The Footprint of Distant Water Fleets on World Fisheries

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Foreword

Distant water fleets, made up of vessels that fish outside of their national waters, are by no means a new phenomenon. For centuries, fishers have travelled to remote waters in pursuit of their livelihood. As early as 1575, hundreds of vessels from France, Portugal, and Great Britain were fishing for cod in the productive fishing grounds of the "New World".

But in the years since World War II the size and catching power of these fleets have grown enormously. The depletion of fish stocks at "home" stimulated a migration of fishing effort in search of more productive waters. The development of robust new markets for fish products in the past several decades – from frozen fish sticks and surimi to high grade sashimi – spurred the construction of burgeoning fleets by nations desiring to be players in the new fishing order. Predictably, as these new vessels have spread out to fish across the global commons, in too many places overcapacity and fisheries depletion have been the result.

The day of reckoning for distant water fleets came two decades ago, as nations around the world established exclusive economic zones around their shores and took legal control over their coastal fisheries. Since then, distant water vessels have had to scramble for access to rich coastal waters or take their chances on the increasingly overcapitalized high seas.

The history of distant water fishing during the past 20 years can best be understood as a series of reactions to this displacement. A political clamour arose in the distant water fishing nations, whose vessels had suddenly seen their oceans shrink measurably. These nations used their clout to secure fishing opportunities for their fleets through the negotiation of fishing access agreements with coastal states – in some cases using threats of market access restrictions as leverage to get more favourable terms. They also responded by creating a panoply of new financial assistance programmes for their now ailing fishing sectors, including a variety of explicit and implicit subsidies that have maintained many fleets at levels that no longer make biological or economic sense. In the case of migratory fish stocks, too many states have reacted to political pressure from their fleets by engaging in heated and shortsighted squabbling over the allocation of dwindling high seas fisheries, undermining the management objectives of regional fisheries management conventions.

Remedying this situation is a multifaceted problem. A workable solution must come to grips with the fact that in distant water fleets, as in most other parts of the fishing industry, overcapacity is a problem. A recent study commissioned by WWF and IUCN-The World Conservation Union estimates that the world fishing fleet possesses more than twice the level of catching power needed to achieve a catch level that would not deplete stocks. The Food and Agricultural Organization of the United Nations' (FAO) Code of Conduct for Responsible Fishing calls upon all states to "take measures to prevent or eliminate excess fishing capacity". In the context of distant water fleets, this will require that existing fishing access agreements be revisited to assure that the levels

of fishing effort deployed are consistent with sustainable fishing. In addition, it will require multilateral plans that establish sustainable levels of fishing capacity in fisheries for highly migratory and straddling fish stocks. An effort to craft such a plan is currently under way in the Inter-American Tropical Tuna Commission. Finally, this problem cannot be remedied without addressing the many subsidy programmes that contribute to fishing overcapacity. As a first step, each of these points ought to be incorporated into the Global Plan of Action on Fishing Overcapacity that will be formulated at the FAO meeting in October 1998.

Even more fundamental, in crafting a resolution to address the crisis facing distant water fleets, we must recognize that the status quo is inconsistent with the norms that have emerged during the past decade that define responsible, well-managed fisheries. As the papers in this publication show, overfishing is a problem in many of the fisheries utilized by distant water fleets, bycatch is in most instances completely unmanaged, and the wisdom of precautionary management is rarely recognized. Too many fishing access agreements, when measured against the ideals embodied in the FAO Code of Conduct for Responsible Fishing, come up far short of the mark. Consistency with the provisions of the United Nations Agreement on Highly Migratory Fish Stocks and Straddling Fish Stocks is still the exception, rather than the rule, for regional fisheries management organizations.

Gareth Porter, author of one of the papers, suggests one avenue for squaring existing fishing arrangements with the new fishing norms. He calls for the creation of a model fishing access agreement by FAO, as a new section of the Code of Conduct or as a stand-alone document. In either case, the provisions of such an instrument could be drawn from existing, well-established norms, as Porter's paper demonstrates. In addition to calling for sustainable, precautionary catch limits and the use of measures to reduce waste, discards, and the catch of non-target species, Porter highlights the need to improve the collection and sharing of information concerning the catch and fishing effort of distant water fleets, and the need to enhance fleet monitoring and surveillance. In too many cases, current access agreements do not contain adequate reporting provisions. The result has been widespread under-reporting of catch. Besides depriving coastal states of revenue, such inaccurate reporting undermines coastal state efforts to manage fish stock sustainably. A variety of approaches for monitoring compliance with fishing arrangements is presently being utilized by coastal states, including observer programmes and the use of satellite-based remote monitoring systems.

Of particular note is a remote monitoring programme being proposed as part of a new convention that will govern western and central Pacific tuna stocks. The new proposed arrangement for the world's most valuable tuna fishery would provide information on the position of tuna vessels fishing both inside and outside of exclusive economic zones. This is a sensible model for the surveillance of fishing on pelagic stocks, which do not respect national boundaries, and could create an economy of scale if the information is collected and distributed by a centralized authority.

One especially thorny problem in crafting a model fishing access agreement involves the application of fishing norms recognizing the special needs of developing states, as

well as the need to avoid adverse impacts on artisinal and small-scale fishers and indigenous peoples. This is of particular concern in regions where fish constitutes an important source of protein for local populations. In instances where the protection of small-scale fishers is important, exclusion zones (if effectively policed) are a useful management tool. In this publication, Gordon Munro points out that in many cases it will be optimal for a developing coastal nation to provide for a mix of national and foreign participation in its fisheries. International norms for fishing access agreements should be flexible enough to recognize this. But they should also recognize the special problem of "infant" fishing industries in developing states. For example, application of the "surplus principle" in a manner that interferes with developing state aspirations to develop the latent capacity of its fishing sector, within sustainable limits, would be inconsistent with existing norms. One way to ensure that the needs of developing states are better met in practice would be to promote the establishment of regional, coastal-state dialogue and cooperation in fisheries management. The history of coastal state-distant water nation relations in waters governed by members of the South Pacific Forum Fisheries Agency demonstrates the value of regional harmonization.

Finally, as noted above, reducing fishing subsidies is an essential component of a work plan to address excess capacity in the world's distant water fleets. In the past year, fishing subsidies have received increased attention in the World Trade Organization, FAO, and other fora. As David Schorr's paper notes, many such subsidies are administered in a manner inconsistent with existing trade rules. These must be addressed expeditiously. In addition, states need to signal their readiness to craft a more ambitious, comprehensive solution to the problem of fishing subsidies. It is not argued here that all government financial assistance to the fishing sector ought to be abandoned. But at the very least, such assistance should be consistent with an explicit vision for the fishery in question – and that in turn must be compatible with accepted norms for responsible fishing behaviour.

WWF thanks the authors of the papers collected in this publication, *The Footprint of Distant Water Fleets on World Fisheries*. Our hope is that their work will contribute to a long overdue international dialogue concerning the future role of distant water fleets in world fisheries.

Contents

Acronyms and Abbreviations

APEC	Asia-Pacific Economic Cooperation
CECAF	Commission for Eastern Central Atlantic Fisheries
cm	centimetre(s)
CSD	United Nations Commission on Sustainable Development
CSRP	West African Sub-Regional Commission on Fisheries
d	day(s)
DWF	distant water fleet
DWFN	distant water fishing nation
EEZ	exclusive economic zone
EFJ	extended fisheries jurisdiction
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency
g	gram(s)
GATT	General Agreement on Tariffs and Trades
GDP	gross domestic product
GRT	gross registered tonnes
ICNAF	International Commission for Northwest Atlantic Fisheries
INPFC	International North Pacific Fisheries Commission
ITQ	individual transferable quota
kg	kilogram(s)
km	kilometre(s)
m	metre(s)
MDS	multidimensional scaling
mm	millimetre(s)
NAFO	Northwest Atlantic Fisheries Organization
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Cooperation and Development
OY	Optimum yield
RFMO	regional fisheries management organization
t	tonne(s)
TAC	total allowable catch
UN	United Nations
UNCED	United Nations Conference on Environment and Development
WTO	World Trade Organization
y	year(s)

Note: miles quoted are nautical miles, 1 nautical mile is equivalent to approximately 1.852 kilometres.

1

Impacts of Distant Water Fleets

An Ecological, Economic, and Social Assessment

A report prepared for WWF by: Ramón Bonfil, Gordon Munro, Ussif Rashid Sumaila, Hreidar Valtysson, Miriam Wright, Tony Pitcher, David Preikshot, Nigel Haggan, and Daniel Pauly
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1 Introduction

Distant water fleets (DWFs), loosely defined in the past as collectives of fishing vessels operating outside the waters surrounding their own territories, and presently best defined as those fishing outside their own exclusive economic zones (EEZs), have been roaming the global oceans since ancient times (the best modern example being perhaps the whaling fleets of the last two centuries). As time passed and technological advances permitted more remote voyages and longer times at sea, DWFs extended their range of action to faraway places. The growth of these operations in modern times was led initially by a few nations after the end of World War II but others joined later. By the 1970s, DWFs were diverse in nationality and covered practically every ocean basin and sea around the world while fishing for a great variety of species. Around the same time, fisheries expansion in the developing world started to take place. These two events brought fleets from coastal and distant nations in contact with one another, and often led to conflicts over ownership of fishery resources and most frequently caused the overexploitation of marine populations. Where fishing occurred on the high seas, the typical situation of open-access common-property resources prevailed, also leading often to overexploitation. The establishment of EEZs by most countries around 1977 and the ensuing agreement for extended fisheries jurisdiction of the United Nations (UN) in 1982 dramatically changed the rules of the fishing game between countries. In recent years, the activities of distant water fishing nations (DWFNs) have been circumscribed by the need to obtain legal access to the EEZs where they want to fish, or otherwise having to remain restricted to fishing in the high seas, or as shown below, to engage in illegal activities such as poaching.

Although DWFs have been at times thought of as a negative element of the global fishing industry, our research shows that this is not always necessarily the case. The ecological impacts of DWF fisheries have often been negative in the past, but the same overfishing effects have happened and still occur inside many EEZs without any DWF activity: the real problem in both cases is overcapacity and excessive effort. From the economic and social point of view, each situation of DWF-coastal nation interaction offers possibilities for failure or success. The final outcome depends on the decisions made by each party and varies from case to case. While some coastal nations are better prepared for dealing with the challenge posed by granting access to DWFs others are less prepared. Choosing between licensing, chartering, or setting up joint-venture schemes can determine the success or failure of the whole enterprise. The capacity to administer the fishery and monitor and enforce compliance with regulations plays another important role in the success of the interaction. Usually, these capabilities are intrinsically linked with the level of economic and social development of the coastal nation. On the other hand, the attitude of the DWFNs performs perhaps an even more important role: whether seeking their own benefit or an equitable deal, DWFNs have in their hands most of the power in situations where the coastal nation is not fully prepared for the challenge. The possible combinations of these and other factors are complex and difficult to determine. Nevertheless, it is clear that the possibilities for successful and efficient DWFN-coastal nation relations exist, and these interactions are

not negative per se. The last few years of DWF activities offer a great variety of situations that range from failed attempts for cooperation or unfair business between DWFs and coastal nations, to exemplary cases of sensible and successful cooperation, with equitability in the share of benefits among all parties.

The present report provides a broad-brush picture of the current state and the effects of DWF operations around the world. The work, as agreed with WWF at the beginning of the project, addresses the ecological, economic, and social effects of DWF fisheries. The final deliverables are:

1. a map showing the most important cases including stocks and players
2. an overview of the recent and current state of DWFs based on seven case studies around the world
3. an ECOPATH/ECOSIM model of the ecological and economic effects of DWFs in Namibia
4. an overview of the economics of distant water fisheries
5. an overview of social impacts of distant water fisheries
6. a multivariate analysis of a distant water fishery.

Project Direction and Management

The project was directed by the principal investigator Dr Daniel Pauly. Dr Ramón Bonfil was in charge of overall research, coordination and report production, and editing. Management of the project was done by Mr Nigel Haggan. All the work was discussed and planned by a team composed of the above-mentioned researchers plus Drs Gordon Munro and Ussif Rashid Sumaila. Additional collaborators who provided specific parts of the case studies and who were added halfway through the project were Mr Hreidar Valtysson and Dr Miriam Wright.

2. Methodology

Overall Strategy

The initial planning of the work, designation of responsibilities, and strategies for achieving the aims of the project were discussed in a couple of meetings with full participation of the research team. Weekly meetings were held to discuss progress and "brainstorm" on approaches. This was important in developing a common mind in an interdisciplinary team such as this. More importantly, from a WWF perspective, it served to identify several key sources of biological and economic information as well as sources on international conventions, legal agreements, etc.

As a result of the planning phase, a decision was taken to address specific fisheries that can be defined in terms of geography, and focus on species rather than fleets which can and do target more than one resource and/or move from one resource to another. This makes it possible to perform ecological, economic, and rapid appraisal assessments. Nevertheless, a global overview of DWFs was also performed and is presented as a preamble to the case studies.

Although we originally planned for a total of nine case studies to be included in the study, the constraints of availability of information, timeliness in accessibility of information, and overall amount of work prevented the preparation of some cases. Most of the case studies were to be addressed in as much detail as the overall size of the report and the availability of information allowed. A few more cases were to be briefly presented as shorter "boxed" cases. The selected case studies reflected the range of situations currently found in DWF fisheries around the world, including examples from the north and the south, interactions between developed and developing countries, situations of DWFs in the high seas, and from all geographical regions of the world. According to correspondence exchanged between Tony Pitcher and Michael Sutton on 29 October 1997, the project deliberately did not consider tuna fisheries. This decision was reached as tuna fisheries are quite complex, are considered a whole league of their own, and are known for being very difficult to document in enough detail. Given the scope of this project and the resources available for it, it was not possible to consider them here.

In the present report, we allude to industrial fisheries in the sense of those carried out with technologically advanced systems (i.e. large size of vessels, mechanized deployment/recovery of gear, electronic instrumentation for fish detection and navigation) as opposed to the alternative use of the term which refers to fisheries whose catch is destined for industrial production of fishmeal. Alternatively and for readability, we sometimes also use the term large-scale fisheries. In a similar fashion, we apply the terms artisanal fisheries or small-scale fisheries to those carried out from small-sized vessels that typically lack modern electronic instrumentation for positioning or fish detection and might even lack powered retrieval of gear.

Of those case studies included in this final report, the case study of Namibia suffers from a lack of historical information on catches by DWFs. The Namibian case study was originally singled out as the case chosen for the ECOPATH and economic analysis because it is a current and important example of DWF-coastal state interactions, and because of the global significance of the fisheries off Namibia. In addition, the research team decided that this case offered the best possibilities in terms of the availability of information (expected good contacts in the Namibian Fisheries Department and the coincidental participation of one of the project's collaborators on a separate project in Namibia, that would allow him to obtain first-hand information during his visit to Namibia). As it happened, all the contacts we explored for obtaining the valuable pre-independence information for Namibia proved to be of no use for data acquisition. Although this has not affected the modelling exercise, it prevented the proper documentation of the case study under the global overview. In a similar fashion, the lack of good contacts to gather the information required for our study made it impossible to address the Chilean horse mackerel case. Nevertheless, a new case study – from Iceland – was incorporated. Iceland presents an interesting case of a country formerly host of many DWFs and now in complete control of its own resources and a DWFN in its own right.

The following is the final list of the case studies that are presented below and that constitute the core of the report:

1. Mauritania and Senegal
2. Illegal fishing in the Galapagos Islands*
3. Pollock in the Bering Sea "donut hole"
4. Iceland
5. Norwegian spring-spawning herring*
6. Northern cod in eastern Canada
7. Namibia.

An asterisk (*) denotes case studies that are presented in brief format only as boxed cases.

The case studies are presented in a standardized format agreed by the research team to facilitate comparison among cases.

The major part of our strategy rested on finding reliable data collaborators. This took longer than anticipated and for some cases was not as fruitful as originally expected. A second-level strategy was to research several sources of economic and fisheries information, such as scientific literature databases, Internet resources, and review of newspaper archives for relevant articles. A specialist in library studies was sub-contracted for the latter task.

■ Ecological and Economic Modelling

The ecological and economic impact analyses were done for the Namibia fishery for hake, horse mackerel, and pilchards. For details of the ECOPATH and ECOSIM modelling

frameworks and software see Christensen and Pauly, 1992 and Walters et al., 1997. Core papers on the specific ECOPATH models used to capture the essence of the Namibian ecosystem are Jarre-Teichmann and Christensen, 1998a and b.

To permit economic analysis, a framework based on valuation techniques developed by environmental economists was used (see Angelsen et al., 1994 and the references therein). Essentially, what we did was to take the catches and fishing efforts generated by ECOPATH/ECOSIM under the "with" and the "without" DWF scenarios, and apply appropriately determined unit prices for the fish landed, the cost of exploiting the fish, and the discount rate. In this way we were able to compute the net discounted economic rent that is achievable under the different scenarios, which in turn allowed us to determine the economic impacts of DWFs under these scenarios.

■ Rapid Appraisal of Fisheries Sustainability

The technique employed for evaluating the sustainability or "health" of fisheries uses multidimensional scaling (MDS) to achieve ordinations of fisheries in four different fisheries science disciplines: biology, economics, sociology, and technology. An overall combined ordination is produced using the results of the four disciplinary ordinations to generate an unweighted interdisciplinary assessment of fisheries sustainability. Full details of the method are provided in Pitcher and Preikshot, 1998.

Disciplinary ordinations are produced first in the four disciplines. Each discipline has a checklist of nine attributes that are scored on a ranked scale from 0 to 4 according to information available in published literature, "grey literature", and from personal contacts. Scoring is generally carried out as a team exercise. The attributes for the biological, economic, sociological, and technological ordinations were selected to meet the following criteria: utility in representing long-term sustainability of fisheries, ease of assigning extreme scores to "good" or "bad", discrimination of changes in time series information, addition of independent information to the overall assessment, agreement in scoring, and wide availability for all fisheries.

MDS is then used to reduce each multidimensional data matrix to a two dimensional output. The first two axes of the MDS ordination represent different contributions from the associated attributes in order to explain as much total variation in the original data as possible. Goodness-of-fit is provided by "stress" scores, and ordinations with stress above 0.27 are rejected.

Two simulated fisheries are included to supply fixed reference points and a gradient of sustainability. The "good" fishery was given the highest possible scores on all attributes contributing to long-term sustainability in the ecological, economic, sociological, and technological spheres. The "bad" fishery was scored in the opposite fashion. In addition, 20 random sets of attribute scores are included, and expressed as 95 per cent confidence intervals along the x and y axes after ordination. The original data is then re-centred to the zero of these "random fisheries", and the 95 per cent confidence interval plotted.

Simulations have been carried out to validate the monotonicity of the sustainability axis from "good" to "bad", the central tendency of the random fisheries, and the lateral displacement normal to the sustainability axis of changes unrelated to sustainability (see Pitcher and Preikshot, 1998).

After the data have been ordinated within each discipline, they are subjected to the following conventions to make their appearance more suitable for interpretation. The axes are rotated so that the "good" fishery is plotted in the upper left corner of the graph and the "bad" fishery opposite to it at lower right. The interdisciplinary ordination is the result of performing MDS on the first two axes of the fisheries in the four disciplinary ordinations.