

Whales & Fisheries



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Cover photo: Humpback whales (*Megaptera novaeangliae*) feeding in the Northwest Atlantic. © IFAW / R. Sobol

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Whales and Fisheries

Calls for the deliberate reduction of whale populations would have been unthinkable even a few years ago. Today, they are an increasingly common occurrence. Whales, we are now told, “consume between 280 and 500 million tons of marine life each year”¹ - 3 to 6 times the annual world harvest of fish for human consumption.² Meanwhile, the Food and Agriculture Organization of the United Nations (FAO) informs us that seventy-five per cent of the world’s fishery resources are fully or over exploited.³ In order to keep marine life plentiful for future generations, we are told that “management of the world’s marine resources must change.”² We must, the advice continues, “base our decisions on sound science, taking into account the complexity of the entire ecosystem.” For whaling nations like Japan and Norway, this means a resumption of commercial whaling and culling (i.e. killing) more whales. For others, it means acknowledging the complexity of marine ecosystems, taking a precautionary approach to the management of commercial fisheries and whaling. It also means acknowledging the scientific evidence that a whale cull likely will not only fail to benefit fisheries, it might actually be detrimental to fishing interests. Initiating a whale cull, therefore, is not something that should be undertaken without careful consideration of its likely consequences.

The desire by some countries to lift the International Whaling Commission’s (IWC) moratorium on commercial whaling and cull, i.e. kill, more whales comes at a time of widespread decline in commercially important fish stocks, and corresponding declines in commercial fisheries.

From the outset, it is worth remembering that in centuries past, the world’s oceans were home to more marine mammals - including whales, dolphins, porpoises, and seals - than they are today.⁴ At the same time, many fish stocks were also more plentiful. Remember, for example, the stories from John Cabot’s early ventures to the Northwest Atlantic, off the East coast of North America. Marine mammals were numerous and not commercially exploited, and Atlantic cod were so abundant that they could be scooped out of the sea in wicker baskets.

Today, there are fewer species of marine mammals in those waters. In the 18th and 19th centuries, the Atlantic gray whale (*Eschrichtius robustus*) was hunted to extinction and the walrus (*Odobenus rosmarus*) was extirpated from the Gulf of St. Lawrence and Northeastern United States. Although protected since 1972,⁵ a number of other great whale populations in those waters have yet to recover from the effects of commercial whaling. Meanwhile, the cod (*Gadus morhua*) stocks collapsed in the early 1990s due to over-fishing⁶ and there has been a moratorium on Canada’s commercial cod fishery since 1992.

The same pattern is seen throughout the world’s oceans. Most large whale populations used to be far larger than they are today; there were obviously enough fish and plankton to support them, and enough left over to support the huge global fish stocks that have since been exploited by commercial fisheries.⁷ Scientists report no substantive evidence that cetaceans have harmed commercial fisheries⁸ and the partial recovery of some whale populations over the past 30 years cannot begin to explain the decline in fisheries worldwide.⁷

Globally, some 75 per cent of all commercial fish stocks are now fully or over-exploited.³ For those individuals and organizations interested in the maintenance of biodiversity and the functioning of marine ecosystems, the concern is not that marine mammals eat marine life. Rather, the concerns are about over-fishing by humans,⁴ which continues to deplete the oceans of their inhabitants, and the threat that a resumption of commercial whaling might pose for the remaining great whales.

- Over 75% of world fisheries are fully or overexploited today (FAO 2000).
- Overfishing by humans is the major cause of depleted fish stocks.
- Before the great whales were depleted by commercial whaling, there was no shortage of fish in the sea.

WHO IS CALLING FOR A WHALE CULL?

While calls for culling seals for the intended benefit of fisheries have been heard for years, the suggestion of culling large whales is a recent phenomenon. Virtually every call for a whale cull heard thus far can be traced directly to the major whaling nations: Norway, Japan, and Iceland. Proposals to cull whales are also promoted through newspaper opinion pieces - including some written by the seafood industry - which repeat the whalers’ culling arguments uncritically, and by journalists, who confuse pro-whaling advocacy with news.

Those who promote whale culls often give the erroneous impression that we need to cull, i.e. kill, lots of whales to maintain or restore the “balance of nature.” Those who know their history will know, however, that the “balance of nature” argument was long ago abandoned by mainstream ecologists. As Charles Elton, the renowned British ecologist, wrote in 1930, “The balance of nature does not exist, and perhaps has never existed.”⁹

YES, WHALES EAT FISH...AND OTHER MARINE LIFE...BUT...

There was a time when the conventional wisdom was that marine mammals had voracious appetites. Such appetites, it was reasoned, were necessary to fuel an elevated metabolic rate, which - it was thought at the time - was required for a warm blooded mammal, such as a whale, to maintain a

constant deep body temperature in cold ocean waters. Some scientists went even further to suggest that marine mammals were “inefficient converters of fish flesh.”¹⁰ Not surprisingly, an early book on whales called them “gluttons.”¹¹

Although one still sees occasional references to these older views, scientists have since demonstrated that marine mammals actually have “normal” mammalian metabolic rates,¹² “normal” mammalian rates of food consumption,¹³ and similar digestive efficiencies as other mammals.¹⁴ In other words, whales - for their size - have similar energy requirements to other mammals, including humans.¹⁵

Nonetheless, some recent comparisons of the amount of fish eaten by whales with that taken in commercial fisheries¹ have been used to imply that fewer whales would mean more

fish for fishermen.² The truth is, however, that estimates of whales’ food consumption - even if they were based on adequate data, which they aren’t - would actually tell us little about whether or not marine mammals are having direct or indirect effects on the abundance of various fish stocks or on the catches of commercial fisheries.

Of course, whales - like all animals - still must eat to survive and reproduce their kind. And being large mammals, they do have large appetites. They satisfy those appetites by eating a variety of marine life and, in the case of the great whales, the bulk of the prey species consumed are invertebrates, including zooplankton such as krill (Euphausiacea), and squid (Teuthoidea).¹⁶ Some whales do eat fish but many of the species eaten - whether invertebrate or fish - are of no current interest to commercial fishermen. And, in those situations where whales - like some seals - do eat commercially important species, it is not at all clear whether a whale cull would be beneficial or detrimental to fishing interests.

Regardless, if someone insisted on trying to estimate the total amount of food eaten by whales in the world oceans, they would need to know the population size for the nearly 80 species of marine cetaceans (whales, dolphins, and porpoises), their daily energy requirements, the amount of various prey species consumed and the energy content of each. Since we don’t know population sizes for most cetaceans, nor specific details about most of their diets, it quickly becomes evident that it is impossible to estimate accurately the total amount of food eaten by all whales.

So, when proponents of culling whales suggest that whales eat huge amounts of marine life - the 280 to 500 million tons mentioned earlier¹ - the actual number is virtually meaningless. It tells us nothing about how much commercially important fish is eaten by whales. And it tells us even less about the effects of culling whales on the future abundance of commercially important fish stocks and catches that might be obtained from them. And, it obscures the fact that the major predators of commercially important fish are not whales, but other fish.¹⁷ Other problems with the ‘cull whales’ argument are outlined on the following pages.

“COMMON SENSE”...AND WHY IT MAY BE WRONG

The view that fewer whales would mean more fish in the ocean, and more fish for human consumption is said to be based on “common sense.” In reality, it is based on an overly simple model of the world, where the oceans contain only whales and fish (Figure 1a). Since whales eat fish, then fewer whales must mean more fish for humans (Figure 1b).

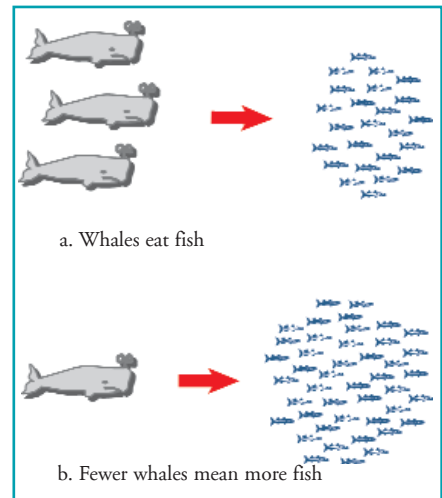


Figure 1. An overly simplistic view of marine ecosystems.

An equally “common sense” argument tells us, however, that in those situations where a whale eats the predators or competitors of commercially important fish (Figure 2a), then fewer whales would actually mean fewer fish for fishermen (Figure 2b). Adding just one more component to the system changes the predicted outcome of a whale cull.^{15,18}

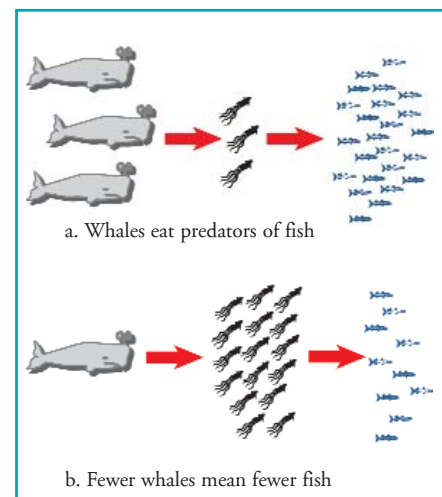


Figure 2. Another overly simplistic view of marine ecosystems

WHALING NATIONS ATTEMPT TO JUSTIFY WHALE CULLS

“Culling of minke whales may greatly help the recovery of the larger baleen whales.”

Japanese Ministry of Foreign Affairs, 2000

“A whale sanctuary... could have significant adverse impacts on fisheries resources by providing excessive and unnecessary protection for cetaceans that consume large amounts of marine living resources.”

D. Goodman, Japan Institute of Cetacean Research, 2000

“Total food consumption by cetaceans was roughly equivalent to three to six times the recent world-wide fisheries catch.”

Institute of Cetacean Research, Japan, 1999

“...to achieve an optimum balance in the food chain, the whale species which occur in large enough numbers should be harvested.”

Norwegian Department of Fisheries web site

“A 10% stock increase in minke whales is estimated to cause an annual loss of almost US \$19 million to those fishing on the whales’ prey species.”

Norwegian Government Progress Report to IWC, 1997

“Research in Iceland has indicated that the long-term yield of the cod stock is significantly impaired by continued growth of whale stocks.”

Icelandic Minister of Fisheries, October 2000

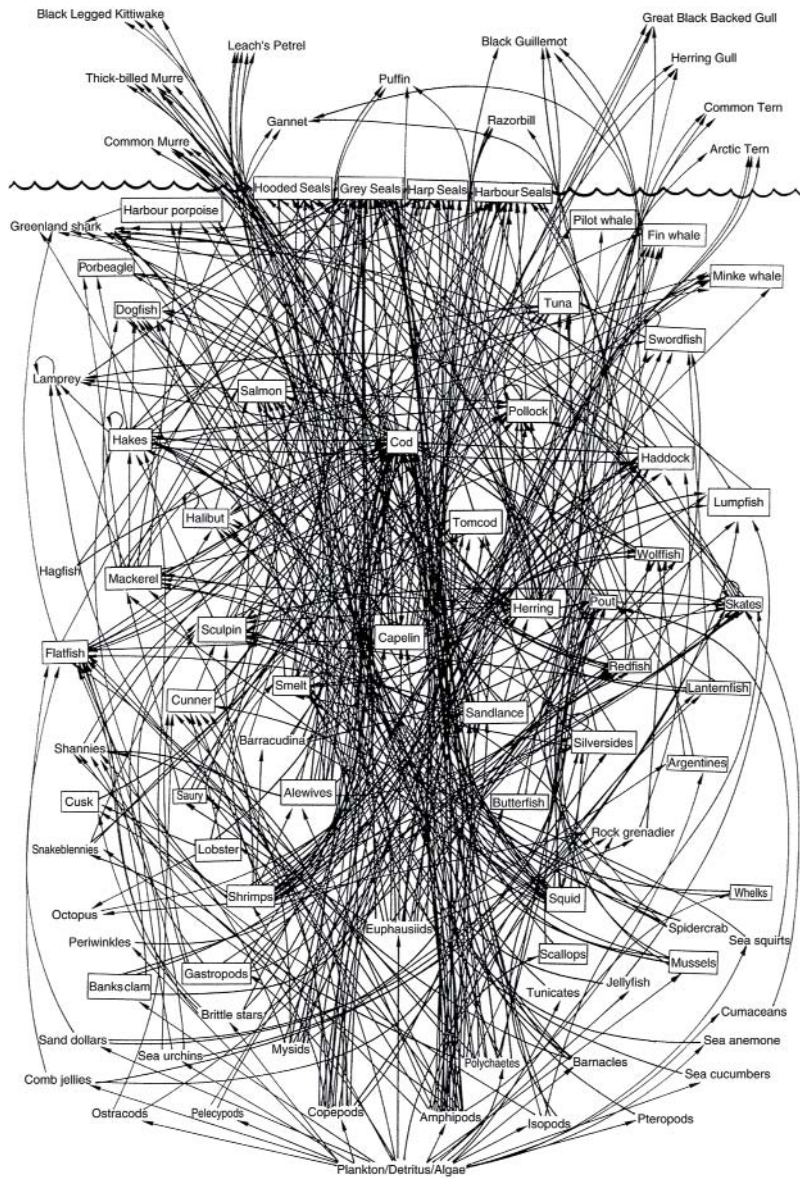


Figure 3. Partial food web for the Scotian Shelf in the Northwest Atlantic off eastern Canada. Species enclosed in rectangles are also exploited by humans. This food web is incomplete because the feeding habits of all components have not been fully described. Further, all species shown do not spend the entire year within the area. Compiled from a variety of sources by D. Huyck - see reference 15.

Of course, both of the previous scenarios are overly simplistic. Ocean ecosystems have many more than two or three components. When one looks at even a simplified food web for the Northwest Atlantic (Figure 3), for example, it becomes obvious that predicting the outcome of a whale cull based on either “common sense” argument would be foolish. Feeding relationships in the oceans are complex and it is extremely difficult to predict what the effect would be of reducing one component - whales - on the rest of the system.

Suppose we disregard the obvious problems and proceed with a whale cull. Will all the fish that the culled whales would have

eaten end up in fishermen’s nets? Certainly not! Any increase in the number of fish resulting from a whale cull is much more likely to be eaten by other predators - including predatory fish, sea birds, other whales, and seals - than it is to be caught by fishermen. Still others of the “saved” fish will simply never be encountered by a commercial fishing boat and will eventually die from other forms of natural mortality. Any possible benefits of a whale cull to a fishery could only amount to some small proportion of the benefits originally implied simply by calculating - no matter how imprecisely - the total amount of food consumed by whales. On the other hand,

there remains the troublesome possibility that a whale cull might actually be detrimental to fishing interests.

A CASE IN POINT

Recent scientific analyses have only confirmed the uncertainty inherent in predicting the results of a proposed marine mammal cull. The most thoroughly studied case involves the expected benefits of a cull of Cape fur seals (*Arctocephalus pusillus pusillus*) in South Africa for the important hake fishery. “Common sense” would dictate that, since Cape fur seals eat hake (*Merluccius capensis* and *M. paradoxus*), fewer Cape fur seals would mean more hake for fishermen. Following an international scientific workshop,¹⁹ two years of additional research and an independent scientific review of the findings, it was determined that a cull of Cape fur seals might actually be detrimental to the hake fishery.²⁰ Given this result, and true to its claim that it bases its fishery management decisions on the best available scientific advice, the Government of South Africa declared a moratorium on the proposed fur seal cull in 1992. Ten years later that moratorium remains in place.

WHAT THE SCIENTISTS HAVE SAID

Both the “whales eat fish” model (Figure 1), and the “whales eat the predator of a commercially important fish” model (Figure 2) produce “common sense” results. Yet, neither model provides an adequate basis for justifying a decision to cull or not to cull whales, because marine ecosystems are much more complicated than implied by these models (remember Figure 3). It is because of such complexity that for over 20 years, scientists have concluded time and again that, for particular marine systems, they are unable to predict the results of a marine mammal cull on fish populations and fishery yields from them.

Scientists are currently trying to determine the most appropriate ways to model interactions between marine mammals (including whales) and fisheries and, recently, some progress has been made. It has been recognized, for example, that two or three component models (Figures 1 & 2 above) are insufficient for predicting the results of a whale (or seal) cull and that some minimum level of complexity must be taken into account, as was done in the case of the Cape fur seal - hake

interaction mentioned above^{19,20}. At the opposite extreme, food web theory has been used to examine the complex interactions at the level of entire ecosystems (to the extent we understand them, e.g. Figure 3).²¹ And, a variety of different modeling approaches are now under investigation to see what they might contribute to the discussion (recently reviewed in reference 21).

In the interim, there are still no documented examples where a marine mammal cull has produced measurable benefits for commercial fisheries. As a consequence, Professor William Montevecchi from Memorial University in St. John's, Newfoundland, was moved to write, "There is no scientific evidence that the culling of large marine predators has ever benefited a commercial fishery."²²

SO, WHY CALL FOR A WHALE CULL?

Given the scientific uncertainty about the possible outcomes associated with culling whales, and the possibility that a cull could actually be detrimental to fishing interests, it begs the question: Why would anyone truly interested in world fisheries promote a whale cull?

One answer is that concern for fish stocks is not the driving force behind proposals to cull whales. The real objective is to provide an apparent (and apparently urgent) reason for lifting the IWC moratorium on commercial whaling. And, if that objective were ever achieved, then the same strategy would almost certainly be used to argue for larger quotas than would be provided by the precautionary Revised Management Procedure (RMP) developed by the IWC Scientific Committee to ensure that any future commercial whaling is biologically sustainable.²³

What the proponents of culling whales ultimately want, then, is to justify the killing of more whales than would be permitted by any biologically sustainable management regimen. To promote their cause, they use the language of science and conservation biology. While they say we should "base our decisions on sound science, taking into account the complexity of the entire system,"² what they present (e.g. the amount of food eaten by whales) is simply inadequate, and what they promote (e.g. culling whales) ignores - at considerable risk to fisheries - scientific

uncertainty and the "complexity" of marine ecosystems.

Clearly, concern for fish stocks is not the driving force behind proposals to cull whales. The real objective is to provide an apparent (and apparently urgent) reason for lifting the IWC moratorium on commercial whaling.

A MODERN SCIENTIFIC APPROACH TO ECOSYSTEM MANAGEMENT

"...although we might wish to manage wild marine animals or their environment, as yet we don't know how. What perhaps we humans can manage are our own activities which affect the marine mammals, to our own ultimate benefit or harm."

S.J. Holt, 1978

Those who are truly concerned with keeping "marine life plentiful" for present and future generations, will nonetheless agree with the proponents of culling whales² on several matters. They will agree, for example, that the "management of the world's marine resources must change." They will also agree that we must "base our decisions on sound science, taking into account the complexity of the entire ecosystem."

For commercial fisheries, that means reducing the current overcapacity of the world's fishing fleet so that we no longer have too many fishing boats and too many people chasing too few fish in the sea. It also means paying more attention to scientific advice and to the lessons of history, acknowledging the complexity of marine ecosystems, and taking a precautionary approach to the management of commercial fisheries. By listening to scientists and erring on the side of caution, we could have avoided, for example, the collapse of cod stocks of eastern Canada and the painful economic and social upheaval that followed.²⁴

For the whales, it also means paying more attention to scientific advice and the lessons of history, and taking a precautionary approach. It means managing human activities (e.g. commercial fishing, shipping traffic, development, and commercial whaling) in ways that minimize impacts on still abundant species, while promoting the recovery of depleted species, as provided for in the United Nations Convention on the Law of the Sea (UNCLOS)²⁵ and Agenda 21.²⁶

A modern scientific approach to managing human activities in the ocean also requires a rigorous way for dealing with proposals to cull marine mammals designed to benefit commercial fisheries. Building on the South African example mentioned above, the United Nations Environment Programme's (UNEP) Marine Mammals Action Plan established a Scientific Advisory Committee in 1992 to develop a protocol for the scientific evaluation of proposals to cull marine mammals.²⁷ That protocol, which is available on the World Wide Web at www.cull.org, outlines the minimum amount of information needed to conduct such an evaluation. In order to facilitate proper scientific evaluation, the protocol notes that cull proposals should be made in writing, and include certain specified information together with references to original sources.

A brief glance at the protocol makes it abundantly clear that, from a scientific perspective, the current calls for culling whales do not satisfy the requirements outlined by UNEP.

Evaluating a culling proposal requires considerable data and sophisticated analyses before it can be said with any certainty that a proposed cull is likely to achieve its objective and actually benefit, rather than harm, commercial fishing interests. In the case of fisheries that are inadequately managed and dependent on high levels of subsidies, the protocol also notes that enhancing the potential yield of a fish stock, through a marine mammal cull or by other means, can actually exacerbate the net economic losses to a fishery.

CONCLUSIONS

"Sometimes when we change the ecosystem we create other problems that we do not anticipate. We must always be cognizant of that...Some people advocate a huge seal cull. The seals eat herring, the herring eat larvae, and that affects the cod. You disrupt other things that you do not want to, and that may be detrimental to your goal. I am always leery about trying to control the ecosystem. We must ensure that we have sound science before we make these decisions."

Canadian Fisheries Minister, The Hon. Herb Dhaliwal, Testimony to the Senate Standing Committee on Fisheries, 15 February 2000.

Professor Peter Yodzis, writing recently in *Trends in Ecology and Evolution*, noted that there is now "a considerable body of current opinion that fisheries should be managed in

such a way as to avoid harm to natural populations, rather than the other way around.”²¹ This view is already reflected in international agreements, such as the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the United Nations Convention on the Law of the Sea (UNCLOS). Both conventions recognize the importance of “dependent species” and require those who wish to exploit fish resources to make sure that enough fish remain for other predators, including whales.

When it comes to calls for culling marine mammals - whether they be seals (as above) or whales - the conclusion is clear. Culling marine mammals may very well not produce the expected benefits for a fish population or for a commercial fishery. Indeed, the effects could very well be detrimental to fishing interests.

Prudence and a precautionary approach to the management of human activities in marine ecosystems requires that any proposal to cull a whale population be evaluated using approaches similar to those outlined in the UNEP protocol before any action is taken. To institute a whale cull without doing such an evaluation could have serious, unintended biological and economic consequences. These consequences will be borne, ultimately, not by the pro-whaling groups that advocate whale culls for their own self-interests, or by the politicians who make such decisions. Rather, they will be borne by the coastal fishermen and culled whale populations, both of which depend on the seas for their survival.

WHALES & FISHERIES - THE FACTS

- Because whales are large mammals, they have large energy requirements. But the scientific evidence is that they do not have disproportionately high metabolic rates; they are not “inefficient converters of fish flesh;” and they do not have larger appetites for their size than do other mammals, including humans. In short, they are not the “gluttons” they are sometimes portrayed to be.
- The major predators of marine fish are not whales, but other marine fish.
- Of course, whales do eat to survive and reproduce. Much of what they eat includes invertebrates and fish species that are not used by humans. In those cases where they do eat commercially important fish, it is still not at all clear whether a whale cull would be beneficial or detrimental to commercial fisheries.
- There is no substantive evidence that whales have harmed fisheries and the partial recovery of some whale populations over the last 30 years cannot begin to explain the decline in fisheries worldwide.
- The major predators of marine fish are not whales, but other marine fish.
- The view that because whales eat fish, fewer whales would mean more fish for fishermen, is overly simplistic. In those cases where whales eat the predators or competitors of commercially important fish, a whale cull might actually mean fewer fish for fishermen. The real world, however, is more complicated than either of the above scenarios, which makes it very difficult to assess the likely effects of a whale cull on commercial fisheries.
- While it is sometimes suggested that culling whales is necessary to restore or maintain “the balance of nature,” ecologists have long told us that “the balance of nature” does not exist.
- Ironically, a whale cull could actually result in a reduction in the availability of commercially important fish and, consequently, in reduced catches for fisheries. Therefore, a whale cull might actually be detrimental to fishing interests.
- Furthermore, “There is no scientific evidence that the culling of large marine predators has ever benefited a commercial fishery” (William Montevecchi 1996).
- “...there is [however] a considerable body of current opinion that fisheries should be managed in such a way as to avoid harm to natural populations, rather than the other way around” (P.Yodzis 2001).
- A Scientific Advisory Committee to the United Nations Environment Programme’s Marine Mammals Action Plan has produced a protocol for the scientific evaluation of proposals to cull marine mammals. Prudence and a precautionary approach to the management of human activities in marine ecosystems requires that any proposal to cull a whale population be evaluated using approaches similar to those outlined in the UNEP protocol before any action is taken.

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