

AUSTRALIAN SEAFOOD CONSUMERS MISLED BY PROPHETS OF DOOM AND GLOOM

DR RAY HILBORN
Professor of Aquatic and Fisheries Sciences,
University of Washington

&

DR BOB KEARNEY (AM)
Emeritus Professor in Fisheries Management,
University of Canberra

Embargoed: 1pm Wednesday, 29 February 2012

Global situation

There is much gloom and doom in Australia and around the world about the sustainability of fisheries. Perhaps the best known example and that most commonly used by those who wish to demonise fishing is the prediction that all commercial fish stocks could be collapsed by 2048 (Worm et al. 2006). A similar message has been portrayed by claims that all the large fish of the ocean were seriously depleted by 2003 (Myers and Worm) and that we are fishing down aquatic food chains to the extent that soon all that will be left will be jelly fish (Pauly et al. 1988).

Each of these pessimistic views of the world has been shown to be wrong. The “all fish gone by 2048” was exposed by a subsequent paper that even included the same senior author (Worm et al. 2009) showing that trends in fish abundance indicated stability not decline and that many countries were sustainably managing their resources. The claim of the demise of high seas tuna stocks reported in Myers and Worm (2003) was shown to be wrong by almost a dozen follow up papers tracking the abundance of tuna stocks around the world, which with the exception of bluefin tuna are in, or above, the range of abundance that supports maximum sustainable yield. (Juan-Jorda et al. 2011). All of the key aspects of “fishing down food chains” have been shown to be wrong; large fish are not all more valuable than small fish, we do not begin catching large fish and move down the food chain, and the mean trophic level of the world catch is rising, not falling (Branch et al. 2010, Sethi et al. 2010).

Australia was recently subjected to the extreme unscientific pessimism about the state of the world’s fisheries by Sylvia Earle, including her support for the discredited prediction of the elimination of all fishing by 2050. To support this, and other ridiculous assertions, such as the world needs to stop eating all tuna, she claimed in December 2011, “On land we are maintaining the wildlife – by the mid-century we will see extinction of fish and seafood”. The facts are remarkably different: According to the List of Threatened Species under the EPBC Act (20/2/2012), Australia already has 27 species of terrestrial mammals, 23 birds and four frogs extinct but not a single extinction of a species of marine fish. Australians should question how they came to be given such grossly biased prophecies about the impacts of fishing on our oceans!

The Food and Agriculture Organization of the United Nations estimates that the percentage of the world’s fish stocks that are at or above target abundance levels is more than twice that of those below target (FAO 2010). Most importantly the distribution of areas where stocks are overexploited is not uniform and many countries have few fisheries management problems (Figure 1).

G Probability of fisheries sustainability

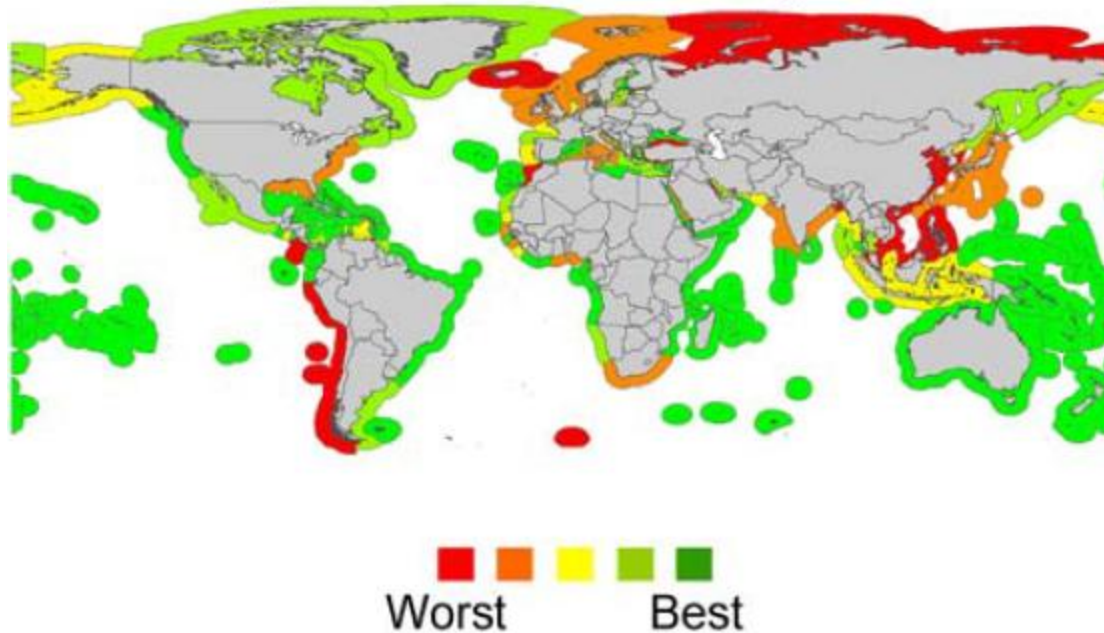


Figure 1. Global distribution of fisheries management sustainability. (Figure 3G from Mora et al.)

There have been some very serious problems with overfishing around the world, and some of them are continuing. But the global picture provides three fundamental messages; the problems are not universal, they are not uniformly distributed and the overly pessimistic view is simply not relevant to Australia. In fact Australians have excellent reasons to have faith in their fisheries management and to consume Australian seafood with confidence and enthusiasm.

Australian fisheries are sustainably managed

Australia has a great record for improving the management of its marine fisheries. Figure 2 shows the proportion of stocks not subject to overfishing (where the level of fishing is below or within the target range to produce sustainable fisheries, in red), and not in an overfished condition (the abundance of fish is above or within the desired target range, in blue). The great majority of fished stocks are in very good shape and, even more importantly for long-term sustainability, the situation continues to improve.

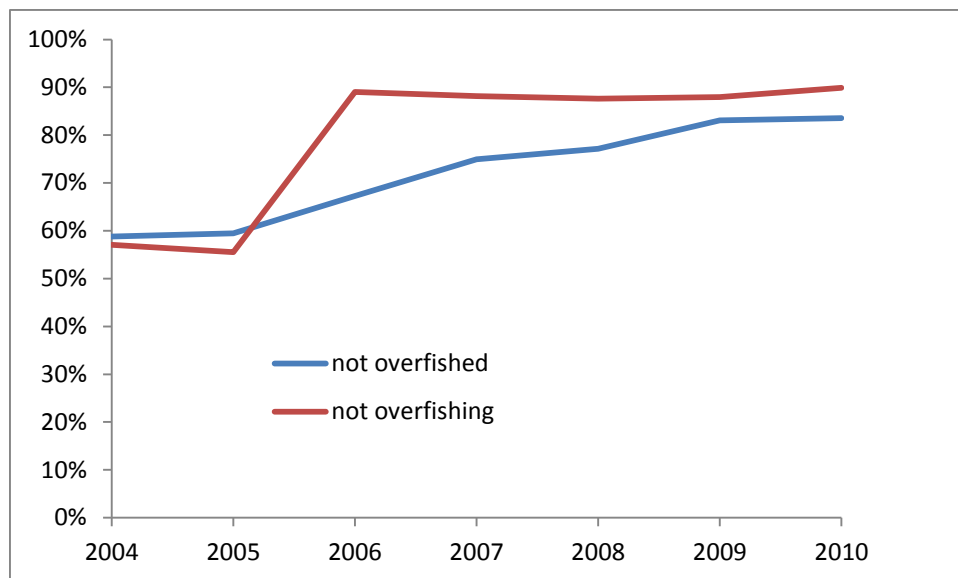


Figure 2. Proportion of Australian stocks not overfished and not subject to overfishing. Data from table 1.3 of Commonwealth Fisheries Status report (Woodhams et al., 2011).

Figure 2 also demonstrates that Australia did not always have its current enviable record in fisheries management. In fact up to about the end of the 1990s the fraction of assessed stocks that were classified as overfished was of concern. The number of overfished stocks was increasing and overfishing of even depleted stocks was continuing. Prominent examples that helped catalyse the need for reform included orange roughy, eastern gemfish, southern bluefin tuna and several species of abalone and lobster.

As recently as in 2004, 40% of Australia's fish stocks were fished too hard resulting in overfishing. Figure 2 demonstrates that Australia addressed the generic overfishing problem forcefully, particularly in the period 2004-2006, and as a result the percentage of stocks that are recovering continues to increase. By 2006, overfishing had been eliminated in all but 10% of the stocks, and as a result the number of stocks assessed to be no longer in an overfished state increased to 85% by 2010; an extremely impressive performance for any form of natural resource management. In fact the rapid recovery of the status of Australia's exploited fish stocks highlights the fundamental effectiveness of commitment to traditional fisheries management (in this case catch and effort controls) compared to attempts to recover terrestrial systems that have been impacted by urban development, mining or agriculture.

Some problems with definitions

There are two commonly used reference points in the regulation of fisheries in the interests of sustainability. First is when the biomass of stocks is so low that the long-term sustainable yield has been reduced – this is called “overfished.” The second is when the fishing pressure is so high that the long-term sustainable yield will be reduced if fishing continues at this level, this is called “overfishing. As undesirable as overfishing is it should not be over-dramatised; stocks that are overfished or subject to even moderate overfishing are still usually biologically sustainable with no immediate threat to the survival of the species (there has never been a species of fished confirmed to have been fished to extinction, and certainly not in Australia). In fact fishing levels that technically constitute “overfishing” can be deliberately employed on underexploited stocks for controlled periods with the intended result of reducing a stock to target levels where surplus production and long-term sustainable yields are estimated to be maximized. Stocks can sometimes remain at lower than desired abundance (technically ‘overfished’) for generations, and still recover under improved fisheries management, as demonstrated by Figure 2. During their period of low abundance reduced catches can often still be sustainable; the yield from the fishery is simply less than it could have been.

It is noteworthy that the classifications of fished stocks used in Australia’s official Government assessments of the status of fisheries (Woodhams et al., 2011) confirm Australia’s pre-disposition to not having stocks overfished. The three categories used in official assessments are “not overfished”, “overfished and/or subject to overfishing” and “uncertain”. ‘Under-fished’ or ‘under-utilised’ are not prominent categories in Australia’s assessments and underutilized stocks are merely given the ‘green light’ of “not overfished”. This complete concentration on the regulatory side of fisheries management, at the expense of drawing attention to new fishery development opportunities, is surprising for a country with such a huge EEZ but a dependence on imports for the bulk of its seafood (discussed below). It reflects the failure by fisheries and marine environmental managers to adjust policies to recognize the successes of traditional fisheries management in Australia and develop new fisheries, not further restrict existing ones.

Relevant international comparisons

In contrast to Australia’s impressive record in fisheries management roughly half of European stocks are still overfished and subject to overfishing. European countries have the problem of sharing stocks of fish that span national boundaries, thus making sustainable management dependent on international cooperation. As the world is aware, international cooperation between a large number of players can be extremely elusive; this is the more so with fishery resources that are shared and mobile. In the absence of binding and enforced agreements for shared stocks the ‘tragedy of the commons’ (Hardin 1968) is difficult to avoid, even for the world’s most developed democracies. Australia, as an island, has individual control of most of its fisheries resources and very few stocks for which international cooperation is imperative. Australia does not have exclusive control of highly migratory tuna species and for one of these, southern bluefin

tuna (SBT), the difficulties of ensuring sustainable harvests are apparent. Current biomass estimates for SBT are between 3% and 8% of un-fished levels, approximately one sixth of the level that would classify the species as overfished in Australia and trigger mandatory recovery action. Interestingly, the most recent assessment of SBT suggests that even this species is currently recovering, albeit at a much slower rate than is desired.

Many developing countries do not have the governance systems nor the political imperative to manage all fisheries in the interests of long-term sustainability. This is particularly the case for those developing countries where there is intense pressure on fish stocks from local communities for short-term subsistence. In such situations strict effort and catch controls to achieve maximum long-term sustainable harvests of heavily fished species would restrict and redistribute total short-term yields. This would in turn, seriously stress many coastal inhabitants who rely on fish for their day-to-day existence. Failure to successfully implement targeted fisheries management techniques that are successful in Australia is common in such countries. As a result the reported successes in such countries of less specific and less efficient forms of management, such as closures of areas to all forms of fishing, should not be considered relevant to Australia.

A number of countries, including the United States, have, like Australia, in recent years made great efforts to eliminate overfishing. As a result the USA has many fisheries recovering. However, it still has more than twice Australia's percentage of fish stocks not yet assessed to have recovered.

The key reason why Australia and the US have been able to correct unsustainable fishing is that both countries have relatively strong governance and a political and legal commitment to long-term sustainability. Action is underpinned by a legal framework that requires an end to overfishing and/or other identified negative effects of fishing. Where overfishing has occurred recovery plans are mandated in the legislation of most states and/or nationally. In Australia most fisheries must be considered sustainable in accordance with three separate pieces of legislation; a state fisheries act, a state environmental act and the Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act (Commonwealth of Australia 1999) which applies to all Commonwealth fisheries and any state fishery from which product is exported. Australia has a governance process for the sustainable management of its fisheries that in the little more than the decade in which it has been enforced has been clearly demonstrated (Figure 2) to be appropriate and effective. It is difficult to understand why the Australian public is not rejoicing in the success of its fisheries management and why Australians believe they need to implement additional, alternative restrictions on fishing, such as more fishing closures in MPAs!

Australian seafood supply and demand

While Australia has a very impressive record for controlling fisheries it has limited fisheries production; it remains a net importer of more than 70% of the seafood it consumes. Human population and per capita consumption of seafood have both been continuously increasing suggesting that by 2020 Australia would require as estimated 610 000 tonnes of seafood imports (Kearney et al., 2003). The most recent nutrition survey by the National Health and Medical Research Council (NHMRC) projects that on average Australians should eat 40% more seafood than they currently do (NHMRC 2011). To meet this projection without increasing its domestic fisheries production (a prospect for which there is no explicit policy and little likelihood under current management strategies which are focused on further restriction of fishing) Australia will need to import approximately 850 000 tonnes of seafood per year by 2020.

Fifty two percent by value and more by volume, of Australia's imports of seafood come from Thailand (26%), China (14%) and Vietnam (12%) (ABARES, 2011), all countries that have much less impressive records for sustainable fisheries management than Australia. In a 2009 estimation of adherence to the UN Code of Conduct for Responsible Fisheries, Australia ranked fourth out of the 53 countries surveyed, Thailand 42nd, China 22nd and Vietnam 45th (Pitcher et al., 2009). Thus by continuing to import the bulk of its seafood Australia is effectively exporting responsibility for the sustainable management of the world's fish stocks to countries with a far inferior record for sustainability (Kearney and Farebrother, 2012).

Eco-labeling

Most of the world's sustainably managed fish stocks are not eco-labeled. Few other food products are so certified. So why should Australians want individual fisheries certified when they are already assessed to be well managed and sustainable under numerous pieces of state and Commonwealth legislation?

The most prominent of fish certification schemes, that of the Marine Stewardship Council (MSC) is designed for large industrial fisheries. Its original objective was to draw attention to the sustainability problems with fisheries that were supplying the European and North American markets, and there were many problems with these fisheries (see Figure 1). It continues to achieve this objective rather effectively and is perceived to bestow a competitive advantage in the market places where the sustainability of competing products is questioned. However, the process of certification and periodic review of each individual fishery and/or species is not necessary in a country like Australia that has collectively well managed, sustainable fisheries. Furthermore, a scheme such as MSC is inherently expensive with the costs being prohibitive for most small-scale fisheries, such as dominate the supply of fresh fish to Australian consumers.

Australia has virtually no high volume, industrial-scale fisheries with most of the locally-caught fish sold in Australia coming from small regional fisheries that produce limited quantities of a relatively large number of species. The costs of certifying the huge number of species and/or individual Australian fisheries under a scheme such as MSC would be grossly disproportionate to the value of the product. Furthermore, as each Australian major fish stock is assessed under state and/or Commonwealth fisheries legislation and usually under additional environmental legislation each fishery is already technically certified to meet the world's highest standards of sustainable fisheries management. Duplication of this certification process would not only threaten the economic viability of many small fisheries but would also likely seriously disadvantage the cost-effectiveness of the whole fisheries monitoring and assessment process. It would of course, necessarily result in a significant increase in price of seafood to Australian consumers and even to exports from Australia.

Under many certification schemes, such as MSC, certification can be obtained even if the species or fishery under consideration is overfished, provided the management system in place is anticipated to lead to stock rebuilding that can be confirmed by assessment. Under current Australian government assessments such species could be certified as 'sustainable' under an independent scheme, such as MSC, but would continue to be listed as 'overfished' by Australian governments until the recovery had actually been confirmed. Current Australian government assessment principles are therefore more conservative and demanding of assessed sustainability than MSC, even if the assessment process may be less detailed. Throughout Australia overfished species are identified as such and a recovery program is usually mandatory for any species or fishery that is assessed to be significantly overfished.

Furthermore, as Australia has extremely few, unsustainable fisheries the cost-effectiveness of providing the public with an unambiguous message on seafood sustainability would clearly be best served by identifying the few problem fisheries that do exist, rather than certifying and re-certifying those that have already been assessed by transparent government processes to be sustainable. A process of listing only those for which there is an assessed problem would not only provide assurance to Australian consumers that local seafood can be consumed with confidence but it would also draw attention to those few fisheries that remain a problem, thereby catalyzing corrective management. It would also remove the confusion created in public opinion by the inconsistencies in the many unregulated 'seafood guides' to which the public is exposed (discussed below).

It is relevant to the Australian situation to note that several countries and even states that have high standard fisheries management, for example Alaska, are moving to government certification based on the FAO guidelines for sustainable fisheries of the collective sustainability of fish and fisheries. Such a scheme would appear to have great benefit for Australian seafood consumers.

Why does Australia so understate the sustainability of its fisheries?

Numerous NGOs active in Australia need the public to believe fisheries to be in poor shape to facilitate their fundraising. Good news is an anathema to those whose business is based on public support for addressing real or perceived problems. There are 16 or more different organisations in Australia that produce ‘guides’ of various forms that are intended to influence public opinion on the environmental responsibility of consuming different seafood species. There are no standards or government regulation of the efficacy of these guides or their impact on the seafood industry they are designed to influence. There are no minimum qualifications or standards of experience required of the people who do the assessments of individual seafood species on which these guides are based.

At the global scale, NGOs are split between those that are opposed in principle to many forms of fishing, such as Greenpeace, and those looking for solutions to the bigger strategic issues. Patrick Moore, a co-founder of Greenpeace became disenchanted with the direction that particular NGO was taking. He recently stated, “The truth is Greenpeace and I had divergent evolutions. I became a sensible environmentalist; Greenpeace became increasingly senseless as it adopted an agenda that is anti-science, anti-business, and downright anti-human”. His more general comments on so called ‘environmental activism’ included, “To a considerable extent the environmental movement was hijacked by political and social activists who learned to use green language to cloak agendas that had more to do with anti-capitalism and anti-globalization than with science or ecology.”(Moore, 2010)

Equally relevant to Australia but particularly pertinent to the debate over restricting fishing in predetermined areas, are the comments of Peter Kareiva, the chief scientist for The Nature Conservancy, a major international NGO based in the USA. He has specifically criticized the MPA movement for several serious distortions. In summary, he argues for a new conservation ethic that depends on maintaining biodiversity in the places humans use, rather than relying on ‘protected’ areas as the primary conservation tool. “For this (a new conservation ethic) to happen, conservationists will have to jettison their idealized notions of nature, parks, and wilderness — ideas that have never been supported by good conservation science — and forge a more optimistic, human-friendly vision”. “But ecologists and conservationists have grossly overstated the fragility of nature, frequently arguing that once an ecosystem is altered, it is gone forever. Some ecologists suggest that if a single species is lost, a whole ecosystem will be in danger of collapse, and that if too much biodiversity is lost, spaceship Earth will start to come apart.” “Protecting biodiversity for its own sake has not worked. Protecting nature that is dynamic and resilient, that is in our midst rather than far away, and that sustains human communities — these are the ways forward now. Otherwise, conservation will fail, clinging to its old myths.” (Kareiva et al., 2011)

The fundamental myth that Kareiva criticizes is that conservation equates to protected areas; he argues that the key to maintaining biodiversity is good management of utilized areas. It is most significant to the current debate that Kareiva philosophy has been developed based on terrestrial systems that are far less naturally dynamic and resilient than marine ones, and in particular Australian marine systems where fishing is tightly managed and not a single species has been lost to fishing. Noting Australia's preoccupation, in spite of its relatively excellent management of fishing, with declaring more and bigger MPAs that are in effect little more than fishing closures, Kareiva's comments are of particular relevance to Australia.

Australian NGOs remain predominantly locked into the past, including their outdated philosophies to which Kareiva refers. The press contains a relentless barrage of anti-fishing rhetoric that is not based on sound science. Spectacular examples abound, including, "...bottom trawling, the equivalent of using a nuclear bomb to catch rabbits" (Craig Bohm, Australian Marine Conservation Society, cited in Webster, S. Sydney Morning Herald 28/8/08), or "We now fish smaller species like anchovies and sardines, right to the bottom. We are at the last-chance cafe when it comes to fisheries." (Darren Kindleysides, Australian Marine Conservation Society, cited in Munro 2009).

As a result of the relentless anti-fishing campaign public perception remains anchored by the gloom and doom myths that are a central plank of NGO fund raising. The failure of Australian government agencies, particularly those responsible for policy on food security and fisheries management, and the seafood industry, to effectively counter the negative publicity on the state of Australia's fisheries remains baffling. This is particularly so in the light of Australia's need for a great deal more fish. Australia's fisheries are amongst the most conservatively managed in the world. Most of the world is aware of this, but Australia actively refuses to accept the credit!

Fisheries assessments that are commonly distorted

Most of the 'guides' to which fish Australians should and should not eat list many species for which assessments are given that are highly questionable, at best. Most have orange roughy at, or very near, the top of the 'do not eat' list. Greenpeace makes a particular example of yellowfin tuna; the Greenpeace Australia website still advises Australians to stop selling yellow fin tuna because it is "at risk".

Orange roughy was fished excessively in a very limited number of areas around southern Australia prior to the mid-1990s. Since then management has been extremely restrictive. The species is the subject of a very rigorous recovery plan. Only a fraction (less than one sixth) of the known area of distribution of orange roughy in Australia has ever been trawled and in

addition to all the unfished areas 90-95% of the small fraction that was fished in Australia is now closed to all orange roughy fishing. The current annual allowable catch in Australia is less than 1% of what it was in the period that overfishing occurred. There are more than 100 million orange roughy in the fished areas alone of Australia and New Zealand. Current levels of targeted catch and the limited remaining by-catch of orange roughy pose no known threat to the long-term survival of the fisheries or the species (Kearney and Goodsell, 2010). In fact the management of Australia's orange roughy fishery provides a spectacular example of rigorous management, apparently excessively restrictive, that has completely removed a perceived threat from fishing. Australians should be being told about the obvious sustainability of what little orange roughy is marketed in Australia and encouraged to eat it with extreme confidence.

Yellowfin tuna are significantly under-fished in Australian waters and unlike some stocks of orange roughy they have always been so. Figure 4 shows the abundance in Region 5 (Australia) of the Western and Central Pacific Ocean (WCPO) yellowfin tuna stock, relative to what it would be in the absence of fishing. Even the small decrease in biomass that has been estimated is likely to be at least partly attributable to exploitation of the species outside the Australian EEZ, not by Australian fishing. Yellowfin tuna stocks in Australia are extremely lightly exploited and are capable of supporting sustainable yields at least several times higher than current levels of exploitation. The species is spread over huge areas, is very fast growing and has extreme reproductive capacity, females spawning approximately a million eggs up to four times a week, year-round in tropical waters. It is absurd, in fact morally wrong, to advise Australians not to eat the very small quantities of yellowfin tuna that are landed in this country on the basis that the species is 'at risk'.

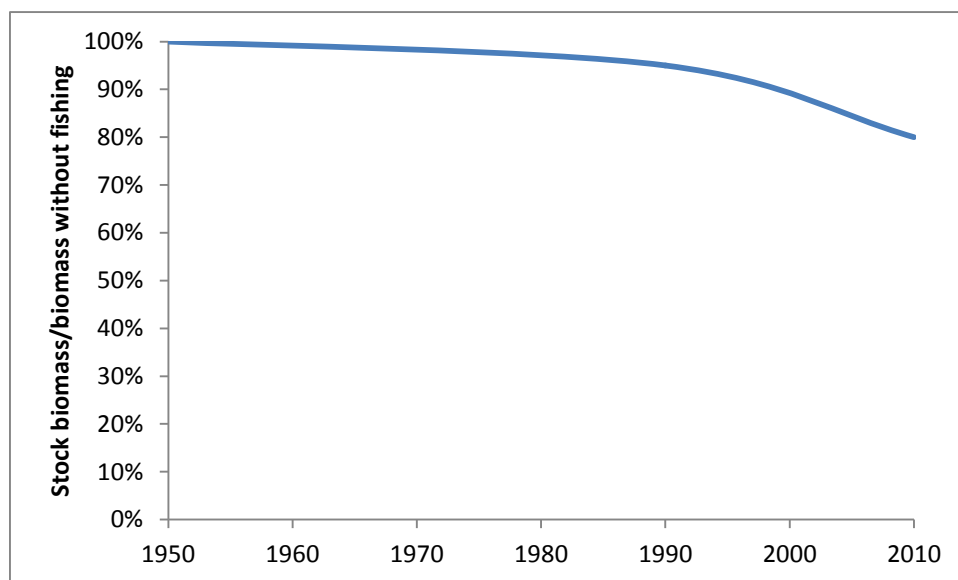


Figure 3. Status of Yellowfin tuna in Australian Zone plotted as a ratio of what the stock is now compared to what it would be in the absence of fishing. Redrawn from Figure 57 of yellowfin tuna stock assessment of the Western and Central Pacific Fisheries Commission. WCPFC-SC7-2011/SA- WP-03

Fisheries have low environmental impact compared to alternatives

Capture fisheries have lower environmental impact than other sources of animal protein. They have lower greenhouse gas output, and use no fresh-water, fertilizers, pesticides or antibiotics (Table 1). Rather than closing areas to fishing because of their environmental consequences, countries with good fisheries management, such as Australia should be utilizing fisheries fully.

Table 1. Amount of water, fertilizer, pesticides, antibiotics and greenhouse gas emissions needed to produce one portion containing 40g of protein, for beef, chicken, pork, dairy and capture fisheries.

	Water (L)	Fertilizer (g)	Pesticides (mg)	Antibiotics (mg)	Greenhouse gases (kg)
Beef	2200	50	494	21	16.7
Chicken	1331	18	163	55	2.5
Pork	1331	46	422	53	3.8
Dairy	1178	34	299	50	2.7
Capture fisheries	Low	0	0	0	0.3-2.0

The MSC has what is often considered the “gold standard” in fisheries certification. To meet this standard a fishery must demonstrate that it does not alter the structure and function of the ecosystem that is fished. This is a high and exacting standard that no form of agriculture could meet. Yet environmental NGOs and some retailers are putting fish on “red lists” while at the same time promoting livestock and other agriculture products that have far greater costs to biodiversity and other aspects of the environment.

Yes fishing does have environmental impacts; all human activities do, even breathing in oxygen and breathing out carbon dioxide, a ‘greenhouse’ gas. The questions that need to be addressed

are, whether the activity justifies the impact, is further regulation necessary, or is there a more environmentally friendly way of providing the same service?

The most obvious impact of fishing is that the abundance of some target species is lower in fished areas; there are usually fewer larger and older fish of exploited species in exploited areas, even if only temporarily. But unlike in the countries with inadequate fisheries management, (discussed above) where there are well managed fisheries the densities and sizes of fished species are maintained at levels that are conservative and optimize the yields that can be taken; this is exactly what assessment of good fisheries management confirms. The maintenance of densities of species at levels that result in optimum productivity has also been suggested to provide an intermediate level of disturbance that is beneficial not only for some individual species but for overall biodiversity (Connell, 1978, Krohne, 2001).

Some forms of fishing have greater and more obvious impacts than others, for example fish-trawling over hard bottoms or dredging in areas of significant benthic communities can be expected to have more obvious impact than line-fishing for pelagic species. But even the most destructive forms of fishing (with the possible exception of dynamiting and poisoning of coral reefs, if they are allowed to be called ‘fishing’ and they are outlawed in Australia and most developed countries) have less impact than the common and accepted terrestrial activities of urban development and most forms of agriculture. Fishing does not deliberately transform landscapes as does urban development, nor does it clear-fell native vegetation and add extra nutrients and pesticides to help cultivate introduced species to the exclusion of the recovery of native flora and fauna, as do most forms of agriculture. What negative impacts fishing does have are relatively easily managed and even when mistakes are made they are normally reversible within relatively short time, as the recovery of Australia’s overfished stocks (Figure 2) demonstrates. Australia’s management of fisheries problems that have been identified is certainly ‘responsive’ and often even excessive; the restriction of the orange roughy fishery as discussed above is testimony to the occurrence of overly-restrictive management.

Trawling is one form of fishing that has been particularly demonized globally and in Australia. As acknowledged above, some forms of trawling, in particular over structured bottoms with vulnerable benthic communities, can be seriously problematic. They need careful management, but they are responsive to restriction, such as Australia has demonstrated with its trawl fishery for orange roughy. Many forms of trawling, however have limited environmental impact. Trawling on soft bottoms, particularly in high energy areas where the effects of currents or wave action dominate, may have little, if any, short-term impacts and no detectable, long-term negative consequences. In Australia this has been best demonstrated by the failure to detect any impact on bottom biota of prawn trawling in the Clarence River (Underwood, 2007). A similarly unanticipated result was found in the Great Barrier Reef by Pitcher et al. (2009a). They found

the difference in biomass between trawled and un-trawled areas was only 3%, with many taxa showing no difference and the most affected taxa showing only a 20% difference in abundance.

Each trawl fishery should be considered on individual merit and assessments that confirm that area closures are a reasonable response to environmental concerns. Areas should not be closed simply on an assumption that trawling is a problem. Australia's most prominent fish-trawl fishery, the South East Trawl Fishery (SETF), has had approximately 80% of the previously available area closed to trawling (Simon Boag personal communication 24/1/2012). Of the remaining 20% that is technically open to trawling only 53% was estimated to be trawlable (Williams, A 2006 p109). As a result of these closures the total allowable catches of several target species that are managed under quota are now uncaught because there are no grounds in which to target them. Examples include some deepwater sharks and smooth oreo dories.

Rebuilding the world's overfished stocks

Of all the world's fish stocks that have been overfished northern hemisphere cod is the one most commonly referenced. Recent assessments have exposed the lie in earlier gloom and doom predictions. Even WWF states that "North Sea cod, once on the brink as a result of decades of over-fishing, has now recovered to an extent that the public should start eating it again with enthusiasm" (cited in Hickman, 2010)

Another of the world's biggest cod fisheries, in the Baltic sea, has staged a remarkable recovery in recent years following an almost classical case of overexploitation in the 1980s and a reluctance to take the necessary action until about 2004/5 (Figure 4).

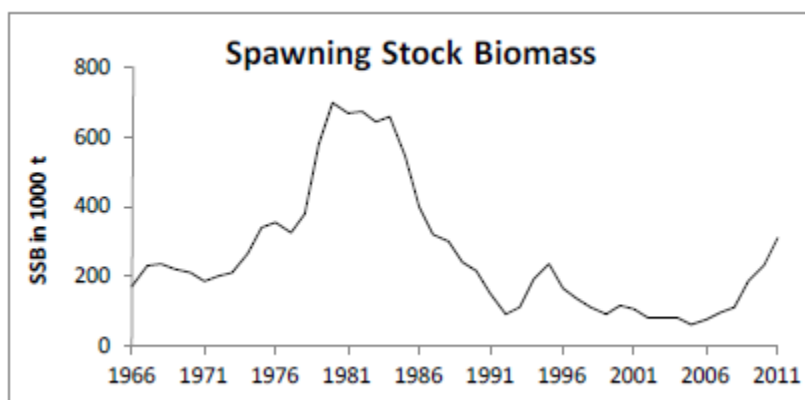


Figure 4. Trend in abundance of Baltic Sea cod. Data from ICES assessment data base

An even more spectacular recover has been reported for the largest cod stock in the world, the Barents Sea (Arcto-Scandinavian) cod which is now more abundant than any time since WW II (Figure 5)

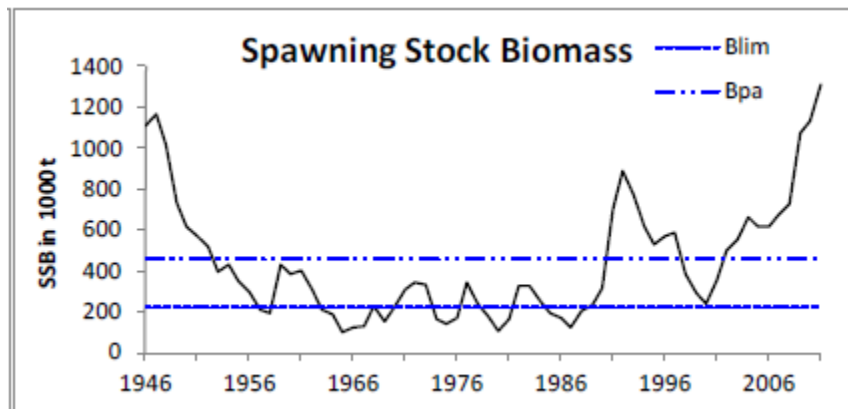


Figure 5. Trend in abundance of Barents Sea cod. Data from ICES data base.

Threats to marine biodiversity

There is no doubt the world's oceans are under increasing pressure from some anthropogenic impacts. The major accepted threats are pollution, including ocean acidification, inappropriate development, destructive fishing practices and overfishing and introduced and trans-located organisms.

In Australia episodic **pollution** events continue to devastate rivers, estuaries and numerous coastal areas, particularly near-shore areas and those with obviously vulnerable biota, notably coral reefs. More insidious and longer-lasting impacts of pollution continue to directly diminish stocks of many marine organisms and increase the vulnerability of even more to disease or other invasive vectors. Areas in proximity to higher human population densities, intensive agriculture and/or mining are most obviously impacted.

While there is little doubt Australians are increasingly aware of the problems that **coastal development** may cause, infrastructure development and less than perfect regulation of routine developments, such as marinas, are still a significant issue. The 'reclaiming' of very large swathes of sea grass beds and fish nursery areas in Botany Bay, one of Australia's most productive and culturally significant estuaries, for airport runways and more recently a container terminal, is one obvious example.

Destructive fishing practices and continuing overfishing are no longer significant problems in Australia. Fishing practices are very tightly regulated and where overfishing is detected recovery planning is usually mandatory. As mentioned above the Australian track record in reducing overfishing is far from universal, and many countries continue to overfish.

Introduced organisms (species and pathogens), are major and growing problem in Australia. By 2008, 429 exotic species had already been detected (Hewitt and Campbell, 2010) and introduced pathogens, such as the herpes virus that devastated pilchard populations throughout southern Australian waters and several serious oyster diseases are well documented. Fouling on ships' hulls and ballast water have been identified as the most common vectors for introductions and with accelerating increases in shipping, particularly in association with the mineral export boom, the problems can only be expected to worsen.

Conclusions:

Australia's fisheries are amongst the best managed in the world and they are without doubt sustainable. Fishing, as managed in Australia, has not been shown to irreversibly threaten the survival of species. To the contrary, it can be demonstrated to be an extremely environmentally friendly source of an essential food, particularly in comparison with other forms of animal protein production. Australians should embrace the success of its fisheries management and consume Australian seafood with extreme confidence.

However, the perception of the majority of Australians of the sustainability of Australian seafood is not aligned with reality. Public perception has been distorted, primarily by numerous NGOs and others who benefit from projecting apprehension in seafood consumers. These NGOs are out of touch with recent global developments and in denial of fisheries management outcomes in Australia. Their distortion of reality has been based on misrepresentation of overseas examples of inadequate fisheries management to falsely claim gloom and doom for Australia's fisheries and their impacts. The resulting anti-fishing rhetoric has falsely demonized fishing and led to ill-directed calls for more restrictions, particularly in areas that are closed to fishing and then called 'protected'.

Australians have been told by health professionals and authorities to eat more seafood, yet the country has a serious and growing shortage of locally produced product and no obvious policies for food security or increasing domestic supply of fish. Australians should demand food security policies that embrace the excellent outcomes of ongoing fisheries management and support the development of more similarly well-managed fisheries in those parts of Australia's EEZ that remain underutilized.

References

- ABARES 2011. Australian fisheries statistics 2010. Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences.
- Boag, S. 2012. Personal Communication January 24, 2012.
- Branch, T. A., Watson, R., Fulton, E. A., Jennings, S., McGilliard, C. R., Pablico, G. T., Ricard, D. & Tracey, S. R. 2010. The trophic fingerprint of marine fisheries. *Nature*, 468, 431 - 435.
- Commonwealth of Australia 1999. Environment Protection and Biodiversity Conservation Act 1999. Canberra: Commonwealth of Australia.
- Connell, J. H. 1978. Diversity in Tropical Rain Forests and Coral Reefs. *Science*, 199, 1302-10.
- Dept. SEWPaC. 2009. *EPBC Act List of Threatened Fauna* [Online]. Canberra: Department of Sustainability, Environment, Water, Population and Communities. Available: <http://www.environment.gov.au/cgi-bin/sprat/public/publicthreatenedlist.pl> [Accessed February 20 2012].
- Earle, S. 2011. *Q&A: Sylvia Earle on the planet's blue engine* [Online]. Science and Development Network. Available: <http://www.scidev.net/en/agriculture-and-environment/eye-on-earth-summit/features/q-a-sylvia-earle-on-the-planet-s-blue-engine.html> [Accessed February 10 2012].
- FAO 2010. The State of World Fisheries and Aquaculture 2010. Rome: Food and Agriculture Organization of the United Nations.
- Hardin, G. 1968. The Tragedy of the Commons. *Science*, 162, 1243-1248.
- Hewitt, C. & Campbell, M. 2010. The relative contribution of vectors to the introduction and translocation of invasive marine species: keeping marine pests out of Australian waters. Canberra: Commonwealth of Australia, The Department of Agriculture, Fisheries and Forestry.
- Hickman, M. 2010. *Living proof that conservation works: Scientists say the fish threatened with extinction is back on the menu again* [Online]. The Independent. Available: <http://www.independent.co.uk/environment/nature/living-proof-that-conservation-works-1973928.html> [Accessed February 10 2012].
- Juan-Jordá, M. J., Mosqueira, I., Cooper, A. B., Freire, J. & Dulvy, N. K. 2011. Global population trajectories of tunas and their relatives. *Proceedings of the National Academy of Sciences of the United States*, 108, 20650 - 20655.

- Kareiva, P., Lalasz, R. & Marvier, M. 2011. Conservation in the Anthropocene: beyond solitude and fragility. *In: Schellenberger, M. & Nordhaus, T. (eds.) Love Your Monsters: postenvironmentalism and the anthropocene*. Oakland: Breakthrough Institute.
- Kearney, R. & Farebrother, G. 2012. Expand Australia's sustainable fisheries. *Nature*, 482, 162.
- Kearney, R., Foran, B., Poldy, F. & Lowe, D. 2003. Modelling Australia's Fisheries to 2050: Policy and Management Implications. Deakin ACT: Fisheries Research and Development Corporation.
- Kearney, R.E. and Goodsell, P.J. 2010. Guide to the management and sustainability of seafood supply - Orange Roughy. FRDC Final Report 2009/071. Fisheries Research and Development Corporation, Canberra.
- Krohne, D. T. 2001. *General Ecology*, 2nd ed. Pacific Grove CA., Brooks/Cole.
- Moore, P. A. 2010. *Confessions of a Greenpeace Dropout: the making of a sensible environmentalist*. Vancouver, Beatty Street Publishing Inc.
- Mora, C., Myers, R. A., Coll, M., Libralato, S., Pitcher, T. J., Sumaila, R. U., Zeller, D., Watson, R., Gaston, K. J. & Worm, B. 2009. Management Effectiveness of the World's Marine Fisheries. *PLoS Biol*, 7, 1 - 11.
- Munro, P, 2009. *Sunday Age*, 23/8/2009.
- Myers, R. A. & Worm, B. 2003. Rapid worldwide depletion of predatory fish communities. *Nature*, 423, 280 - 3.
- NHMRC 2011. Australian Dietary Guidelines Incorporating the Australian Guide to Healthy Eating: Providing the scientific evidence for healthier Australian diets (DRAFT FOR PUBLIC CONSULTATION). Canberra: National Health and Medical Research Council.
- Pauly, D., Christensen, V., Dalsgaard, J., Froese, R. & Torres, F. 1998. Fishing Down Marine Food Webs. *Science*, 279, 860 - 863.
- Pitcher, C. R., Burridge, C. Y., Wassenberg, T. J., Hill, B. J. & Poiner, I. R. 2009a. A large scale BACI experiment to test the effects of prawn trawling on seabed biota in a closed area of the Great Barrier Reef Marine Park, Australia. *Fisheries Research*, 99, 168 - 183.
- Pitcher, T., Kalikoski, D., Pramod, G. & Short, K. 2009b. Not honouring the code. *Nature*, 457, 658 - 659.
- Sethi, S. A., Branch, T. A. & Watson, R. 2010. Global fishery development patterns are driven by profit but not trophic level. *Proceedings of the National Academy of Sciences of the United States*, 107, 12163 - 12167.

- Underwood, A. J. 2007. Assessment and management of potential impacts of prawn trawling on estuarine assemblages. Final Report, Project 2000/176. Canberra: Fisheries Research and Development Corporation.
- WCPFC 2011. Stock Assessment of Yellowfin Tuna in the Western and Central Pacific Ocean. Scientific Committee Seventh Regular Session (WCPFC-SC7-2011/SA-WP-03). Pohnpei: Western and Central Pacific Fisheries Commission.
- Webster, S. 2008. *Sydney Morning Herald*, 28/8/2008.
- Williams, A. 2006 Integrating fishing industry knowledge of fishing grounds with scientific data on seabed habitats for informed spatial management and ESD evaluation in the SESSF. FRDC 2000/153, Fisheries Research and Development Corporation, Canberra.
- Woodhams, J., Stobutzki, I., Vieira, S., Curtotti, R. & Begg, G. A. (eds.) 2011. *Fishery status reports 2010: status of fish stocks and fisheries managed by the Australian Government*, Canberra: Australian Bureau of Agricultural and Resource Economics and Sciences.
- Worm, B., Barbier, E. B., Beaumont, N., Duffy, J. E., Folke, C., Halpern, B. S., Jackson, J. B. C., Lotze, H. K., Micheli, F., Palumbi, S. R., Sala, E., Selkoe, K. A., Stachowicz, J. J. & Watson, R. 2006. Impacts of Biodiversity Loss on Ocean Ecosystem Services. *Science*, 314, 787 - 790.
- Worm, B., Hilborn, R., Baum, J. K., Branch, T. A., Collie, J. S., Costello, C., Fogarty, M. J., Fulton, E. A., Hutchings, J. A., Jennings, S., Jensen, O. P., Lotze, H. K., Mace, P. M., McClanahan, T. R., Minto, C., Palumbi, S. R., Parma, A. M., Ricard, D., Rosenberg, A. A., Watson, R. & Zeller, D. 2009. Rebuilding Global Fisheries. *Science*, 325, 578 - 584.