

A summary of recent papers comparing the performance of fisheries management around the world – how does New Zealand stack up?

Adam Langley (9 September 2009).

This paper provides a synopsis of four recent publications that compare and contrast the effectiveness of fisheries management among the world's countries/EEZs. The publications include a review of fisheries management regimes relative to the UN code of Conduct for Responsible Fisheries (1); a journal paper that publishes the results from (1) that relate to the implementation of the Ecosystem based fisheries management (2); and two additional publications that use (somewhat) differing criteria to assess the fisheries management regimes among all (3) or most of the world's EEZs.

The publication of these studies also coincides with another paper entitled *Rebuilding Global Fisheries* that rated New Zealand marine areas as second equal with Alaska as the healthiest in the world.

This document provides a brief summary of each paper with particular emphasis on the results pertaining to New Zealand and the performance of New Zealand's fisheries management regime relative to other (developed) countries.

1. Safe conduct? Twelve years fishing under the UN code.

Authors	Tony Pitcher, Daniela Kalikoski, Ganapathiraju Pramod, Katherine Short.
Publication	WWF report, December 2008
Funding/Affiliations	WWF, Fisheries Ecosystem Restoration Research, Pew Charitable Trust (Sea Around Us project), University of British Columbia.

Rather than redraft a summary of this report, I have extracted the executive summary from the document and annotated the ES with comments of particular relevance to New Zealand (in *italics*).

"The FAO (UN) Code of Conduct for Responsible Fisheries ("the Code"), published in 1995, is widely acknowledged to be a broadly-based, detailed recipe for the sustainable, responsible and equitable exploitation of marine resources. Here we evaluate the degree to which the fisheries management of the 53 top fishing countries is in compliance with Article 7 of the Code. *[Article 7 deals specifically with fisheries management and the stated objective of the article is to ensure the long-term sustainable use of fisheries resources].* These countries land over 95% of the reported world marine fish catch with more than 150,000 tonnes each per year. This study uses 44 questions designed to capture the key features of the 46 clauses of Article 7 of the Code. Each question is scored against objective criteria on a scale of zero to ten, and a statistical ordination procedure incorporates the stated uncertainty of each score.

Information available from publications, reports, web sites, national legislation and from contacts in the target countries has been employed. Each country's scores were subjected to a formal drafting and cross-checking protocol, and most have been externally validated by independent experts from governmental agencies, non-governmental organizations, research institutes and universities. The 53 detailed country reports, comprising about 1200 pages and 2500 references, are published separately and are in the form of open 'living documents' that are revised in the light of fresh or corrected information. Analysis here is based on revisions to April 2008.

We identify the best and worst countries in terms of compliance with the Code; distinguish each country's intentions, as revealed by its laws, legislation and practices, from the effectiveness of its management measures; and we partition the results into six detailed evaluation fields (*management objectives; management framework; the precautionary approach; stocks, fleets and gear; social and economic factors; and monitoring, control and surveillance*).

Overall compliance with the Code is dismal: not one country out of the 53 achieves a "good" score of 70% or more. Only six countries (11%) have overall compliance scores whose confidence limits overlap 60% (Norway, USA, Canada, Australia, Iceland, Namibia). *New Zealand was just below these countries with a ranking of 8th and a combined score of 55.*

[New Zealand scored well (a ranking of 6th) against most of the management objectives indicators, except for those relating to the consideration of small scale fishers, ecosystem linkages, and environmental influences on fisheries. Likewise, NZ scored highly (ranked 2) under the management framework category and the implementation of the precautionary approach (ranked 8) although lower scores were given to indicators relating to the establishment of specific limit reference points, the scale of no take areas, and the lack of consideration of species interactions. NZ generally scored poorly (but still ranked 10th) under the category relating to the regulation of fishing activity, particularly in regard to the management of non-target species and protection of juvenile and spawning components of the stock. Scores were also relatively low for indicators that related to the consideration of social and economic factors (but still ranked 7th). NZ scored relatively highly against the MCS indicators (6th). In these six categories, NZ only achieved a "good" score in one category (management framework) and received a "fail" for the inability to implement effective regulations to manage stocks, fleets and gear. Most other countries also performed poorly in this category with all but four countries receiving a "fail" grade.]

This means that, twelve years after the Code of Conduct was agreed, there is a great deal of room for improvement in compliance even among those countries at the top end of the rankings. At the lower end, the alarming finding is that 28 countries (53%) had 'fail grades' of less than 40% (Peru, Poland, India, Ghana, Taiwan, Latvia, Philippines, Brazil, Argentina, Morocco, Pakistan, Russia, Senegal, Ecuador, Indonesia, Iran, Thailand, Ukraine, Sri Lanka, Viet Nam, Turkey, Bangladesh, Egypt, Yemen, Nigeria, Angola, Myanmar, North Korea). In the middle range, disappointing scores from most developed European nations with the undoubted resources and know-how to implement the Code reinforce the low political priority given to improving fisheries management internationally. One encouraging finding is that some developing countries score more highly for the Code than many developed European countries, signifying that some elements of good fishery management can be achieved even with limited resources. A negative relationship with a marine biodiversity index suggests that management is weakest in the most species rich jurisdictions.

We also evaluate compliance with the Code in nine specific measures:

- **For Reference Points:** Over half of the countries had fail grades for compliance with the Codes reference points; a chronically poor performance on a basic prerequisite for effective fisheries management. Even some developed countries do not appear to take the use of limit reference points seriously and disconcertingly, over half of the countries exhibit no awareness of the critical importance of limit reference points. *NZ scored relatively highly, approaching a "good" grade and ranked 12th.*
- **For Irresponsible Fishing Methods:** over 80% have unsatisfactory overall scores for discards, bycatch, juvenile catches and damaging fishing methods. Moreover, low scores for many developed countries are of great concern: especially in the European Union where it appears that many by-catch and discard regulations are widely ignored. *NZ scored poorly receiving a fail rating with regard to controlling irresponsible fishing practices and very poorly for the minimisation of discards. These indicators are a subset of those dealing with the management of stocks, fleets and gear. It was also noted that NZ had no reliable statistics of fishery discards.*

- **For Ghost Fishing:** Only a few nations have good performance and have regular lost gear retrieval programmes or mandate biodegradable elements in traps. For most countries, scores for the “ghost fishing” issue were the lowest of any examined and many countries do not even recognize the problem. *NZ also received a “fail” in this area due to a lack of any retrieval programme for lost gear.*
- **For Protected Areas:** despite rather generous scoring that recognised any form of spatial management measures, only 15% of countries have reasonable scores. Some developing nations have proved able to score as well as many developed ones. *NZ had a low score (ranked 14th) due to the small overall area within marine reserves and the location of these areas; i.e. mainly limited to inshore areas rather than in areas of importance to the major commercial fisheries.*
- **For Small-Scale And Aboriginal Fisheries:** Small-scale fisheries issues receive good compliance scores in 19 countries, including both developed and developing nations but they are not necessarily supported by viable consultation with coastal communities. About half of the 53 countries have good scores for recognition of the rights of Aboriginal Peoples while poor compliance scores are found for those countries that do not recognise Indigenous Peoples rights. *NZ received a score barely above the “fail” grade for participation of small scale fishers in the management of the fishery (ranked 29th), while NZ receives the highest rank for participation of indigenous people.*
- **For the Control of Overcapacity:** over 90% of the countries are failing to tackle excess fishing capacity, arguably one of the most important recommendations of the Code. *NZ ranks highly in this area, coming close to achieving a “good” rating and ranked second.*
- **For Illegal Fishing:** Only a quarter of the countries have reasonable scores for IUU, while over a third have fail grades. Overall scores on this critical issue are among the worst scoring questions in the analysis and correlates with Transparency International’s country Corruption Index. *NZ ranks relatively highly, but is still below the score required for a “good” rating.*
- **For Flags of Convenience:** Three-quarters countries have acceptable scores but one in six countries has been awarded fail grades emphasising that it is a significant issue world-wide. *NZ scores highly.*
- **For Developing Countries:** Developed countries could target development aid to improve compliance in focal countries.

Using the same detailed country reports for 33 countries (the top 89% of the world catch), a separate analysis evaluates the implementation of Ecosystem-Based Fisheries Management according to WWF’s 3-part framework. Results, reported in detail elsewhere, show an equally poor status for the implementation of EBM. Only four countries have ‘passable’ ratings for implementation of EBM, while over half of the countries were awarded “fail” grades. *[see summary of Pitcher et al paper for a more detailed review].*

There are significant correlations between the overall Code of Conduct compliance scores and four published, independent indicators of the quality of the government and environmental management (World Bank Governance Indicators aggregate index, Transparency International’s Corruption Perceptions Index, UN Human Development Index, Yale Environmental Performance Index). Moreover a negative correlation with EEZ biodiversity shows that Code compliance is weakest in the most species-rich jurisdictions, exactly the opposite of what is desired.

To address the poor implementation of the Code two key recommendations are made. First, for developing countries, fisheries aid might be beneficially focused on specifically implementing the CCRF, especially as some developing countries have found it possible to achieve middle-ranking scores. Secondly, although the Code’s origins a decade ago relied on its voluntary nature, attitudes

have now changed and so, to encourage broad compliance in all countries, the time may have come to implement the essential features of fishery management, as set out in Article 7 of the Code of Conduct, in the form of a legally-binding international instrument.”

2. An evaluation of progress in implementing ecosystem-based management of fisheries in 33 countries.

Authors	Tony Pitcher, Daniela Kalikoski, Katherine Short, Divya Varkey, Ganapathiraju Pramod.
Publication	Marine Policy 33 (2009) 223-232
Funding/Affiliations	WWF, Fisheries Ecosystem Restoration Research, Pew Charitable Trust (Sea Around Us project), University of British Columbia.

The paper is essentially the section of the WWF review paper (*Safe conduct?*) that focused on the performance of the countries with respect to the implementation of ecosystem-based management of fisheries (EBFM). For the purpose of this paper, EBFM was defined as ‘a new fishery management system that recognises explicitly how food web linkages and human interventions may affect sustainability in aquatic ecosystems’.

The study ranked 33 countries against three sets of criteria.

- i. Adoption of the overall principles of EBFM (5 attributes).
- ii. Indicators of successful EBFM (six indicators: effective policy framework; incorporation of social, cultural, economic values; ecological values incorporated; adequate stock assessments; adequate monitoring, environmental variation considered).
- iii. Implementation of EBFM (12 attributes). Essentially a prescriptive set of steps to implement EBFM which the authors consider best practice.

Aggregate scores were derived for each of the three components and an overall (average) score was calculated for each country. New Zealand was in the top five countries for the first two components with scores of about 70/100 along with Norway and the United States; i.e. New Zealand has adopted most of the principles of EBFM and has been moderately successful in managing the fisheries in accordance with these principles. By contrast, developing countries were typically the lowest ranking in both criteria (including Thailand, India and Vietnam) although it was also noted that a number of European countries received a low ranking (UK, France, Spain) indicating a lack of political will to adopt the EBFM principles.

The scores for implementation steps of EBFM (3) were generally lower than for the other criteria. This was certainly the case for New Zealand and, given the higher weighting assigned to the third criteria (12 of 23 attributes), this resulted in a lower overall ranking (about 63/100) although New Zealand was still ranked third (after USA and Norway). The authors (somewhat) arbitrarily assigned a “good” rating as being above 70/100 and, on that basis, none of the countries in the study met that standard, although a few countries including New Zealand are moving close to that standard.

3. *Management effectiveness of the world's marine fisheries.*

Authors	Camilo Mora, Ransom Myers, Marta Coll, Simone Libralato, Tony Pitcher, Rashid Sumaila, Dirk Zeller, Reg Watson, Kevin Gaston, Boris Worm.
Publication	PLos Biology June 2009, Volume 7
Funding/Affiliations	Pew Fellowship, Pew Charitable Trust (Sea Around Us project), Sloan Foundation.

This study ‘quantified the status of fisheries management in each nation worldwide that has an EEZ’. Data were collected via a web-based survey of fisheries experts (fisheries managers, professors, governmental and non governmental researchers) with a total of 1,188 respondents from 13,000 contacted. A range of checks were conducted to ascertain the (high) level of consistency in the response for a specific country. The results of the survey were used to determine a score for each of the 219 EEZs across six categories.

- i. Scientific robustness.
- ii. Policy making transparency.
- iii. Implementation and enforcement of regulations.
- iv. Fishing capacity.
- v. Reliance on subsidies.
- vi. Access to foreign fishing.

Each score was then assigned to a quarter (four classes worst to best). The scores from each component were averaged to derive an overall score. The actual scores are not reported in the paper. Only 15 countries were in the top quarter for “scientific robustness”, including New Zealand. While only two countries were in the top quarter for all of the first three categories (Falkland and Faeroe Islands).

New Zealand received relatively high ranks (in the top quarter) for policy making transparency and reliance on subsidies but received only moderate scores for implementation/enforcement, fishing capacity, and fishing by foreign fleets. New Zealand’s overall ranking was approximately 70 out of 100. There were only 8-9 small EEZs with a higher score and New Zealand was on a par with Australia, Greenland and Alaska.

The paper differed from the other studies in that it also attempted to determine the probability of fisheries sustainability at the EEZ level. Simply, this involved calculating the ratio of the total fisheries production to total EEZ primary production. The ratio was then compared to the ratio from EEZs where the fisheries are known to be overfished. The approach is interesting but is reliant on accurate catch data, the assumption regarding energy transfer (from primary production to the harvested trophic levels) and the EEZ specific level of primary production as well as the reference levels used to define unsustainable fishing. Nonetheless, based on the analysis conducted, New Zealand received a high probability of fisheries sustainability, as did all the Pacific EEZs, North America, Latin America, and most African EEZ, while Iceland, Russia, SE Asia, Chile, and Peru were ranked at the bottom. A high probability of sustainability was also closely linked to the level of subsidies (low) and transparency in policy making (high).

4. *A comparative assessment of biodiversity, fisheries and aquaculture in 53 countries' exclusive economic zones.*

Authors Edited by Jackie Alder and Daniel Pauly

Publication Research Report from the Fisheries Centre at UBC

Funding/Affiliations Pew Foundation

A recent scientific report has published the results of a study that attempts to rank the management of fisheries in 53 countries' EEZs. The study has been conducted by Daniel Pauly's group at the University of British Columbia and was funded by the Pew Foundation. The document is published as Research Report from the Fisheries Centre at UBC and as such is not subject to the level of peer review associated with scientific journal publications.

The current study ranked 53 developing and developed countries (ranging from Yemen to Norway) on 14 indicators within three categories:

- i. Biodiversity. Indicators related to MPAs, area trawled, seabird protection, and marine mammal protection.
- ii. Fishery value. Indicators based on GDP, FAO Code of Conduct, fisheries statistics, fishery subsidies, fishmeal in mariculture.
- iii. Jobs. Indicators based on fuel consumption, subsidies.

Rather strangely, none of the indicators provided a direct measurement of the management and sustainability of the fish stocks within the EEZ. Possibly, this information was simply not available for many of the countries included in the study. A number of the indicators included in the study may be strongly correlated with the overall sustainability of the stock, although the lack of a direct measurement of fishery sustainability (greatly) weakens the study. The selection of the indicators may, at least partly, reflect the authors' areas of particular interest (MPAs, trawling, seabirds, marine mammals).

The study confirms New Zealand's eminence in management of fisheries resources. New Zealand was the highest ranking country of the 53 included in the study. New Zealand scored well on landed value (high), use of fishmeal in aquaculture (low), statistical reporting (high), and compliance with the FAO code (high), and levels of subsidies (low), but scored low on fuel consumption (high) and MPAs (low). New Zealand was ranked in the upper-middle for the seabird and marine mammal indicators.

Overall, New Zealand came out on top with a combined index score of 5.5 out of 10. For comparison, Norway and Spain scored 4.2 and 4.5, while Thailand and Vietnam scored 3.6 and 3.3. New Zealand's score can be interpreted in two ways. Either, New Zealand's top score suggests we lead the world in fisheries management (this might be akin to celebrating the one student that passed School Certificate at a small high school) or viewing the result as a minimum pass mark (a C- perhaps) and stressing the need to substantially improve the current situation.

The latter view is that expressed by the authors in their conclusions. However, at least for New Zealand, I think that is somewhat unfair given the rather subjective approach used in the study (i.e. the indicators used and the relative weighting of the indicators) that results in a relatively low score for New Zealand. The inclusion of a number of other important indicators (relating to fishery sustainability, etc) is likely to have resulted in a more positive outcome for New Zealand.

Summary

These four studies were conducted by the staff of universities (principally UBC and Dalhousie) and NGOs (WWF) that have a strong focus on the plight of the world's fisheries and have been criticized over recent years for participating in advocacy-based science.

The papers represent a useful stock-take of the status of fisheries management regimes around the world. All papers used a similar approach, whereby, fisheries management regimes were ranked against a range of indicators either by a panel of experts or by a self-completion survey. This semi-quantitative approach was necessary given the paucity of information available to independently evaluate the fisheries management regimes of such a large number of countries. Nonetheless, the authors did endeavour to investigate potential sources of bias in such an approach (to the extent possible).

There are differences in the specifics of the sets of indicators used (depending on the specific objectives of the study); however, all studies essentially included a core set of indicators which are considered crucial in fisheries management from a developed world perspective (effective policy framework; incorporation of social, cultural, economic values; ecological values; adequate stock assessments; adequate monitoring, environmental variation). The commonalities in approach and ranking system are understandable but also reflect the shared authorship among the papers either by institution (UBC) or individual (Pitcher) and, so, the studies should not be considered to be independent of each other.

The studies endeavour to define a "best practice" for fisheries management based on the perfect score of the range of indicators selected and rank each country/EEZ against that score. Not surprisingly, given the context of these studies, "best practice" represents a high level of attainment relative to each of the indicators and for many of the indicators (e.g. MPAs, trawling impacts, etc) it would be difficult (impossible) for countries with significant fisheries to achieve a high score.

The four studies define "good" management regimes as those that achieve an average score of 70/100 over all indicators. The generic approach is necessary for comparisons among a large number of countries and certainly it is reasonable to expect that a high standard of fisheries management would be achieved by countries that attain a high score for all indicators. However, the approach risks down-grading those countries that are achieving good fisheries management outcomes through regimes that focus on specific elements (possibly at the expense of others). For example, NZ's quota system has arguably reduced the participation of small-scale fishers and as a result NZ's rank is down-graded; however, sustainability of the resource would likely to be compromised in the absence of the QMS. Another example is the need for large MPAs which are (arguably) not necessary if levels of fishing mortality and ecosystem impacts are relatively low in the areas fished.

One of the key limitations of these studies is that they do not identify what are the key factors or different sets of factors that actually result in sustainable utilization of the fisheries. In fact, only one study (3) attempts to derive an index of sustainability for the fisheries and, while the approach may be overly simplistic (out of necessity), it provides the opportunity to investigate the key drivers in achieving the over-arching fisheries management objectives.

So how does NZ stack up in these studies? The results are reasonably consistent between the four studies with NZ ranked amongst the top group of developed countries. However, even the upper echelon of countries struggle to reach a score sufficiently high to attain a "good" standard of fisheries management. This is somewhat at odds with New Zealand's (self) proclaimed world leadership in

fisheries management. New Zealand was generally ranked highly in terms of having the appropriate regulatory framework (policy, assessments, management response) in place but was down-graded due to relatively weak management of the operation of the fishery (discard levels, lack of protection of juvenile and spawning fish, limited MPAs), limited consideration of ecosystem interactions, and lack of consideration of small-scale fishers. It would be useful to focus on some of these apparent “deficiencies” in more detail. However, arguably, some of these elements should be less important in achieving sustainable utilization within the context of the NZ fisheries management system and the overall outcome may, therefore, under-rate the standard of New Zealand’s fisheries management regime both in terms of the final score and the relativity with other countries.