in seeking to improve the governance and management arrangements for controlling bottom trawling. If the letter and the spirit of the Fisheries Resolution is implemented, unregulated bottom trawling outside the management framework provided by RFMOs (or equivalent interim and other arrangements) will cease within the next year or two. Bottom trawling can only legitimately continue if it is conducted in compliance with regional management arrangements and be shown to pose no significant threat to vulnerable marine ecosystems. This reversal of the burden of proof is an historic development.

With the exception of trawlers targeting seamounts on the high seas, most bottom trawling occurs on continental shelves, as these areas are traditional fishing grounds being easily accessible and economically attractive. This means that most bottom trawling is occurring within coastal states' EEZs. While some states are taking actions to conserve and manage those fisheries as well as the habitats and ecosystems that they depend upon, others have failed to do so, lacking either the capacity or will to do so. The 1995 UN Fish Stock Agreement (UNFSA) calls for compatible conservation and management measures for stocks that straddle EEZs and the high seas. WWF is calling for ecosystem-based management to be applied in all jurisdictions where bottom trawling occurs. In some cases, this will involve high seas measures being introduced or upgraded to match measures already in place in adjacent EEZs. In other cases, the reverse will apply.

Identifying sustainable management for bottom trawling

Although bottom trawling is inevitably damaging to ocean floor ecosystems to some extent, it is possible that under some strict operating conditions on some seafloor types and in some places, it may be conducted sustainably with acceptably insignificant ecosystem damage. Only adequately regulated and sustainably managed bottom trawling should be permitted. Ideally, it should be verified and accredited through independent certification such as that provided by the Marine Stewardship Council (MSC). Whether the bottom trawling occurs within EEZs or on the high seas, the criteria for acceptability and sustainability of bottom trawl management should be the same. Such criteria include:

Adequate regulation of target stocks based on precaution and best available science

1. All target species must have ecologically-based Total Allowable Catches (TACs) and sustainable harvest strategies in place, with adequate scientific justification and precautionary discounting for uncertainty and variability.
2. Use of Maximum Sustainable Yield (F_{MSY}) as a target for such TACs is no longer appropriate or safe and should be abandoned in favour of calculating 'Optimum Yields' based on estimates of total target stock fishing mortality constrained within precautionary limits and by ecosystem considerations (especially those associated with fisheries targeting aggregations of deep water species).

3. Accurate species-specific catch data must be reported on all target species landed or discarded by bottom trawling, including estimates of catches from illegal, unregulated and unreported (IUU) fishing.
4. All licensed fishing vessels in all fisheries must be covered by adequate MCS (monitoring, control and surveillance) measures, including comprehensive observer coverage on fishing vessels, to ensure compliance and deter non-compliance (IUU fishing).
5. Precautionary bans on deep-sea aggregating species, including MPAs covering some aggregation areas, must be considered until enough is known about them to determine whether any harvest can be sustainable.
6. Management should ultimately be ecosystem-based, entailing socio-economic decisions with stakeholder input, based on risk-averse policies and best available science.

Ecosystem-based management

7. Fisheries management must incorporate holistic ecological considerations rather than focussing purely on target populations.
8. Measures must be included to ensure bycatch (including target stock juvenile bycatch, incidental mortality of non-target species and habitat damage) does not threaten populations and allows for recovery of depleted stocks and threatened populations.
9. In some mixed (multiple target-stock) fisheries, especially those with high and un-mitigatable bycatch levels, where conventional TACs cannot be determined, limits should be placed on trawling effort, rather than catch rates, including establishment of comprehensive networks of MPAs to conserve biodiversity and protect stocks from overfishing.
10. Mixed fisheries must be managed such that bycatch does not have unintended deleterious effects on the socioeconomic or cultural aspects of other fisheries dependent on those bycatch species.
11. Management should include decision rules, but should be iterative and adaptive to new information and understanding (especially where external factors to fishery management are concerned such as land-based pollution and climate change).
12. In particular, management needs to be able to deal with overcapacity, not only by reducing licensed levels of fishing where necessary to match impacts of EBM-driven measures but also by scrapping surplus capacity to reduce incentives for IUU fishing.

Vulnerable ecosystems and closures

13. Management should recognise that some sensitive ecosystems and habitat areas should never be subject to bottom trawling or bottom fishing and to designate appropriate MPAs over and around such areas.
14. The burden should be on fishers and management agencies to establish that no significant damage will occur from bottom trawling before fishing is permitted through use of conventional EIA procedures, including research-directed new and exploratory fishing rules for inadequately understood fisheries and ecosystems.
15. Before issuing permits for new and exploratory un-assessed fisheries or expansion of assessed ones, environmental impact assessments should be completed to establish that, for particular stocks and gear types, the target area is not a vulnerable ecosystem or critical habitat.
16. Closures should be established through designation of MPAs with appropriate controls where necessary to protect critical habitat and vulnerable ecosystems such as coral and sponge areas, spawning or nesting areas for target or non-target species or to minimise non-target species bycatch.
17. Bottom trawling should be allowed only on less sensitive areas, away from both fragile soft bottom communities and rocky or reef areas known or likely to support vulnerable ecosystems, including making allowances for recovery of areas already severely and widely damaged by past trawling.
18. In designating networks of MPAs, closed areas should be distributed where possible to allow for sufficient genetic exchange (breeding) between stationary populations to ensure long term viability.
19. Management should consider not permitting bottom trawling unless independently certified by organisations such as the MSC as sustainable, especially on structures likely to support vulnerable marine ecosystems, such as canyons on continental margins, isolated seamounts and ocean

ridges, whilst being careful that effort is reduced, where necessary, rather than being diverted to already over-exploited waters.

Monitoring and enforcement

20. All fishing vessels within EEZs and on the high seas should be licensed and permitted by responsible flag states (see below for more on responsible flag states) and regulated by the competent RFMO (flag states should cease to authorise unregulated fishing).
21. Adequate enforcement and penalties should be in place to deter illegal, unreported or unregulated (IUU) fishing.
22. On-board observers should be employed to monitor bycatch and ecosystem-habitat interactions and identify and report evidence of encounters with areas of vulnerable ecosystems such as deep-water coral and sponges.
23. Caps or limits on bycatch of coral or sponges by bottom trawling should be established; especially a requirement to move on from and close areas where vulnerable marine ecosystems are encountered and measures to prevent significant impact are not yet in place. Once limits are reached, relevant areas should be immediately closed to all bottom trawling by designating suitable MPAs.
24. Vessel Monitoring Systems (VMS) should be required on all bottom trawling vessels both within EEZs and on the high seas that report in real time, not only to flag states but also to coastal states and RFMO secretariats, as appropriate.
25. All MPAs with closed areas should be rigorously monitored to evaluate the effects of such closures and regulations rigorously enforced to ensure compliance and sanction non-compliance.

Compatible measures

26. Conservation and management measures adopted by coastal states and adjacent RFMOs for managing straddling deep-sea stocks subject to bottom trawling should be compatible and coordinated between states and bodies concerned..
27. Transboundary deep-sea stocks should be managed cooperatively by adjoining coastal states.

Implementing these criteria globally requires filling in many governance and management gaps. The first step is for all licensed and permitted bottom trawling to be adequately regulated. Coastal states already have the necessary authority to implement ecosystem-based management to regulate this activity within their EEZs, even if some are lacking in capacity or will to do so. Five RFMOs are competent to regulate bottom trawling for deep water species (see footnote 3).

To cover bottom trawling in other areas, existing RFMOs need to be expanded and strengthened, or management arrangements developed – all capable of regulating activities to deliver EBM and compliance with the full suite of applicable international law and commitments by governments set out in relevant resolutions.

Conclusions

WWF believes that human activities in the seas can be managed to ensure that regulated bottom trawling is sustainable and that healthy ecosystems are maintained. This is only possible when fishing is managed within effective, holistic, ecosystem-based management regimes and that IUU fishing is eliminated. It is also vital that fishing states exercise adequate responsibility especially by maintaining and using a genuine link with vessels flying their flag.

Irrespective of whether it is conducted in an EEZ or on the high seas, bottom trawling can be a highly damaging fishing practice, especially when conducted in sensitive habitats or without adequate management.

WWF believes that, under the Precautionary Principle, bottom trawling should not be conducted unless an adequate, EBM-based management plan is in place to ensure sustainable resource use, protecting sensitive habitats, vulnerable species, ecosystem integrity, and the livelihoods of legitimate fishers.

WWF further believes that a viable strategy to address the ecosystem impacts of bottom trawling, both within EEZs and on the high seas, requires five simultaneous sets of measures. These are:

- freeze the footprint of bottom trawling (no new areas to be opened up)
- minimize trawling impacts (conduct EIA, designate MPAs, reduce capacity, avoid vulnerable marine ecosystems and aggregations)
- halt all unregulated bottom trawling (fish only subject to coastal state or RFMO measures)
- develop new management regimes for demersal fisheries and ecosystems
- intensify efforts to eliminate IUU fishing and to reduce overcapacity

If a bottom trawling fishery is conducted under the criteria of EBM, and meets criteria set by independent certifiers, WWF would support the continuation of such a fishery. The 2006 UNGA Fisheries Resolution provides an excellent policy framework for establishing the governance framework within which acceptable bottom trawling can be conducted. It is now up to states and the fishers for which they are responsible, with the help and support of markets, consumers and other stakeholders, to develop and apply the requisite management measures to give effect to the expectations of the UNGA and the hopes of the wider community.

Regional fisheries management organisations

CCAMLR	Commission for the Conservation of Antarctic Living Marine Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
GFCM	General Fisheries Commission for the Mediterranean
IATTC	Inter American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Bluefin Tuna
IOTC	Indian Ocean Tuna Commission
NAFO	Northwest Atlantic Fisheries Organisation
NASCO	North Atlantic Salmon Conservation Organisation
NEAFC	North East Atlantic Fisheries Commission
SEAFO	South East Atlantic Fisheries Organisation
SPRFMO	South Pacific Regional Fisheries Management Organisation
WCPFC	Western and Central Pacific Fisheries Commission

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