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ECONOMIC ASPECTS AND DRIVERS OF IUU FISHING: BUILDING A FRAMEWORK

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TABLE OF CONTENTS

Executive Summary	3
List of acronyms	4
1. Introduction.....	5
2. Definitions of IUU fishing	5
2.1 Scope of this report.....	6
2.2 Flags of Convenience (FOC).....	8
2.3 Conclusion.....	9
3. Review of relevant information	10
3.1 Estimating the extent of IUU/FONC fishing.....	10
3.2 Monitoring the effects of IUU fishing.....	11
3.3 Conclusion.....	11
4. Analytical framework	12
4.1 Understanding the economics of IUU vessels.....	12
4.2 Economic incentives to engaging in IUU activities.....	14
4.3 Social Drivers	14
4.4 Markets and trade	15
4.5 International Regulation/management.....	17
4.6 National fisheries management policy.....	19
4.7 Fishing activities.....	21
4.8 Company/vessel operations	24
4.9 Conclusions	25
5. Economic and social impacts of IUU fishing	26
5.1 The Economic Impacts of IUU Fishing.....	26
5.2. The Social Impacts of IUU Fishing	28
6. Summary and Conclusions.....	29

Tables

Table 1. The Macroeconomic and Social Impacts of IUU Fishing.....	27
Table 2. Possible Negative Social Impacts of IUU Fishing at the National Level	28

Boxes

Box 1. Definitions of the FAO IPOA to prevent, deter and eliminate illegal, unreported and unregulated fishing	6
Box 2. Preamble to CCAMLR RESOLUTION 19/XXI, entitled “Flags of Non-Compliance”**.....	9

ECONOMIC ASPECTS AND DRIVERS OF IUU FISHING: BUILDING A FRAMEWORK¹

Executive Summary

1. This report examines the economic and social drivers that influence the development of Illegal, Unregulated and Unreported (IUU) fishing. It does this primarily from the point of view of high seas fishing, especially by vessels flying Flags of Convenience (FOC). These vessels undermine conservation measures agreed by Regional Fisheries Management Organisations, and thus we prefer the term Flags of Non-Compliance with such conservation measures (FONC).

2. It is difficult to obtain good information on the historical and existing levels of IUU fishing activity, because adoption of a solution in one area may simply move the problem to another. In order that the effectiveness of measures to combat IUU fishing can be determined, we believe that it is important to develop good quantitative statistics on the levels of IUU fishing in the entire world's oceans, both those under national jurisdiction and those in high seas waters.

3. IUU vessels appear to be relatively inexpensive to buy (probably less than USD 1.2M for a longliner) and running costs are lower since crew wages and conditions are lower than on legitimate vessels (with the exception of those pertaining to officers, especially fishing masters). Some additional costs might accrue with the requirement that these vessels re-supply and tranship at sea, but they do not have to pay for licences and expensive safety checks, so on the whole they are likely to have lower running costs than legitimate vessels. The additional cost they do have to cope with, however, is the cost of arrest (forfeit of catch and punitive fines), but against this must be set the probability of being caught. Thus the opportunity cost of engaging in IUU fishing is probably quite low.

4. The bulk of the report is an analysis of the various incentives to engage in IUU fishing. Our analytical framework is based around the very basic equation,

$$\text{IUU incentive} \sim \text{Profit from IUU fishing} = \text{Benefit from IUU fishing} - \text{Cost of IUU fishing.}$$

In the analysis we examine economic and social drivers, including market control, price distortion, effect of the global economy and world fishing opportunities, international regulations, fishing agreements, reflagging, national fisheries management policy including subsidies and excess capacity and surveillance activities. We also consider the geographical features of IUU fishing areas, and the health of other fish stocks, and the financial and operating structure of companies operating IUU vessels.

5. The analysis points to a number of factors which can create incentives for IUU fishing. More detailed examination of these factors (outside the scope of this report) should allow the identification of which is likely to be most important in creating an economic incentive for vessels to engage in IUU fishing. The ultimate aim of this work should be to eliminate IUU fishing, and to do this more detailed analysis should identify how one might manipulate the economics so that the opportunity cost of illegal fishing becomes too high to be sustained. Several solutions are discussed within the analysis. Often, however, the cost of a solution to a particular incentive would also be high for legitimate vessels. We believe that it will be difficult, but not impossible, to find solutions which do not penalise legitimate operators who are following the rules.

6. Finally, we identify a number of economic and social parameters that are likely to be impacted by IUU fishing. These parameters might be monitored, to complement the quantitative estimates of IUU fishing identified in paragraph 0.2 above, to judge the effectiveness of measures taken to combat IUU fishing.

List of acronyms

ABC	Australian Broadcasting Commission
ACFM	Advisory Committee on Fisheries Management
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources/ Convention for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
DWFN	Distant Water Fishing Nation
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FOC	Flag of Convenience
FONC	Flag of Non Compliance
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission
IPOA	International Plan of Action
ITLOS	International Tribunal for the Law of the Sea
IUU	Illegal, Unregulated and Unreported fishing
LSTLV	Large Scale Tuna Longline Vessels
MAGPS	EU Multi Annual Guidance Programme
MCS	Monitoring, Control and Surveillance
NAFO	NorthEast Atlantic Fisheries Organisation
NEAFC	NorthEast Atlantic Fisheries Commission
OECD	Organisation for Economic Cooperation and Development
RFMO	Regional Fisheries Management Organisation
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel Monitoring System

1. Introduction

7. This report addresses the OECD project on the economic and social issues and effects of IUU/FOC fishing operations. The requirements of that project are to develop a framework for analysing the economic and social effects of IUU/FOC fishing, including:

- review literature on the economic and social effects of IUU/FOC fishing
- identify key factors affecting incentives for IUU vessels
- develop an analytical framework to evaluate economic and social effects of IUU/FOC fishing
- develop a checklist of economic characteristics that should be monitored to understand the key economic features that encourage IUU fishing and the impacts that it has

8. We approach this problem by first defining IUU fishing and the scope of the project. IUU fishing is an extremely broad category of behaviours, and needs some refining in the context of this project. Thirdly, we consider the key economic drivers behind IUU fishing and a framework within which they can be studied and their relative importance evaluated. Finally, we review the economic and social impacts of IUU fishing, and how they might be monitored.

2. Definitions of IUU fishing

9. As an activity, illegal, unreported and unregulated (IUU) fishing has been with us ever since fisheries management first started. As an acronym, however, it is much younger. First used informally during the early 1990s by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)² in relation to Southern Ocean fishing, it began life as “IU” (illegal and unreported). Formal use of the term IUU can be found in the report of the Commission’s XVIth Meeting in 1997 and in a letter to the Food and Agriculture Organisation (FAO) that same year, in which the nature and seriousness of these problems were described³. IUU fishing is now commonly understood to refer to fishing activities that are inconsistent with or in contravention of the management or conservation measures in force for a particular fishery.

10. There are a number of international instruments that contain provisions that are of relevance to control of IUU fishing. These include the 1982 United Nations Law of the Sea Convention⁴ (the 1982 Agreement), the 1993 FAO Compliance Agreement, the 1995 United Nations Straddling Stocks Agreement⁵ (the 1995 Agreement), and the 1995 FAO Code of Conduct for Responsible Fisheries⁶. None of these was set up to deal directly with IUU fishing. Concern over the growth of IUU fishing worldwide increased rapidly during the late 1990s. An initiative taken by the FAO Committee on Fisheries in 1999 culminated with the adoption of an IPOA on IUU fishing in March 2001⁷. The IPOA is a voluntary agreement, and it has been elaborated within the overall framework of the FAO Code of Conduct for Responsible Fishing.

11. IUU fishing is defined in paragraph 3 of the IPOA as follows:

12. Not all unregulated fishing is necessarily conducted in contravention of applicable international law. This is because many high seas waters and/or fisheries are still unregulated by regional fishery management organisations (RFMOs). Examples of these include the orange roughy/ alfonsino fishery in the southern Indian Ocean, and the toothfish fishery on the northern Patagonian shelf edge. While IPOA appears to exempt this aspect of fishing from the definition “IUU”, we consider it part of the problem. This is because even in the absence of regulations, States have an obligation under UNCLOS and (after its entry

into force in December 2001) the Straddling Stocks Agreement (not to mention the Code of Conduct) to make efforts to ensure such stocks are managed. Thus while there is no doubt that the orange roughy/alfonsino fishery is currently legitimately unregulated, it certainly should become regulated, and the negotiations for the South-West Indian Ocean Convention address this concern. In fact, it has been argued that there are no areas of high seas fishing that may be considered legitimately unregulated in terms of States' obligations under that Agreement and Part VII of the 1982 Agreement. However, this appears to be an area of international law about which there remain differences of opinion⁸.

Box 1. Definitions of the FAO IPOA to prevent, deter and eliminate illegal, unreported and unregulated fishing

3.1 **Illegal** fishing refers to activities:

3.1.1 conducted by national or foreign vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations;

3.1.2 conducted by vessels flying the flag of States that are parties to a relevant regional fisheries management organization but operate in contravention of the conservation and management measures adopted by that organization and by which the States are bound, or relevant provisions of the applicable international law; or

3.1.3 in violation of national laws or international obligations, including those undertaken by cooperating States to a relevant regional fisheries management organization.

3.2 **Unreported** fishing refers to fishing activities:

3.2.1 which have not been reported, or have been misreported, to the relevant national authority, in contravention of national laws and regulations; or

3.2.2 undertaken in the area of competence of a relevant regional fisheries management organization which have not been reported or have been misreported, in contravention of the reporting procedures of that organization.

3.3 **Unregulated** fishing refers to fishing activities:

3.3.1 in the area of application of a relevant regional fisheries management organization that are conducted by vessels without nationality, or by those flying the flag of a State not party to that organization, or by a fishing entity, in a manner that is not consistent with or contravenes the conservation and management measures of that organization; or

3.3.2 in areas or for fish stocks in relation to which there are no applicable conservation or management measures and where such fishing activities are conducted in a manner inconsistent with State responsibilities for the conservation of living marine resources under international law.

3.4 Notwithstanding paragraph 3.3, certain unregulated fishing may take place in a manner which is not in violation of applicable international law, and may not require the application of measures envisaged under the International Plan of Action (IPOA).

2.1 Scope of this report

13. The objective of this report is to review information on the economic incentives for IUU fishing, and the economic and social impacts of such fishing. In order to do that it is necessary to define the scope of our review, because the scope of all areas covered by the FAO definition is outside the remit of this project.

14. What we are ultimately interested in is removals of fish from a fisheries ecosystem that are either unauthorised or unrecorded. These unauthorised removals damage the fish stock and ecosystem, because they are not accounted for within the fisheries assessment and management system. Indeed, these actions undermine conservation measures promulgated to ensure the rational use of those stocks.

15. Collateral to this damage to the resource is economic damage to legitimate, law abiding fishers. This damage may be direct (an IUU vessel may trawl over the gear set by a legitimate vessel) or it may be indirect. Indirect effects are of two kinds. The first is associated with the depletion of the stock that is caused by IUU fishing. Because they are not accounted for IUU catches usually deplete a resource, leaving less of it for legitimate fishers. The result of such damage erodes the ability of the fishery to provide a sustainable long term basis for use of fisheries and associated environmental resources by fishermen and other stakeholders. Legitimate fishers might therefore suffer a declining allowable catch (as the stock declines) and a declining catch rate. This declining catch rate directly affects the economics of fishing vessels. The second economic effect is bad publicity arising from high levels of IUU fishing, which will make consumers cautious of purchasing even legitimate product from companies engaged in fishing for a resource where there is widespread IUU fishing, no matter how legitimate their fishing operations are.

16. Thus there is a clear cause – the taking of fish beyond what is defined by a management body, or at unsustainable levels – and a clear effect – damage to the ecosystem which is passed on to legitimate resource users and an economic and social cost. Of course, there are plenty of examples where such damage is being or has been caused directly by management setting quotas that are higher than scientific advice indicates are sustainable (ref: ICES ACFM reports on cod, hake etc over the last 2 years), but this is not within the scope of our review. Similarly, there are instances where there is no management in high seas waters (the Southern Indian Ocean alfonso/roughy fishery, for instance). While, as we have argued above, fishing in these areas is strictly IUU fishing under the definition of 3.3.2, and under the obligations of States Parties to UNCLOS and Straddling Stocks Agreements, it must also be pointed out that there are some states that are not party to these agreements. Thus this is a problem of international management that is also beyond the scope of this review; it requires action by States with interests in the region, and with obligations under UNCLOS or the Straddling Stocks Agreement.

17. What remains of the IUU fishing problem can be divided into two types of problem; fishing inside or outside of areas of national jurisdiction. Regarding fishing inside areas of national jurisdiction, in the IUU literature there are two clearly different cases of IUU activity, that is misreporting and poaching (covered by the FAO definitions 3.1.1 and 3.2.1). The former is carried out by otherwise legitimate vessels, and while it is likely to be illegal under the FAO definition 3.1.1 this will depend on the strength of national laws. It is a well-documented and widespread problem, well-known to most fisheries management authorities, and involves a number of areas such as discarding, high-grading, domestic-use unreporting, disreporting, black fish⁹. Pitcher et al (2002) categorise these catches as unreported discards (which may not be illegal but are not reported by observers), unmandated catches (catches that an agency is not mandated to record) and illegal catches (catches that contravene a regulation: poached fish from closed areas, transshipments at sea, under- or mis-reported catches including those whose identity is deliberately concealed). Amongst a host of examples from around the world they focus on two, Iceland and Morocco. Using an analytical method they estimate that catches of Icelandic cod may have been underestimated by between 1 and 14% at different times, and haddock by between 1 and 28%. Catches in Moroccan waters may have been underestimated by as much as 50%. Obviously, these levels of IUU fishing in national waters have very serious consequences for domestic fisheries, especially as the level of IUU extractions is not constant from year to year but varies depending on circumstance. For instance, a quota system will inevitably lead to greater incentives for misreporting than management based on effort limitation (Agnew, 2001: sustainability of squid fisheries; Pitcher et al 2002).

18. This dimension of the IUU problem is very large, and requires clear management and MCS (Monitoring, Control and Surveillance) action to solve. It is outside the scope of this review. Furthermore, to a large extent the activities covered by definition 3.2.2 are similar to those of 3.2.1 – i.e. they are misreporting, discarding, high-grading, etc. Although these problems are exacerbated by the activities of Illegal/FOC vessels, they are not dissimilar in their solutions to those experienced within waters under national jurisdiction, and will not be covered here.

2.2 *Flags of Convenience (FOC)*

19. As generally used, the term Flag of Convenience refers to a state that is willing to have a vessel on its national register without undertaking fully its obligations under UNCLOS Article 94 to exert Flag State jurisdiction and control. FOC countries are usually those which have established open registers, accepting vessels from other countries without having a genuine link between the flag state and the vessel or company owning the vessel. Initially, vessels were registered with these countries for reasons more to do with licensing fees, tax evasion, reduced safety requirements etc¹⁰. These are all still valid economic reasons for vessels to use flag with these countries, but an additional one is that effective control is not exercised. Under the terminology of the Compliance Agreement the flag state must be able to exert effective control over the vessel, but States referred to as FOC usually fail to exercise this control¹¹. It further says that States should ensure that their vessels do not engage in activity that undermines the effectiveness of international conservation measures. FOC states are generally not members of RFMOs and other agreements and their flag vessels are therefore not bound by the management regulations enforced by these organisations. Furthermore, while they would normally then be bound *generically* by the provisions of the Compliance or Straddling Stocks agreements, they have usually not acceded to these agreements either. Therefore, they are effectively beyond the reach of international law.

20. IUU vessels often fly flags of convenience, or employ reflagging, as a means of deliberately avoiding fisheries conservation and management measures based on regional arrangements applicable on the high seas. Reflagging is relatively easy, and IUU vessels may re-flag several times in a fishing season to confuse management and surveillance authorities. One classic example would be San Rafael 1, flagged to Belize, which following an encounter with a fisheries patrol vessel in December 1999 around South Georgia changed its name to the Sil, then the Anyo Maru 22 and finally the Amur, flagged to Saõ Tome e Principe before sinking around Kerguelen on 9 October 2000¹². Another is the Camouco, arrested by France in 1999 around the Crozet Islands, and released on bail following a case which was taken to the International Tribunal for the Law of the Sea¹³. After its release the vessel changed its name to Arvisa 1 and subsequently Eternal, only to be arrested on 3 July 2002 by France, again, for illegal fishing in Kerguelen waters. We mention these cases only to illustrate that IUU vessels often use re-flagging to confuse surveillance, and we do not suggest that any of the abovementioned flag states should be classified as a Flag of Convenience or Flag of Non Compliance.

21. However, there are differences between merchant vessel and fishing vessel use of flags of convenience, and between the behaviour of vessels flying flags of convenience in different regions of the world, that have led to the emergence of a new term to describe FOC vessels. For instance, vessels of Panamanian flag would be regarded as FOC in Antarctic waters, because Panama is a non-party to CCAMLR that would not be exerting effective control on its vessels in the waters of that RFMO. However, Panamanian flagged vessels are not FOC vessels in waters administered by ICCAT, since it has become a Member of ICCAT. For these reasons CCAMLR has moved away from the term “Flags of Convenience” and now uses the term “Flags of Non Compliance”. In the preamble to Resolution 19, the definition of this term is clear (Box 2):

22. This clearly indicates the cause of the problem (i.e. the lack of State control on vessels which are conducting activities that undermine the effectiveness of conservation measures), but allows States and RFMOs to take action against FONC/FOC States and their vessels only in respect of the violations of specific regional agreements. This maintains consistency with the intent of the FAO compliance agreement and WTO requirements where trade measures are contemplated.

Box 2. Preamble to CCAMLR RESOLUTION 19/XXI, entitled "Flags of Non-Compliance"*

The Commission,

Concerned that some Flag States, particularly certain non-Contracting Parties, do not comply with their obligations regarding jurisdiction and control according to international law in respect of fishing vessels entitled to fly their flag that carry out their activities in the Convention Area, and that as a result these vessels are not under the effective control of such Flag States,

Aware that the lack of effective control facilitates fishing by these vessels in the Convention Area in a manner that undermines the effectiveness of CCAMLR's conservation measures, leading to illegal, unreported and unregulated (IUU) catches of fish and unacceptable levels of incidental mortality of seabirds,

Considering therefore such fishing vessels to be flying Flags of Non-Compliance (FONC) in the context of CCAMLR (FONC vessels),

Noting that the FAO Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas emphasizes that the practice of flagging or reflagging fishing vessels as a means of avoiding compliance with international conservation and management measures for living marine resources and the failure of the States to fulfil their responsibilities with respect of fishing vessels entitled to fly their flag, are among the factors that seriously undermine the effectiveness of such measures,

.....

* Many of the flags hereby called FONC are commonly referred to as 'flags of convenience'.

2.3 *Conclusion*

23. In conclusion, the areas that we will attempt to cover will be FAO definitions 3.1.2, 3.1.3 and 3.3.1. These cover the activities of IUU and FONC vessels in high seas waters covered by RFMOs. However, of necessity we will need to consider that aspect of definition 3.1.1 that relates to piracy by foreign vessels within an EEZ, because the activity of these vessels in high seas waters is intimately linked with their activities in waters under national jurisdiction. Thus much of the following discussion will include discussion of the drivers for IUU fishing within and outside EEZs, as well as its impacts.

3. Review of relevant information

3.1 *Estimating the extent of IUU/FONC fishing*

24. The problem of IUU fishing has been encountered by most regional fisheries organisations since the 1980s. For instance, in the period between 1985 and 1993 an annual average of 30 – 40 fishing vessels from non-contracting parties were sighted in the regulatory areas of the Northwest Atlantic Fisheries Organisation (NAFO) primarily flagged to Panama and Honduras. Following diplomatic démarches to these countries, some of the vessels were reflagged to Belize¹⁴.

25. NEAFC has also had some, more recent, experiences of IUU/FONC fishing. In 2001 the non-member Lithuania declared 14,000 t of redfish had been taken from NEAFC waters. This was taken outside of agreed NAFO quotas of about 100,000 t. Vessels from Sierra Leone have also been sighted in NEAFC waters (Joao, pers. Comm.).

26. ICCAT has of course experienced the activities of FONC vessels for a number of years. In 1994, a Bluefin Tuna Action Plan was adopted by ICCAT that linked information gathered by the Bluefin Tuna Statistical Document Programme¹⁵ with Contracting Party compliance and non-Contracting Party cooperation with ICCAT's conservation and management regime. Having identified in 1995 that Belize, Honduras, and Panama had vessels that were fishing in a manner which diminished the effectiveness of ICCAT's conservation measures, in 1996 ICCAT prohibited imports by its Members of bluefin tuna products from these three countries (effective from 1997 for Belize and Honduras and 1998 for Panama). This was successful in terms of Panama, which became a contracting party in 1998. Similar sanctions were extended to cover bigeye tuna taken by vessels flagged by Belize, Cambodia, Honduras, Equatorial Guinea and St. Vincent and the Grenadines in 2000. Once again, this move seems to have been effective, and in 2001 ICCAT lifted the import ban on bigeye tuna from St. Vincent and the Grenadines and the bluefin tuna ban from Honduras. ICCAT has estimated that the IUU catch of big eye tuna reached a maximum of 25,000 t in 1998 but has since declined to about 7,200 t (2001). In 1998, IUU catch was about 25% of the total catch.

27. The problem with IUU tuna vessels is widespread. At the Santiago de Compostella meeting on IUU fishing Japan presented a paper which suggested that despite various incentives to scrap vessels and move them onto national fleets there are still some 100 IUU large scale tuna longline vessels (LSTLV) catching an estimated 25,000 t of tuna each year. ICCAT has for some time been concerned about the activities of these vessels, particularly since most of them have crew from ICCAT Contracting Parties and there is considerable evidence of laundering of IUU catch either through links with legitimate vessels or through forging documentation¹⁶. In response to this concern, at its December 2002 meeting ICCAT enacted a series of resolutions¹⁷ which create both "white" and "black" lists of vessels. Any vessel not on the white list that fishes, tranships or otherwise engages in unregulated fishing is placed, following a series of review procedures, on the black list, and there are a number of punitive measures that are activated once a vessel is on this list. IOTC is similarly concerned, but as far as we know has not yet been able to estimate the size of IUU catch in the Indian Ocean.

28. Since 1992 CCAMLR has experienced large amounts of IUU/FONC fishing, with levels reaching up to 80% of the total catch in some areas of the Indian Ocean¹⁸. Agnew (2000) for instance, estimates IUU catches in 1996/97 were restricted to the Indian Ocean and reached 43,000 t. FONC States have been Belize, Panama, Vanuatu, Portugal, Namibia, Vanuatu, Seychelles, Faeroe Islands, South Tomi, St Vincent and the Grenadines, Netherlands Antilles. Although many of these states have now acted to stop their vessels fishing in CCAMLR waters, there are also vessels from CCAMLR Members that are engaged in illegal fishing in CCAMLR waters, in particular Russia and Uruguay¹⁹. Since bringing in a Catch Document Scheme for toothfish CCAMLR has been able to curtail some of the IUU activity on toothfish,

but catches in the Indian Ocean sector are still thought to be very high. The latest estimates from CCAMLR are that there were 11,000 t of IUU caught toothfish in 2002, about 45% of the total catch from CCAMLR waters, 99% of this coming from the Indian Ocean²⁰. However, examination of trade data by Traffic Oceania suggested that the CCAMLR estimates may have been underestimated in 1999/00, when the Catch Document Scheme came into force²¹. Like ICCAT, CCAMLR at its October 2002 meeting brought in two important Conservation Measures regarding lists of vessels engaged in IUU fishing²², although both are “black” lists (CCAMLR chose not to create a “white” list other than its already existing list of vessels licensed by Members to fish in the Convention Area).

3.2 *Monitoring the effects of IUU fishing*

29. The level of IUU fishing is notoriously difficult to assess. Methods to assess it can be divided roughly into direct and indirect. The former (direct) relies on statistical methods and actual observations to derive estimates of the level of IUU fishing (e.g. Agnew & Kirkwood 2002; Pitcher et al 2002). However, even these methods rely on certain assumptions, such as the value of certain input parameters. The value of these parameters can be treated as uncertain, and in this sense bayesian approaches may have considerable value. The second (indirect) methods are based on deductive assumptions. They can be based on occasional sightings of vessels, or on trade data. The use of these methods is more widespread. [refs]

30. Both methods suffer from the problem that they all require data. As IUU fishing is revealed through the use of one method of assessment, the IUU fishers become aware of the danger of allowing such data to be released and therefore move to disguise the data source. One advantage therefore that the first set of methods have is that much of the data are generated by management and surveillance authorities. Therefore, they are less subject to bias than the indirect methods

31. It is often thought that the only factor of importance in dis-incentivising which may lead to the effective control of IUU fishing is surveillance, and it well-known that increasing surveillance leads to increasing avoidance²³. While it may be a large part, a host of other economic and social considerations also come into play, as we show in the next section. Indeed, some of the economic models currently developed take this into account²⁴, and more needs to be done in terms of applying such models for the various IUU situations that we have identified above. In particular see Charles et al (ref 23).

3.3 *Conclusion*

32. One problem that one realises as one examines IUU fishing in a global sense is that it has been widespread over the last 30 years. This time period coincides with the time over which international (and national) management regulations have been considerably tightened up, being primarily dependent upon closure of the commons as EEZs were declared and codified into international law in the 1982 UNCLOS agreement. However, it has not been uniform in its application across the globe. The earliest records appear to come from NAFO, then from ICCAT and finally from CCAMLR. Unfortunately it is not currently possible to really assess the changes in the extent of IUU fishing because much of it is only documented by national or international agencies, and there is no simple global picture. Fighting IUU fishing has been likened to trying to squash a balloon full of air, in that as the problem is solved in one area it pops up in another.

33. We will never be able to assess the effectiveness of our attempts to eliminate IUU fishing unless we have a global IUU monitoring programme that can tell us whether what we are doing is having any effect. That global view is currently not available. We would conclude that a necessary precursor to the many current initiatives on IUU fishing would be to monitor IUU fishing (or define methods for its monitoring). As far as we are able to ascertain, although FAO has stated that it will “monitor, to the extent that it is possible, global developments in IUU fishing and report on these developments at UN and FAO

fora”²⁵ this will not necessarily include producing annual statistics on the level of IUU fishing. As we have seen these are difficult to obtain, so considerable effort will have to be exerted to acquire these data.

4. Analytical framework

34. In this section we attempt to understand the economic and social drivers behind IUU fishing activities.

4.1 *Understanding the economics of IUU vessels*

35. The economics of IUU vessels centre around the vessel operating costs of IUU activities as opposed to non IUU activities. In addition factored into IUU fishing activities there will be a **risk factor**, namely the costs of being apprehended, catch confiscation and the potential costs of a fine. In the absence of a competitive fishing environment and with limited regulatory control, IUU fishers will be able to extract a higher level of **economic rent** than transparent non IUU fishing activities. However the issue of rent extraction as between fishing fleets is one issue. The other issue is the distribution of economic rent as between foreign fishing vessels (IUU and non IUU) and the coastal states in whose waters these vessels are fishing. There are several studies which show that in many cases local coastal states only receive a fraction of the value of the resource which is taken from their waters.

36. There appear to be two groups of vessels that are currently engaged in wide-spread IUU fishing in high seas waters (i.e. IUU fishing falling under the scope of this study). These are the LSTLV vessels, of which there appear to be about 100, fishing for tuna in ICCAT and IOTC waters. The authors have little knowledge about the economics of these vessels.

37. Secondly, there are the IUU vessels undertaking longline fishing for toothfish in CCAMLR waters. These vessels may be relatively inexpensive to buy, probably lower than £1M. Information is hard to come by, but there have been a number of cases of contested bonds of arrested IUU vessels brought to the International Tribunal of the Law of the Sea²⁶ which are relevant. Valuations of vessels in court cases are likely to be lower than the market price, since they are the subject of negotiations on damages. Nevertheless, they do give us some clues. In this regard the Camuoco was originally valued at about USD 3M (GBP 2M) by the French authorities which arrested it, but this was contested at the ITLOS court by the applicant (Panama) and it was decided that the value for bond purposes was USD 345 000 (GBP 220 000). Again, in the Monte Confurco case (Seychelles v France) the vessel was originally valued at USD 1.5M by the respondent (France) and USD 500 000 by the Applicant, and the Court upheld the value of USD 500 000. In the case of the Grand Prince (Belize v France) the respondent (France) valued the vessel at USD 2M (FF 13M) and the respondent at USD 360 000, although the court does not seem to have made a judgement between these two figures.

38. In all these cases there are strong vested interests, for the respondent in having a high valuation (to increase the bail amount) and the applicant having a low valuation (to reduce the amount of bail). Therefore the true value of the ship is likely to lie somewhere between them, at an average of about USD 1.2M. In the more recent Volga case, the value of the vessel was uncontested at about USD 1.1M (AUD 1.8M, GBP 720 000). This tends to support a nominal value for an IUU longliner of about USD 1.2M or GBP 780 000.

39. Longliners are usually of 500 -1000 GRT. They are usually staffed with captains from a variety of fishing states and often with Russian engineers²⁷. The staff costs of these professional staff will usually be greater than for legitimate vessels, since certain risks are being taken by these officers, and will as usual be linked to the value of the catch. Crew costs are, however, much lower, since very cheap labour Indonesian, Chinese and other developing country crew are used, and paid very poor wages (in the region

of USD 100/month). As a result, total staff costs are likely to be 25 - 30% of total catch value. Additionally, routine running costs for an IUU vessel will be somewhat similar to those for a legitimate vessel, around GBP 800 000 per year²⁸. In addition vessel operating costs will be lower as in many cases they may not be fully insured and the crew may not be operating under the health and safety and insurance norms that will be found with non IUU fishing vessels.

40. Several years ago most IUU vessels fishing for toothfish were thought to be acting relatively independently, although several would have been owned by a single fishing company. Often, that fishing company would be operating several legitimate vessels as well as a vessel engaged in IUU fishing. For instance, in 2000 the Falkland flagged vessel "Mila" was arrested in Australian waters around Heard Island and was later convicted by a Falkland Island court of illegal fishing, but the same company also owned the Falkland flagged "Jacqueline" which was engaged in licensed fishing around South Georgia in the same year. CCAMLR reported that a large number of vessels with a great many flags were engaged in IUU fishing in 1996 – 1999, and as exemplified by the case of the San Rafael 1 the activities of these IUU vessels can best be described as opportunistic.

41. Set against these costs will be the profit from IUU activities. In terms of toothfish these are likely to be between GBP 3M and GBP 4M per year (USD 4.5 – 6M), based on a fishing year of about 200 days, currently likely catch rates and market prices of toothfish. It can readily be seen that the likely profit far exceeds the costs, even if a vessel was to be arrested and confiscated once a year.

42. More recently, however, a disturbing development has been the engagement of an organised IUU fleet of vessels with common ownership and control links to two major companies based in the far east – Pacific Andes and P. T. Sun Hope Investments (Jakarta), although Pacific Andes officially denies this. The Austral Fisheries press release states that "the 'alphabet' boats are, of course, technically operated and controlled by their skippers while being owned by dummy companies in (at various times) the British Virgin Islands, Russia, Belize, Bolivia and elsewhere"²⁹. We would emphasise that at the moment these are simply allegations from Austral Fisheries.

43. The development of highly complex company ownership structures has several effects which skew the economic balance sheet for these vessels. Firstly, laundering IUU catch along with legitimately obtained catch (Pacific Andes is a major purchaser of fish caught by legitimate vessels) will allow the price of IUU fish to be higher than would otherwise be the case. There is considerable evidence for fraud in the documentation accompanying toothfish catch documents, as there is in the certificates of registry that are now required by Japan for import of tuna. Secondly, it is not sufficient to simply examine the economics of a single vessel (as we have done above), when a company runs a series of legitimate and IUU vessels, because single vessels can quite easily be sacrificed to the overall benefit of the fishery. There are certainly allegations that the two vessels arrested by the Australian navy in February 2002 (the Volga and the Lena) were the oldest and most dispensable in the IUU fleet fishing around Heard Island. Thus the actual disincentive of arrest may be much less (for the company) than would be assumed for a fleet. Finally, of course, a fleet and large company operation can much easier afford the administration required for rapid reflagging, re-configuring and other disguising tactics.

44. The authors have no direct information on the economic operations of the LSTLVs, but we would assume that their operations are developing the same level of coordination that the toothfish vessels are, given the increased sophistication of the fraud reported by Japan.

45. The above summary of the economics of the operations of IUU vessels sets the scene for a discussion of the major economic drivers behind IUU fishing, discussed in the next section.

4.2 *Economic incentives to engaging in IUU activities*

46. Before embarking on this section, we should mention that there are economic incentives for companies and vessels on the one hand, and individuals on the other. The drivers for entities and individuals may not be the same, and we will recognise these differences where they occur. However, we consider it more useful to present an analytical framework for investigating the economic drivers for IUU activities by reference to generalised categories. Thus the category “world economic outlook” would affect both companies and individuals, as would “disparity between developed and developing world economies”.

47. Our analytical framework is based around the very basic equation,

$$(1) \text{ IUU incentive} \sim \text{Profit from IUU fishing} = \text{Benefit from IUU fishing} - \text{Cost of IUU fishing}$$

Each of the economic drivers will act differently on this equation. For instance, one might reduce costs, thereby increasing the incentive, and another might increase the value of the catch, thereby achieving the same result.

48. It is not sufficient simply to analyse the effect on IUU fishing of certain drivers. The objective of undertaking such an analysis is to identify areas where further research would be best directed, and ultimately to find ways in which equation 1 can be tipped into negative profit, thereby reducing any incentive for IUU fishing and assisting its elimination. However, we also need to take account of the effect of each driver on legitimate fishers. There is no point in adopting a solution, such as a total moratorium on exploiting a particular species, if the effect on legitimate fishermen is even worse than on IUU fishermen. Therefore, our analysis also takes into account the effect of the various drivers on legitimate fishermen.

49. At this point, our analysis is simply qualitative. There is very little information on which to make quantitative analyses. However, we think that such information could be acquired, and useful economic models developed, to investigate the relative importance of each of the drivers in Table 1 in influencing the general equation above.

4.3 *Social Drivers*

50. There are a number of social drivers behind IUU fishing. Closer control over EEZs of coastal states will mean that DWFN nations may have problems in employing fishing crews. In the case of countries such as Taiwan/China and Korea there is therefore an incentive to take the risk of IUU fishing because the relative risks and costs of arraignment may be small. In some of the fishing nations, over exploitation of their own fishing grounds causes a displacement effect to the EEZs of coastal states and the high seas. Fishing operators may also engage in IUU fishing because of the more limited health and safety controls and other controls over working conditions and workers' rights.

51. In the case of low income countries which have semi – industrial fishing fleets there may be an interest in IUU fishing as a relatively low risk, cost effective way of maintaining fish supplies for the country. IUU fishing may therefore have a number of social drivers in the case of these countries, including employment, protein supply and food security. IUU fishing because it evades controls, payment of access rights and social security is therefore attractive as an option.

4.4 *Markets and trade*

4.4.1 *Market control/access and the regulatory environment*

52. It is often thought that increasing restrictions on market access will have a deterrent effect on IUU fishing. This may be the case, but we need to understand exactly how such deterrence might take effect. Firstly, we should note that trade-based measures have been adopted, so far, only in respect of tuna and swordfish (ICCAT, CCSBT, and recently IOTC) and toothfish (CCAMLR). The toothfish scheme is fundamentally different from the tuna schemes. The latter are directed on species falling wholly under the control of the RFMO, and are primarily trade documentation schemes, in which documents are issued in respect of products entering trade. Following the success of the ICCAT Bluefin Tuna Statistical Document Programme a linkage was made in the Bluefin Tuna Action Plan to prohibit imports from non-members whose vessels diminish the effectiveness of ICCAT conservation measures. In 1996, this was extended to allow the prohibition of imports from ICCAT Members who exceed their catch limits³⁰. However, a statistical document scheme is not an essential precursor to the imposition of trade measures; sufficient information may already in existence as to provide evidence of undermining conservation measures. Thus ICCAT maintains a Swordfish Action Plan, which together with its resolution 96-14 can be used to prohibit imports of swordfish from Member or non-Members. Also, ICCAT Resolution 98-18 is aimed at catches of tuna by large-scale longline vessels, and has been used to prohibit the importation of bigeye tuna from one ICCAT Member and four non-Members (FAO, 2002³¹). This is in the (then) absence of specific Statistical Document Schemes for these species.

53. The toothfish scheme operated by CCAMLR, on the other hand, is a catch certification scheme, with documents being issued at point of capture or landing. A second major difference is that not all toothfish fall under the control of the RFMO, there being significant high seas stocks of toothfish falling outside the CCAMLR Area³².

54. There is evidence from the CCAMLR situation that fish certified using a catch document or other trade tracing document may command higher prices than uncertified fish, but that this premium may not be particularly high and therefore it may not act as a sufficient incentive to switch to certified sales (yet). Evidence from CCAMLR suggests that the current premium on fish carrying CCAMLR Catch Documents is only 20 – 30%. This is encouraging because it was always acknowledged that one of the aims of the scheme would be to create a price differential which would act as an economic disincentive for IUU vessels. Unfortunately, the level of economic penalty associated with IUU catches does not seem to be high enough, on its own, to dissuade IUU fishers.

55. Another area of potential economic leverage is the cost of fraud. Certainly fraud is taking place, and gaining in sophistication, as evidenced by the Japanese experience with the difficulty of ensuring that tuna from ICCAT IUU-listed vessels is not imported. However, what is important in the balance of equation 1 is the cost of this fraud, which must be increasing. This cost will also include the cost of financing corruption where state officials are involved in either tacitly or actively assisting fraud. Another avenue for IUU companies to take would be to disguise their fish through repackaging and re-labelling. Although there are genetic methods of identifying the species from fish product, these methods are usually expensive and not available routinely for customs authorities. Therefore, attempts to disguise fish products may go un-noticed. On the other hand, such disguising would have to be followed by mixing of IUU and legitimate fish within a country, so they could be sold, or the value of the fish would be considerably reduced.

56. Increased market control has costs for legitimate vessels as well as IUU vessels. They have to structure their company activities so as to obtain all the relevant documentation and ensure that their fish are appropriately dealt with by landing and import authorities (including those in States which may not be

party to a particular RFMO and/or the scheme operated by that RFMO). For instance, the new ICCAT measure to combat fraud are based on turning the Statistical Document into a Catch Document³³, and requires more rigour in applying the catch document. Such rigour is also required by vessels using the CCAMLR catch document. Vessels may have to carry additional costs associated with verification, such as on-board observers, regular inspections, VMS etc. For instance, the cost of a VMS unit is about USD 3000, of an observer is USD 300-500 a day. Finally, there are costs associated with the import action since many instances of IUU fraud involve fraud under a false name. Where this name is the same as a legitimate vessel, costly delays in importing product may occur while potential fraud cases are eliminated, once more adding a burden on legitimate vessels.

4.4.2 Species value, price distortion

57. Obviously, the higher the price of fish, the higher the benefit to both IUU and legitimate fishers. In the short term, one can expect market forces to increase the value of fish as volumes decrease due to declining stock sizes and quotas. This will disproportionately advantage IUU fishers at the expense of legitimate fishers, because the latter will be constrained by quotas or limitations on effort, whereas IUU fishers will not. This is a dangerous feedback, because as the resource becomes scarcer, the legitimate quota declines still further, creating greater market pressure for increases in value.

58. The imbalance that is apparent in this equation is the fact that in such a feedback system market forces are likely to be unconstrained whereas the deterrent effect of arrests will be severely constrained. We will discuss the relationship between the extent of IUU fishing and the cost of MCS activities later, but it is important to realise here what effect declining stocks have on MCS activities.

59. The first is financial. Reducing stock sizes leads to reducing revenue to Government from a fishery (either in the form of licence sales or tax receipts). This in turn leads to decreased MCS budgets at a time when costs are increasing. Unless additional funds are made available by increasing fines for IUU activity this can lead to the inability of a management body to adequately police its waters.

60. The second effect has to do with presence. There is some evidence from CCAMLR that the presence of legitimate vessels can have a deterrent effect on IUU vessels. Legitimate vessels may have observers on board who have a statutory obligation to report all vessel sightings. Legitimate vessels also find their interests coinciding with those of management authorities when it comes to informing on poachers³⁴. However, as stocks are depleted the fishing opportunities of legitimate vessels decrease also, with the effect that they cease to be effective as a deterrent.

61. In the long term, of course, continued IUU fishing will have a negative effect on both IUU and legitimate fishers, in that catch rates will decline and consequently profit will decline.

4.4.3 General market trends and the global economy

62. While the demand for marine fish products continues to rise steadily, overall supply has been at best static for a number of years and, given the state of the world's marine fish stocks, it is unlikely to increase much above current levels in the near future. Buoyant and increasing fish prices are therefore to be expected. This is an overriding, global, driver for IUU fishing because it clearly will lead to increasing benefits (sales). It should, however, have similar effects on legitimate vessel, albeit within the constraints noted above. IUU fishing by contributing to a reduction in the availability of certain species a negative impact on food security for coastal states where fish consumption is relatively high.

63. Like everything else, fishing is heavily influenced by the global economy, and local economy imbalances. Local economy collapses, for instance, are likely to increase the incentive for corruption, decreasing its cost, so decreasing the cost of this part of the IUU fishing vessel's equation. Large

disparities in incomes/economies of developed and developing countries will create a ready and cheap labour pool for IUU fishers (many crew are Indonesian, Chinese or Filipino), once again decreasing their costs. For instance, the illegal trochus fishery in Australian waters in the early 1990s was mostly due to the extreme poverty of Indonesian fishermen³⁵, despite facing heavy penalties and imprisonment. Illegal fishing in Somali waters is largely due to the ineffective patrolling and enforcement of its EEZ, itself a function of the economic and political situation in the country³⁶. Poor economic outlooks will also force states to make cuts in surveillance coverage, often an early casualty of worsening economic conditions. Thus, one should look for increasing incentives (support) to control IUU fishing in areas adjacent to states or continents which have severe economic difficulties. The coastal states of West Africa are good examples of where there is a need for such support.

4.5 International Regulation/management

4.5.1 International regulations

64. In the normal course of events RFMOs will develop regulations to manage their fisheries. There are also a large number of regulatory issues which are being developed by RFMOs, especially to do with inspection, increased scientific observation, avoidance of bycatch of fish species, avoidance of incidental mortality of birds, avoidance of interactions with marine mammals etc. These regulations inevitably lead to higher costs for legitimate vessels, and no costs for IUU vessels. Their imposition therefore erodes the profitability of legitimate operations, and increases incentives to engage in IUU fishing.

65. RFMOs face a difficult question of how to account for IUU fishing. If estimates of IUU catch and reported legitimate catch exceed the total allowable catch, should next year's catch be reduced by that amount to ensure that the fishery is sustainable? It might seem obvious that it should, but this would mean that the cost of IUU fishing was disproportionately higher on legitimate fishers than on the management authorities. IUU fishing is a failure of management, not of the legitimate fishery to behave responsibly. Furthermore, acting in such a way would be somewhat equivalent to acknowledging that IUU fishing was going to be as large next year as it was this. However, the lesson from other areas where total extractions continually exceed the allowable sustainable stock (for instance, most demersal fisheries in Europe) is that such patterns inevitably lead to fishery collapses. This is also an economic cost on legitimate fishers, but it happens in the medium to long term rather than the short term, and is therefore easier to accept.

4.5.2 Externalities

66. There are a number of externalities that affect IUU and legitimate vessels differently. In addition to having to implement all the abovementioned international regulations, legitimate vessels must implement general safety and pollution requirements of the IMS/MARPOL etc. These added costs are not borne by IUU vessels.

67. We discuss the consequences of IUU fishing in the next section. However, the long-term degradation of resources that result from overfishing, itself a consequence of IUU fishing activity, will lead to fishery closures with consequences on both IUU and legitimate vessels.

4.5.3 Vessel flag transfers

68. Vessel flag transfers reduce the traceability of vessels and compromises MCS attempts to control IUU fishing, since the legitimacy of hot pursuit ceases if a vessel changes its flag. The costs of reflagging³⁷ to various FONC parties is minimal (USD 1 000-5 000, mainly legal costs), it is relatively simple and fast, can often be done at sea, and the benefits great. Interestingly, however, re-flagging problems seem to have acted against the Grand Prince, in that between the time that she was arrested by the French authorities (12 December 2000) and when the court in La Réunion set the bond of FF 11.4M, her registration with

Belize lapsed. Accordingly, *The Tribunal observed that, in the light of the expiration of the provisional patent of navigation issued by the Marine Registry of Belize or of the de-registration of the Grand Prince, referred to in the note verbale dated 4 January 2001 of the Ministry of Foreign Affairs of Belize, and on the basis of an overall assessment of the material placed before it, the assertion made on behalf of Belize that the Grand Prince was still considered as registered in Belize did not provide sufficient basis for holding that Belize was the flag State of the vessel for the purposes of making an application under article 292 of the Convention.*³⁸

69. For legitimate vessels which need to maintain registration with reputable countries (i.e. not FONC parties), transfers of flag are much more costly, and may involve protracted administrative procedures. They are only undertaken when access to a particular fishery is closed to one particular flag.

4.5.4 Fishing Agreements

70. There are two types of fisheries agreements that we consider. The first is the multinational agreements relating to high seas fisheries, elsewhere called RFMOs (Regional Fisheries Management Organisations). The second is agreements between a coastal state or states for access by a third party to fish in their waters.

71. Membership of fisheries agreements brings benefits to legitimate vessels, as Panama has discovered by becoming a party to ICCAT. However, there are considerable costs to legitimate vessels of the existing Members of RFMOs when Membership increases, because limited allowable catches have to be divided up between more Members and therefore quota sizes are reduced. This is a very serious problem faced by, not just ICCAT, but all RFMOs as they attempt to deal with IUU fishing. Various actions by these RFMOs can force the cessation of IUU fishing by certain Non-Contracting Parties, but transferring IUU vessels to legitimate fleets (either by straight transfers or by accession and membership of previously Non-Contracting Parties) increases the capacity of the legitimate fleet. This has direct costs for legitimate fishers. This situation is analogous to that faced by national management authorities; in the end, it is overcapacity which is the largest problem, not necessarily the behaviour of various groups of fishers.

72. Coastal state fishing agreements may be multilateral, bilateral and private. In the case of multilateral fishing agreements, the largest number is those signed by the European Union with African, Caribbean and Pacific (ACP) countries. These agreements support fishing activities in the Atlantic, Indian and Pacific Oceans. Other types of fishing agreements may be bilateral (e.g. Taiwanese agreements with Mauritius; Japanese agreements with Mauritania) or private, the latter being agreements between fishing companies and third party states for fishing access. Other options may include joint venture agreements for fishing rights between external fishing companies and local partners (the case of French and Spanish agreements with Namibia and Spanish and Moroccan companies). These types of agreements confer rights of fishing access subject to the provisions of the agreements (fish quotas; types of gear and equipment and vessel size). In the case of the EU fishing agreements they may also increase (to a certain extent) the degree of transparency with respect to the number and types of vessels. Agreements in themselves do not necessarily avoid the issues of IUU fishing and even fishing vessels operating under transparent agreements may be operating within one of the constituent elements of IUU fishing (e.g. illegal or unregulated).

73. In addition, in some cases, multilateral fishing agreements may bring a displacement effect. For example the extension of fishing rights to EU vessels within the waters of a number of West African countries may have the effect of pushing IUU fishing into other waters. Furthermore the non – agreement of fishing agreements, for example the non completion of a fishing agreement between the EU and Morocco in 2001 may have had the effect of promoting IUU fishing within Moroccan waters. A number of studies and consultancy reports have looked at the issue of the economic and social impacts of fishing agreements. These include a study that was carried out for the EU on issues of coherence and

complementarity between EU fisheries and development policy with respect to EU fishing agreements and development policy (ADE: 2002).

4.5.5 World fishing opportunities

74. We have mentioned this in a previous section, but it is worth re-iterating that the lack of many alternative world fishery resources leads to high opportunity costs for IUU fishing. At the same time, the competition for legitimate fishing opportunities is increasing so the costs associated with those opportunities (such as licensing and other costs such as tonnage payments for certain species which may be defined in fishing agreements e.g. the EU fishing agreements with various third party states) is also increasing.

4.6. National fisheries management policy

4.6.1 National management policy

75. Different countries have very different national management policies. They may adopt input or output controls, have or not have regulations on fishing capacity (by vessel or by GRT/power or by other measures), have heavily detailed or almost non-existent domestic regulations for fishing in inshore and offshore waters. For countries that are very tightly controlled, it is usually also the case that they have very strict regulations concerning the use of their flags by vessels engaged in IUU fishing. Norway, for instance, is particularly strict, being one of the first countries to enact laws denying Norwegian flags and domestic fishing opportunities to vessels having had any past involvement with IUU fishing. Others may have very lax laws regarding the use of their flags by vessels engaging in IUU fishing.

76. Economically, the combination of domestic laws acts as an entry barrier to vessels wishing to be engaged in IUU fishing. If domestic fishing opportunities are denied to vessels on IUU lists (such as the list created by CCAMLR Conservation Measure 10-07 (2002)) this will be a significant economic cost to those vessels. If that denial is extended to other economic areas, such as the denial of re-flagging opportunities to any vessels associated with a FONC state or the prohibition of landings or exports from FONC states (CCAMLR Resolution 19/XXI) this is a further strengthening of economic cost.

77. Thus, it is clear that all things being equal strong domestic legislation will act to combat IUU fishing in the EEZ of a country and will, additionally, force IUU vessels to seek an alternative flag under which to carry out their activities. This strong management policy would of course extend to such areas as the control of fishing capacity. If fishing capacity is not controlled rigorously by national management policy to be equal to the resources that can be exploited by the national (flag) fleet, there will be an economic incentive for those vessels not making enough money in national fisheries to engage in IUU fishing. Thus those countries with weak domestic regulations and national management policy are likely to be the source of vessels engaging in IUU fishing. An extreme example of this is of course FONC states.

4.6.2 Subsidies

78. Subsidies benefit legitimate operations because they depress the operating cost curve and change its shape. In effect, the operating costs of a vessel are reduced. This benefit is not available to IUU operators, except when beneficial ownership of an IUU vessel is held by a company receiving subsidies for legitimate vessels. Subsidies also tend to encourage overcapacity by hiding the real economic cost of fishing, and therefore act to exacerbate the situation discussed in 4.4.4.

79. Subsidies may also be given to companies to sell vessels (e.g EU payments for the decommissioning of fishing fleets). If these vessels subsequently become available to the IUU market, the subsidies will act to artificially depress the cost equation for IUU companies, sometimes by as much as

30%. Most of the IUU fleet currently consists of old vessels no longer capable of competing with the modern fleets operating in regulated fisheries. This is especially the case for the LSTLVs transferred off the Chinese Taipei and Japanese flags since 2000. However, there are some signs that new longliners are being purpose-built for the IUU fishery on toothfish. The number of such vessels available is increased and to some extent their purchase costs are further decreased by the continued practice of some countries to provide subsidies for building new and more efficient fishing vessels.

4.6.3 Excess capacity/ idle capacity

80. Excess or idle capacity will, as shown in 4.4.4, lead to lower costs of vessels and crews to IUU vessels. While the EU has paid subsidies under the MAGP schemes in an attempt to decommission vessels, in other cases subsidies paid by the EU (regional development, vessel refitting) have encouraged the transfer of excess/idle capacity from EU waters to the fishing waters of the Eastern Atlantic and the Indian Ocean. In other cases, fishing vessels which are excess to need may be reflagged, sometimes on numerous occasions, and may end up in IUU fishing activities.

81. Excess capacity has the potential to be an extremely powerful driver for IUU fishing, because it will act at all scales, from the individual to the vessel to the company. Vessels not offered scrapping incentives will face large costs which can only be mitigated through engaging in IUU fishing. Even when scrapping funds are made available, fishermen are likely to face much reduced employment prospects, through two mechanisms. Firstly, even when they re-skill an experienced fisherman will become an inexperienced other professional. Secondly, fishing communities are likely to face multiple job losses through multiplier effects of loss of fishing opportunities, so the job market in these areas will be depressed. Vessels engaged in IUU fishing will therefore find that their costs are doubly reduced, firstly by not having to remain idle at the dockside and secondly because the labour market will be very cheap.

82. There is now considerable and growing concern, especially in the southern hemisphere, that the northern hemisphere's overcapacity problem will increasingly be a very strong driver behind increasing IUU fishing.

4.6.4 Corruption

83. Corruption is a significant factor in gaining IUU access to EEZ waters in various parts of the world. The pressure for corruption will also grow when complex or expensive tracing or certification schemes are in place to try to curtail IUU fishing, since the level of sophistication in fraud must also increase. Corruption is a direct cost to IUU vessels, not being relevant to legitimate vessels. In other cases even where countries may have fishing agreements there may be close relationships between the government and business interests in the third party country and business and local bureaucracies in the countries seeking access to those waters. There is some evidence that these trends are happening in a number of countries which have fishing agreements with the EU. Corruption is a reflection of the lack of transparency, good governance and imperfections in the market. It is in effect a payment for fishing access and rights.

4.6.5 Monitoring, Control and Surveillance (MCS)

84. Increased MCS leads to increased costs of IUU fishing. In Charles et al's model of illegal activity, they found that at low levels of enforcement fishers respond to increases in enforcement by increasing avoidance, but at higher levels of enforcement it becomes uneconomical to continue to do so. Thus the cost of avoidance eventually becomes greater than the benefit from fishing (the greater the time and effort spent avoiding detection, the less time can be spent actually fishing).

85. Increased MCS may also have an effect on legitimate fishers, but this is usually low, especially where they have VMS on board and so inspection authorities know where they are all the time. In fact, it should be the case that increased surveillance considerably benefits legitimate fishers, since it not only protects the long-term sustainability of their resource but it reduces the supply of their product and any undermining that this might have on product value.

86. MCS is, unfortunately, of little use in true high seas/RFMO situations, especially with regard to FONC. Although under UNCLOS these vessels and states have an obligation to act in ways which do not undermine conservation measures, there is no right of arrest of such vessels on the high seas by third parties. Arrests and prosecutions can only be brought by the flag state³⁹. Thus, in these situations, increased MCS only acts to increase the costs of IUU vessels in so far as an RFMO has an agreement to deny port, landing or transshipment facilities to vessels sighted engaging IUU fishing; or in prohibiting trade in their landings or undertaking other actions in conjunction with a IUU lists.

87. This may not increase the costs of the IUU vessels very much, and it comes at such a high cost to the MCS vessel that it is often not seen as viable to undertake high seas MCS activities. There is also a serious problem with the distribution of MCS effort within RFMOs. Some, such as NEAFC, share costs and inspection duties, but others, such as CCAMLR, have no arrangements for this in which case costs are borne completely by the MCS vessel.

4.7. Fishing activities

4.7.1 Areas of fishing/ geographical constraints: the juxtaposition of EEZ and High Seas

88. Since there is no third party power of arrest on the high seas all such arrests of IUU vessels take place either in EEZ waters or in waters adjacent to an EEZ under hot pursuit rules. The juxtaposition of EEZ and high seas areas is thus a vital economic driver for IUU vessels, and it manifests itself in several ways.

89. Firstly, let us take the example of a resource that occurs in both an EEZ and in high seas adjacent to that EEZ, but over which no RFMO has authority. Any vessel can then use the high seas area as a refuge, undertaking excursions into the EEZ. Unless a patrol vessel actively engages with an IUU vessel while it is inside the EEZ it cannot undertake hot pursuit and arrest in the adjacent high seas. The risk to the IUU vessel is therefore much lower than if the resource was only available in the EEZ. Some such refuges are notorious in providing a refuge to poachers, for instance the donut hole in the Bering sea or the waters of the SW Atlantic which provide a refuge for squid poachers⁴⁰.

90. Once again the benefit equation is skewed in favour of IUU vessels, because while they cannot be arrested once they are in high seas waters it is quite possible that a national vessel can be. Such an arrest will be dependent upon other evidence that a State has that its flag vessel was engaging in IUU fishing in EEZ waters or on the high seas. This would be any fishing that is contrary to its licence – so, for instance, continuing to fish in the EEZ after a fishery has been closed, and then moving into high seas waters.

91. On the other hand, there are other aspects of this issue that act economically in favour of legitimate vessels. Legitimate vessels can be expected to have lower market access costs than IUU vessels when they fish legitimately in high seas waters adjacent to an EEZ, because of the actions that Port States can take to prohibit access to IUU vessels. Thus IUU vessels will generally have to pay higher costs for transshipment, or travel to and from high seas fishing areas, if ports in the immediate vicinity of the fishery are closed to them. By expanding the definition of FOC to FONC it is possible to include vessels that are currently flagged to Members of a RFMO. Both CCAMLR and ICCAT have measures that impose costly sanctions on Member's vessels as well as Non-Members' vessels if they appear on the IUU lists.

4.7.2 *Quality of MCS*

92. IUU vessels can fish up to EEZ boundaries and where there is insufficient MCS they may well enter into those parts of the EEZ which are farthest away from the coastline, without fear of arrest, and therefore without penalty, and the cost-benefit of IUU fishing in EEZs in these circumstances can be modelled on both a macro and micro-economic level⁴¹. It will clearly be influenced strongly by the probability of arrest and the size of the fine in the event of arrest (i.e. illegal fishing will occur if the marginal value of the catch, net of the expected marginal fine, exceeds the marginal factor cost – see Charles et al 1999). The strength of MCS activities is of critical importance in deterring IUU activities. However it should also be noted that it is not merely the quality of MCS that is important but also the commitment by national states to the implementation of MCS and the accompanying laws on fisheries and the marine environment. This is not restricted to third party flag IUU vessels, which may be FONC vessels, but should extend most strongly to licensed vessels. Strengthening national laws and the use of new technologies such as VMS or onboard monitoring of vessel activities will considerably assist MCS authorities, and should increase the cost of doing business as an IUU vessel.

93. One of the problems that is being faced by MCS authorities is the level of penalty that can be applied when an IUU vessel is arrested. In response to large-scale IUU fishing around Kerguelen for toothfish, France has arrested a number of vessels and has fined them with large bonds. In three cases, now, the flag state of the IUU vessel has taken France to the International Tribunal on the Law of the Sea (ITLOS), seeking immediate release of the vessel and considerable reductions in the level of the bond set. In the first case, regarding the *Camuoco* (Panama vs France), France had set a bond of FF 20M (USD 3.1M). Despite drawing attention to the seriousness of IUU fishing around Kerguelen (estimated by France to be in excess of USD 56M to that date) on 7 February 2000 the Tribunal found that the bond set by France was too high, and reduced it to FF 8M (USD 1.2M). The following factors were cited by the Tribunal in reaching its decision that the original bond was unreasonable⁴²:

The Tribunal, in a previous judgment in the 1997 M/V "Saiga" (Prompt Release) case, had determined that: "the criterion of reasonableness encompasses the amount, the nature and the form of the bond or financial security" and that the "overall balance of the amount, form and nature of the bond or financial security must be reasonable".

The Tribunal, in today's Judgment, reiterated that conclusion and elaborated on a number of factors that are relevant in an assessment of the reasonableness of the bond or financial security. The Tribunal considers the following to be of relevance:

The gravity of the alleged offences;
The penalties imposed or impossible under the laws of the detaining State;
The value of the detained vessel and of the cargo seized; and
The amount of the bond imposed by the detaining State and its form.

94. In a second test case (18 December 2000), the Tribunal again decided that a FF 56.4M (USD 8.7M) bond set by France on the Seychelles flagged *Monte Confurco* was not reasonable, and reduced it to FF 18M (USD 2.8M). However, in the final French case (regarding the Belize registered *Grand Prince*, 20 April 2001), the Tribunal decided found "that it had no jurisdiction under article 292 of the Convention to entertain the Application". The Tribunal stated that the "documentary evidence submitted by the Applicant fails to establish that Belize was the flag State of the vessel when the Application was made". France's bond of EUR 1.7M (USD 1.7M) was therefore upheld (Belize had asked for its reduction to EUR 206 149)⁴³.

95. A similar case has recently been brought by the Russian Federation against Australia. This stems from the arrest on 7 February 2002 of the *Volga*, which was boarded by Australian military personnel from a military helicopter on the high seas in the Southern Ocean for alleged illegal fishing in the Australian fishing zone. The vessel was directed by an Australian warship to proceed to Perth, where it was still detained. The crew of the vessel were repatriated to their respective home countries after a period of detention with the exception of three officers who remain in Perth under court orders. The catch which had been on board the vessel at the time of boarding was sold by the Australian authorities for the amount of AUD 1 932 579.28. The Australian authorities set the amount of the security for the release of the vessel and the crew in the amount of AUD 4 177 500. The Russian Federation requested the Tribunal to order the Respondent to release the *Volga* and the officers upon the posting of a bond or security in an amount not exceeding AUD 500 000. What is particularly interesting about this case is that Australia actually made the arrest in high seas waters adjacent to its EEZ around Heard Island.

96. In making its judgement, the ITLOS tribunal has obviously learned from its previous experiences. It set a bond consisting of the value of the vessel, fuel/lubricants and fishing gear (AUD 1.9M). Significantly, they did not consider that the proceeds of the sale of fish and bait from the vessel, which is being held on trust by the Australian authorities pending the outcome of domestic proceedings, should form part of the bond. This departs from their previous judgements, and is an important principle because it means that the company must find an *additional* AUD 1.9M for a bond guarantee. However, they disallowed an application by Australia to include within the bond AUD 1M for a VMS system on board the vessel. This would have been a “good behaviour” guarantee pending full trial in Australia, because as was pointed out during the ITLOS hearing IUU vessels are usually repeat offenders. For instance the *Camuoco*, which following the January 2000 ITLOS hearing of *Panama v France* was released on bail, was arrested on 3 July 2002 by French authorities around Kerguelen Island (again), this time named the ‘Eternal’ (previously ‘Arvisa 1’, previously *Camuoco*). However, at least one judge disagreed with the court finding, and opined that such a good behaviour mechanism would be appropriate given the high level of re-offending of such vessels.

97. It will be clear from the above that the level of bond that the Tribunal regards as appropriate is lower than the likely annual profit of an IUU vessel (estimated in section 4.1 as USD 4.5 – 6M/year). However, it is also clear that what is most important to ITLOS is the value of the vessel and its cargo, not the overall damage that the vessel can do to the resource. This is an important factor influencing the benefit side of equation 1.

4.7.3 Transshipment/steaming costs

98. We have mention above (4.4.1) the fact that closure of ports to IUU vessels increases their cost, and therefore can reduce profits of IUU vessels. Several RFMOs are now developing lists of IUU vessels, with the intention of prohibiting a raft of benefits from being given to those vessels including port access, flagging, access to licenses for legitimate fishing in their EEZ, imports, chartering etc⁴⁴. These should all have the effect of increasing IUU vessel costs of steaming, transshipment, hiring of crew etc. In principle there will be a radius of action within which it will be still profitable for IUU vessels to fish. Once deterrent measures are reinforced such as improved implementation of MCS and the control of landings, these transshipment and operating costs will increase eventually to the point where IUU fishing becomes considerably less profitable and even unprofitable.

4.7.4 Health of other stocks

99. If we ignore the (probably remote) possibility that some vessel owners and crew may simply prefer to fish illegally, we should conclude that the reasons that vessels engage in IUU fishing are solely financial and regulatory. This also immediately implies that vessel owners will prefer to engage their

vessels legally in regulated fisheries rather than in IUU fishing, as long as the opportunity to do so exists and legal fishing is sufficiently profitable. However, for a substantial and increasing number of vessels, the conditions of this proviso are not met. As estimated by FAO⁴⁵, nearly 70% of the world's fisheries are either fully exploited, overexploited, or in various stages of recovery from overexploitation. Management responses to this have led in many cases to substantially reduced allowable catches, and at last action is also being taken to reduce the overcapacity that exists in most of the world's major fishing fleets. In the absence of heavily subsidised decommissioning schemes, and with ageing vessels being replaced in regulated fleets by (heavily subsidised) newer and more efficient vessels, inevitably owners of vessels unable to maintain past levels of profits will look for other options.

100. In previous eras, pressures such as these led to vessels looking offshore for new fishing opportunities. For example, the establishment of Exclusive Economic Zones (EEZs) led to many distant water fleets being excluded from fisheries in waters of coastal state jurisdiction, and the response was the development of then-unregulated fisheries on the high seas. This legitimate avenue is now no longer open to many of these vessels, since most of these resources are now regulated by RFMOs and many are also subject to substantial levels of exploitation.

101. Becoming IUU is thus sometimes the only way that a vessel or company can gain access to very limited resources. This is a very strong benefit that is not shared by legitimate vessels, because in order to remain legitimate they must refrain from IUU activities. These strong benefits (incentives) apply equally to individuals as to companies. Unemployment in the fisheries sector is likely to become considerably worse in the medium and short term in some OECD countries (especially Europe) as the true environmental and economic cost of past poor management policies becomes evident. This unemployment is (and will be) an important driver of IUU fishing, as there is simply no benefit to be gained from being a legitimate fisher since the opportunities for such fishing are not present. For this reason, there continues to be a strong emphasis on state control over nationals involved in IUU fishing (either as crew or as company beneficial owners) under UNCLOS Article 94⁴⁶.

4.8. *Company/vessel operations*

4.8.1 Vessel economics

102. The financial operating costs of IUU vessels are likely to be lower than for legitimate vessels. We have attempted to estimate operating costs in section 4.1, and IUU vessels will undoubtedly have lower insurance (or no insurance) costs, low compliance costs, low registration/flagging costs especially if they are FONC flagged as well as lower crew costs, including social security. In addition IUU vessels will not be paying the taxes and port dues which legitimate fishing vessels may incur nor will they be paying the vessel charges and tonnage charges which may be set in fishing agreements⁴⁷. It may be that in some theatres the purchase of IUU fishing vessels is used as a means of disposing of money from other illegal operations, such as drugs. Indeed, although wildlife crime (including IUU fishing) was until recently thought to be opportunistic rather than organised, there is evidence that it is now much more organised and may have links to other aspects of organised crime such as drug and armament smuggling⁴⁸.

103. It is possible to conceptualise the shape of the cost function with IUU fishing. It would be considerable lower when compared with non IUU fishing. Capital costs in terms of replacement costs would be reduced as replacement values and depreciation would not be included. It is likely that there would be lower levels of capital investment. Recurrent costs (crew, maintenance) and other maintenance costs are also likely to be lower and if fuel is obtained through informal channels, this may be cheaper through the avoidance of tax. In addition IUU vessels will bear the costs of tonnage levies and in many cases where there are private agreements they may well pay lower costs than vessels operating in a transparent fashion under fishing agreements.

4.8.2 Size of company/global companies

104. We have previously made reference to this factor in reference to the Austral Fisheries publication on “the alphabet boats” and their links to the large multinational company Pacific Andes. Large companies have several advantages over small ones, these include:

- the ability to launder IUU catch with legitimate catch,
- access to worldwide markets, so that they can split consignments and confuse customs authorities
- access to bulk processing facilities, with further opportunities for disguising/hiding IUU catch
- complex company ownership structures, which are costly for MCS authorities to trace and easy to change
- the ability to disguise fleet movements through rapid re-flagging, name changing, and modification of vessels which may thwart legal cases (e.g. in the case when two vessels are identical but carry different flags, it is practically impossible to prove unless a vessel is boarded that it was sighted in a particular area).
- Large fleets can indulge in “sacrifice games” where a fleet of efficient vessels is augmented by one or two slow inefficient vessels which are used as decoys. After their arrest the efficient fleet is practically assured of a period of fishing uninterrupted by a patrol vessel
- access to sophisticated communications and early warning systems

These factors all tend to reduce the costs that an IUU vessel would usually expect to pay.

105. One should bear in mind that for legitimate vessels some of the same advantages might pertain when they are owned by a large company.

4.8.3 Dual-flag operations

106. In addition to the arguments above for company size, the make-up of the fleet in a company is particularly important. Companies attempting to operate fleets of both IUU and legitimate vessels can expect to experience lower operating costs (through paying less in licence fees and other access requirements) than companies operating only legitimate vessels. For this reason, a number of companies are suspected of operating this strategy. However, an added risk factor should be taken into account when considering the costs of companies taking this strategy, and that is the increasing propensity of licensing authorities to take into account the overall beneficial ownership of vessels when considering their applications for licences. This trend, and it is likely to strengthen, could well redress the balance of the equation and create an overall cost rather than benefit of adopting this strategy.

4.9. Conclusions

107. The discussion above has identified the various economic drivers behind IUU fishing. This includes the factors that are likely to affect the economics of the IUU vessels and companies, as well as those factors that are likely to increase the incentive for legitimate vessels to engage in IUU fishing.

108. In an analytical framework we would anticipate that each of these factors should be examined in detail, through a combination of case studies and models, as appropriate. This should result in the identification of which are likely to be the most important drivers of IUU fishing in various circumstances, for instance for different species, areas, socio-economic classes, high seas and EEZ fisheries. This would

then allow judgements to be made about what actions, addressing which drivers, would be most likely to yield results in the fight against IUU fishing.

5. Economic and social impacts of IUU fishing

109. The biological and ecological impacts of IUU fishing are well-known, and fairly self-evident. Large scale IUU fishing undermines conservation measures directed at conserving stocks and ensuring the long-term sustainability of fisheries. It is doubly insidious as, because it is extremely difficult to monitor, its effects are also very difficult to predict because reliable estimates of total extractions can not be used in stock assessment models. Thus, a management authority may not even know that the stock is in danger until it is in a poor state. IUU fishing is, effectively, over-fishing and will ultimately lead to stock collapses, the result being that the resource is of no value to legitimate or IUU fishermen.

110. IUU fishing also damages the ecosystem and associated species. As we have pointed out above, IUU fishermen do not respect the various control measures put in place to ensure responsible fishing by legitimate fishers, with the result that they may kill large numbers of other fish as bycatch, birds, seals and whales as incidental mortality. The deaths also go unreported. There are, for instance, significant problems with bycatch of sharks in tropical tuna fisheries, and with interactions between sharks, orcas and longline fisheries. These are barely reported from legitimate fisheries, let alone IUU fisheries (ref: recent workshop in APIA). Indeed, there are anecdotal reports of IUU vessels shooting orcas in an attempt to protect fish from them.

111. These biological effects create significant economic and social impacts, which we explore below.

5.1 *The Economic Impacts of IUU Fishing*

5.1.1 *The Macroeconomic Impacts of IUU Fishing*

112. The macroeconomic impacts of IUU fishing agreements are those impacts that will have impacts at the level of a national or regional economy. It is fair to say that in terms of loss of economic rent and other revenues to the national economy, the major macroeconomic impacts of IUU fishing will be on low and middle income countries that have EEZs with important fish resources and whose EEZs lie adjacent to important high sea fishing zones. It is also in the middle and low income countries that there are resource constraints in terms of financing and implementing adequate MCS and fisheries law. A number of publications have looked at the economic impacts of the activities of distant water fishing fleets, including IUU activities⁴⁹. One of the problems in assessing the impacts of IUU fishing is that in the absence of adequate MCS, many countries have no idea of the extent of IUU fishing within their EEZs and in adjacent waters. Only when it is brought to their attention, often by industry groups, do they recognise it and act to curb it⁵⁰.

113. The development of IUU fishing within a country's EEZ and in adjacent high seas areas may have a number of specific impacts. These are summarised in Table 1.

Table 1. The Macroeconomic and Social Impacts of IUU Fishing

PARAMETER	INDICATORS	IMPACTS
Contribution of fishing to GDP/GNP	Value added; value of landings	IUU fishing will reduce the contribution of EEZ or high seas fisheries to the national economy and lead to a loss of potential resource rent.
Employment	Employment in the fishing, fish processing and related sectors	IUU fishing will reduce the potential employment that local and locally based fleets may make to employment creation and the potential for employment creation. This is likely to be a major factor only in respect of EEZ IUU fishing.
Export revenues	Annual export earnings	IUU fishing by reducing local landings and non payment of access dues will reduce actual and potential export earnings. This will, of course have potentially serious implications for surveillance activities, where these are supported wholly or partly by export revenues (or port revenues, see below).
Port revenues	Transshipment fees; port dues; vessel maintenance; bunkering	IUU fishing will reduce the potential for local landings and value added.
Service revenues and taxes from legitimate operations	Licence fees, revenue of companies providing VMS, observer etc facilities, exchequer revenue from company taxes.	IUU fishing will reduce the resource which in turn will reduce the other revenues that would accrue from companies providing legitimate fishing services. This includes company taxes
Multiplier effects	Multiplier impacts on investment and employment	The direct and indirect multipliers linked to fishing and fishing associated activities will be reduced with the loss of potential activities through IUU fishing.
Expenditure on MCS	Annual expenditure on MCS linked to IUU fishing.	The existence of IUU fishing will put budget pressures on MCS/fisheries management ⁵¹ .
Destruction of ecosystems	Reduction in catches and biodiversity of coastal areas	Loss of value from coastal areas e.g. inshore prawn fishing areas and from mangrove areas that might be damaged by IUU fishing. Reduction in income for coastal fishing communities.
Conflicts with local artisanal fleets	Incidences recorded of conflict between IUU fishing vessels and local fishing fleets.	Reduction in the value of catches for local fishing fleets. Possible increased health and safety risks because of conflicts between the artisanal and industrial fleets.
Food security	Availability of fish for local consumption (food and protein balance sheets)	The reduction in fish availability on local markets may reduce protein availability and national food security. This may increase the risk of malnutrition in some communities.

114. The actual impact of IUU fishing on low and middle income countries will depend on a number of different factors. These include:

- The dependence on the fisheries sector for government revenue, export earnings, employment etc.
- The efficacy of MCS and the commitment to the control of IUU fishing.
- The size of a country's EEZ and the importance of high value fish stocks with ready markets.

115. Thus countries such as the Seychelles which have a very high dependence on fisheries and notably tuna fisheries for export earnings, licence fees, transshipment and port duties and which has a large EEZ would suffer more from IUU fishing than say Tanzania. While Tanzania has a relatively large coastline and EEZ, fish production from marine resources at present plays a much smaller role in the national economy.

116. The effects of IUU fishing are often a vicious circle. Lack of resources for surveillance and enforcement at the market place or at sea will enable IUU fishing to develop, which itself will lead to lower revenues from fishing licences or other linked activities, which then feeds back to lower government resources. For instance a large proportion of fish caught in the Russian sector of the Bering sea is reported

to be caught and sold without passing through state-approved channels, which means that little income from fisheries is being harnessed by the government for re-investment in the industry or for enforcement. It also means that billions of US dollars are being lost to IUU operators annually⁵².

5.1.2 The Microeconomic Impacts of IUU Fishing

117. The macroeconomic impacts of IUU fishing will not simply remain at the levels of the national and regional economies but will filter down to the microeconomic level, that is to the level of villages, communities and households. In developing countries these impacts may be significant. In terms of the economic activities of fishing communities and villages, IUU fishing may have negative impacts of the revenues for fisheries, operating costs as well as on biological stocks. There is some evidence that in some cases e.g. off West Africa and Mozambique, the activities of DWFNs and IUU fishing may through reducing stocks, damaging gear and equipment have a direct impact on the livelihoods of fishing communities as well as posing a threat to the activities of artisanal fishermen, including collisions and health and safety issues. Furthermore if IUU fishing damages biological stocks and reduces the availability of certain species of fish (e.g. small pelagics) which are important

5.2. The Social Impacts of IUU Fishing

118. The social impacts of IUU Fishing are inextricably linked to the economic impacts. Where IUU fishing has a negative impact on biological stocks and marine resources, fishing revenues, licence fees, port income and associated value added it will also have negative social impacts, particularly for medium and low income countries where in many cases social support and safety nets are not well established and no alternative to fishing exists. At the national economy level, negative economic impacts of IUU fishing will translate into a number of social impacts, these are summarised in Table 2 below.

Table 2. Possible Negative Social Impacts of IUU Fishing at the National Level

PARAMETER	INDICATORS	IMPACTS
Employment	Employment rates in marine fishing communities	IUU fishing may lead to lower employment if it has a negative impact on stocks and the activities of artisanal and local coastal fishing activities. <u>Less opportunities for new generations of fishers to participate in fishing</u>
Household incomes	Gross and net household incomes	IUU fishing through conflicts with local fishing fleets and by over exploitation of certain species may lead to reduction in household incomes and therefore exacerbate poverty. Possible negative impacts on income distribution.
Gender issues	Employment of women in fishing and fish marketing	IUU fishing may have a negative impact on shore fishing by women and on the marketing opportunities for women who in many societies have an <u>important role in basic fish processing and marketing.</u>
Nutrition and food security	Availability of fish on local markets at affordable prices.	In some cases IUU fishing through its negative impact on fish stocks and availability may have a detrimental impact on the availability of fish, an important source of protein in some countries.

119. It may also be thought that IUU fishing suffers from a social feedback akin to the “moral hazard” described in relation to IMF funding⁵³. In the case of the IMF, critics argue that the knowledge that IMF financing will be made available in the event of a financial crisis makes the crisis more likely to occur. In the case of IUU fishing, a similar social effect might take place in that the knowledge that IUU fishing is taking place might make fishermen less keen to participate in responsible fisheries. The moral hazard in IUU fisheries relates to the problem of asymmetric information where one party e.g. the coastal state does not have information on landings, catches and other data relating to fisheries exploitation by IUU fishing vessels.

120. This might, in extreme cases, lead to a classic race to fish (aka the ‘tragedy of the commons’⁵⁴) in which a certain level of IUU fishing encourages more IUU fishing in a race to get all the fish before the

stocks are depleted. This is only likely to occur for species with very low carrying capacities (e.g. orange roughy) but it nevertheless could be a significant social and economic driver for IUU fishing. Likewise, it may be seen to be an undesirable but unavoidable consequence of publicity about IUU fishing, its effects, and attempts to eliminate it.

6. Summary and Conclusions

121. We have identified above:

- Ways of monitoring the extent of IUU fishing – essential for monitoring the effectiveness of measures taken to eliminate it. It is not clear that any organisation is currently doing this.
- Factors acting as the economic drivers of IUU fishing
- An analytical approach, involving analysis of these factors through case studies and/or models, which will show which of them is most important, and where in the economic equation the IUU operations are most vulnerable
- A system of indicators of the economic and social effects of IUU fishing which could be monitored to assess the damage that IUU fishing is causing.

122. We have not been able to assess, in this brief study, the global extent of IUU fishing, although we have been able to give some recent estimates for various RFMOs and from other case studies. We would suggest that getting something of a global picture is essential for future progress in this field.

123. We have also not made an attempt to identify which of the factors in Table 1 are most important. It is probable that different factors are important in different situations. For instance, one in situations where a whole fleet is idle because of collapsed fish stocks, the cost of reflagging or penalties in arrest may be a very small part of the economic equation compared to the high personal cost of scrapping.

ENDNOTES

- 1 . Written by consultants Messrs David J. Agnew and Colin T. Barnes of MRAG Ltd., London.
- 2 The Commission established under Article VII of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), 1980. Reprinted in *International Legal Materials* 19 (1980): 827.
- 3 Executive Secretary, CCAMLR to FAO (REF: 4.2.1. (I), 18 December 1997), as cited in G. Lugten, "A review of Measures taken by Regional Marine Fishery Bodies to address contemporary Fishery Issues," FAO Fisheries Circular No. 940. (Rome: FAO, 1999): Footnote 130 at 35.
- 4 United Nations Convention on the Law of the Sea, Montego Bay, 10 December, 1982.
- 5 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. New York, 4 December, 1995.
- 6 See Edeson, W. M. 1966. "The Code of Conduct for Responsible Fisheries: An introduction. *Int. J. Mar. Coast. Law* 233.
- 7 See "Implementation of the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing. FAO Technical Guidelines for Responsible Fisheries. No. 9., Rome, FAO. 2002, 122pp. See also Report of the Twenty-Fourth Session of the Committee on Fisheries, Rome, 26 February – 2 March, 2001. Document COFI/2001/7, and Kirkwood & Agnew 2002 [G. P. Kirkwood and D. J. Agnew. 2002. Deterring IUU fishing. Proceedings of the Symposium on International Approaches to Management of Shared Stocks – problems and future directions. Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft 10-12 July 2002.].
- 8 See, for example, Freestone, D and Makuch, Z. 1996. The new International environmental law of fisheries: The 1995 United Nations Straddling Stocks Agreement. *Yearbook of International Environmental Law*. 7: 3-51.
- 9 Valatin, G 2000 Fisheries management institutions and solutions to the "black fish" problem. CEMARE Misc. Publ. no. 48, pp. 101-118. Management institutions and governance systems in European Fisheries. Univ. of Portsmouth, Portsmouth (UK)
- 10 European Parliament. Working Document 1 on the role of flags of convenience in the fisheries sector. Committee on Fisheries, 11 April 2001.
- 11 Vukas and Vidas discuss this point in detail, and show how the concept of requiring a genuine link between Flag State and vessel was repeatedly watered down in the negotiations leading up the the 1982 UNCLOS agreement. B. Vukas and D. Vidas, Flags of Convenience and High Seas Fishing: the emergence of a legal framework. In *Governing high seas fisheries: the interplay of global and regional regimes* (Ed. O. S. Stokke) pp 53-91, OUP.
- 12 D.J. Agnew and G.P. Kirkwood 2002. A statistical method for analysing the extent of IUU fishing in CCAMLR waters: application to Subarea 48.3. CCAMLR WG-FSA-02/4
- 13 ITLOS press release 35, 7 February 2000. Case of the Camouco, Panama vs France. For later information on the movements of the Camouco, see ITLOS Transcripts of the Volga case (Russia vs Australia), statement of Mr Campbell, ITLOS/PV.02/02, 12 December 2002.
- 14 Reported in Vukas and Vidas, opp. Cit. Citing Joyner and the NAFO annual reports 1994, 1995. Other sighted flags included Cayman Islands, Sierra Leone, St Vincent and the Grenadines, New Zealand, the USA and Venezuela.

- 15 ICCAT resolutions 92-1 and 92-3, implemented in 1993.
- 16 See: [(Japanese submission at FAO-IPOA meeting; Japanese paper delivered to the Santiago de Compostella meeting. The preambular paragraphs in ICCAT Resolution 01-19 make these concerns very clear: “RECALLING that the Commission makes yearly reviews of various trade and sighting data and based on that information prepares a list of IUU fishing vessels, RECOGNIZING that since IUU fishing vessels change their names and flags frequently to evade the sanction measures against them and that the lists of IUU fishing vessels based on the past trade data are still useful but should not be the sole tool to eliminate the IUU fishing vessels; EXPRESSING GRAVE CONCERN that a significant amount of catches by the IUU fishing vessels are believed to be transferred under the names of duly licensed fishing vessels; BEING AWARE that the majority of crew onboard the IUU tuna longline vessels are residents of the Contracting Parties, Cooperative Non-Contracting Parties, Entities or Fishing Entities; STRESSING THE NEEDS for Chinese Taipei, Japan and Parties concerned to investigate the relation between licensed vessel owners and IUU fishing activities and take necessary actions to prevent licensed vessel owners from being engaged in and associated with IUU fishing activities.”
- 17 02-22, “Recommendation by ICCAT concerning the establishment of an ICCAT record of vessels over 24 meters authorized to operate in the Convention Area”, and 02-23, “Recommendation by ICCAT to establish a list of vessels presumed to have carried out illegal, unreported and unregulated fishing activities in the ICCAT Convention Area”.
- 18 Agnew, D J, 2000. The illegal and unregulated fishery for toothfish in the Southern Ocean, and the CCAMLR Catch Documentation Scheme. *Marine Policy*. 24: 361 – 374.
- 19 CCAMLR Report, 2002.
- 20 CCAMLR Scientific Committee Report, 2002, Annex 4, Table 3.2.
- 21 M. Lack & G. Sant, 2001. Patagonian toothfish: are conservation and trade measures working? *TRAFFIC Bulletin Vol 19, No 1. TRAFFIC Oceania*. See Agnew, 2000 *op cit* and Green, J. and D.J. Agnew. 2002. [Catch document schemes to combat Illegal Unregulated and Unreported fishing: CCAMLR’s experience with southern ocean toothfish. *Ocean Yearbook 2000*, 16, pp000-000 (in press)] for a discussion of the CCAMLR CDS.
- 22 CCAMLR Conservation Measures 10-06 (2002) “Scheme to promote compliance by Contracting Party vessels with CCAMLR conservation measures” and 10-07 (2002) “Scheme to promote compliance by non-Contracting Party vessels with CCAMLR conservation measures”
- 23 Charles et al, 1999; Milliman, SR 1986 “Optimal fishery management in the presence of illegal activity” *J. Envir. Econ. Manage.*13, 363-381.
- 24 See Charles, A.T, R.L. Mazany, M. L. Cross, 1999 “The economics of illegal fishing: a behavioural model”. *Mar. Resource Economics*, 14, 95-110; Sutinen, JG; Kuperan, K, 1995, “A socio-economic theory of regulatory compliance in fisheries”, *Int. Coop. Fish. Aquaculture. Dev: Proc 7th Biennial Conf. Of the Int. Inst. Fish. Econ. Trade, National Taiwan Ocean Univ, 1995, vol. 1, pp. 189-203*
- 25 FAO Observers report to CCAMLR, 2002: CCAMLR-XXI/BG/36.
- 26 Copies of the court proceedings and judgements in the ITLOS cases can be found on the ITLOS website, <http://www.itlos.org/>
- 27 The information in this section comes from a variety of confidential sources, but also the Australian Broadcasting Corporations’ 4 Corners programme, “The toothfish pirates”, broadcast on 30 September 2002 and “The Alphabet Boats: a case study of toothfish poaching in the Southern Ocean”, a publication by Austral Fisheries Pty, PO Box 280, Mt Hawthorn, Western Australia 6916.
- 28 These are figures obtained from discussions with the toothfish industry. A more comprehensive analysis of licensed vessel operation is given in *Évaluation des accords de peche conclus par la Communauté européenne*. Ifremer/Cemare/CEP. *Contrat. Européen no 97/S 240-152919, 1999*
- 29 Page 3 of the Austral Fisheries document
- 30 ICCAT Resolution 96-14.

- 31 Implementation of the international plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing. FAO Technical Guidelines for Responsible Fisheries No 9. Rome, FAO, 122pp.
- 32 See Agnew, 2000 *op cit*, and Kirkwood & Agnew, 2002 *op cit*. Definitions of the differences between trade and catch documents is given in the Report of the Expert Consultation of Regional Fishery Management Bodies on Harmonisation of Catch Certification, La Jolla, 9-12 January 2002. FAO.
- 33 Resolution 02-25 by ICCAT concerning the measures to prevent the laundering of catches by IUU large-scale tuna longline vessels, paragraph 1 of which reads: Contracting Parties, Cooperating non Contracting Parties, Entities or Fishing Entities (hereinafter referred to as the "CPCs") should ensure that their duly licensed large-scale tuna longline fishing vessels have a prior authorization of at sea or in port transshipment and obtain the validated Statistical Document, whenever possible, prior to the transshipment of their tuna and tuna-like species subject to the Statistical Document Programs. They should also ensure that transshipments are consistent with the reported catch amount of each vessel in validating the Statistical Document and require the reporting of transshipment.
- 34 For instance, a licensed Australian trawler spotted a notorious IUU vessel, the *Eternal* (previously the *Arvisa 1*, *Kambott* or *Camouco*, using several FOC) in French waters around Kerguelen, and after calling the French authorities took up hot pursuit until the *Eternal* was intercepted by the French naval vessel the *Albatross* on 3 July 2002, arrested and taken to Réunion. *La Voz de Galicia*, 9 July 2002.
- 35 Peachey, G, 1991. Illegal trochus fishing--what can we do? *Aust. Fish.*, Canberra, vol 50, 8-9.
- 36 Hassan, MG, Marine resources in Somali waters: opportunities & challenges. 6th Asian Fisheries Forum Book of Abstracts. p. 93. Asian Fisheries Society.
- 37 See for instance www.flagsofconvenience.com.
- 38 ITLOS press release 48.
- 39 Freedom of the high seas is enshrined in Article 87 of the 1982 Agreement. Third parties may only arrest vessels through hot pursuit (Article 111) or which are stateless (unflagged).
- 40 See A. J. Barton, D. J. Agnew & L. Purchase 2002. The Southwest Atlantic: achievements of bilateral management and the case for a multilateral arrangement. Proceedings of the Symposium on International Approaches to Management of Shared Stocks – problems and future directions. Centre for Environment, Fisheries and Aquaculture Science (CEFAS), Lowestoft 10-12 July 2002.
- 41 See, for example, P. J. B. Hart, Controlling Illegal Fishing in closed Areas: The case of mackerel off Norway. Proc. 2nd World Fisheries Congress, Brisbane, 1998; and A. T. Charles, R. L. Mazany & M. L. Cross, The economics of Illegal Fishing: a behavioural model. *Mar. Resource Economics* 14, 95-10, 1999.
- 42 ITLOS press release 35; also see ITLOS press release 42 and 48 in this section
- 43 *La Voz de Galicia*, 13 April 2002. The fine was not, ultimately, paid, and France sank the vessel off Réunion in early 2002.
- 44 See for example CCAMLR Conservation Measures 10-6 and 10-7, ICCAT measures 02-22 to 02-24.
- 45 FAO. 2000. *The State of World Fisheries and Aquaculture 2000*.
- 46 For example, "IUU fishing and state control over nationals, presented by D. A. Balton at the Santiago de Compostella conference on IUU fishing, November 2002, and the EU Plan of Action for the Eradication of Illegal, Unreported and Unregulated fishing.
- 47 Such payments are set for different sizes of vessels and for species in the EU fishing agreements. These do not necessarily mean that the levels of such payments are correct. There may well be under or miss – reporting of catches by quantity and species.

- ⁴⁸ International Environmental Crime: The nature and control of black markets. Royal Institute of International Affairs, 2002, workshop report. G. Hayman & D. Brack. Sustainable Development Programme, Royal Institute of International Affairs 10 St James's Square, London SW1Y 4LE, UK.
- ⁴⁹ Acheampong, A. (1997). Coherence Between EU Fisheries Agreements and EU Development Cooperation: The Case of West Africa. ECDPM Working Paper No. 52, Maastricht: ECDPM; Brandt, H. (1999). The EU's Policy on Fisheries Agreements and Development Cooperation. The State of the Coherence Debate. German Development Institute, Report and Working Paper 1/1999; Milazzo, M. (1998). Subsidies in World Fisheries – A Reexamination. World Bank Technical Paper 406; MRAG (1998). The Impact of Fisheries Subsidies on developing Countries. Report to DfID, Contract No. CNTR 98 6509. In association with Cambridge Resource Economics and IIED; Tsamenyi, M. and Mfodwo, K. (undated). The Fisheries Agreements of the African Atlantic Region, an Analysis of Possibilities for WWF Intervention. Draft; WWF (undated). The Footprint of Distant Water Fleets on World Fisheries. WWF Endangered Seas Campaign.
- ⁵⁰ See, for example, “Authorities reassert fight against illegal fishing”. Fisheries Information Service, 18 December 2002.
- ⁵¹ Costs of fisheries management are often high but unquantified. A useful discussion is given in “The cost of fisheries management, W.E.Schrank, R.Arnason & R.Hanneson, Ashgate, Aldershot, UK, 2003”.
- ⁵² Vaisman, A 2001 “Trawling in the mist. Industrial fisheries in the Russian part of the Bering sea” TRAFFIC International, Cambridge (UK)
- ⁵³ T. Lane and S. Phillips. IMF Financing and Moral Hazard. Finance & Development, June 2001, Volume 38, Number 2. Also at <http://www.imf.org/external/pubs/ft/fandd/2001/06/lane.htm>.
- ⁵⁴ Hardin, G. 1968. Tragedy of the Commons, Science, 162: 1243-1248.