

Cutting a lifeline to maritime crime: marine insurance and IUU fishing

Dana D Miller^{1*}, U Rashid Sumaila¹, Duncan Copeland², Dirk Zeller³, Baris Soyer⁴, Theodora Nikaki⁴, George Leloudas⁴, Stig T Fjellberg², Rebecca Singleton¹, and Daniel Pauly³

Restricting or eliminating access to insurance for illegal, unreported, and unregulated (IUU) fishing vessels could alter the associated balance of costs and benefits in favor of reducing IUU fishing activity. We present a simplified conceptual economic model for IUU fishing that demonstrates how having marine insurance is financially beneficial, thereby encouraging IUU fishing. By analyzing available data on vessels and their affiliations to insurers, we also determined that some IUU vessels are covered by insurance. IUU fishing is not an issue that is currently being addressed by insurers, and an opportunity exists for developing strategies to confront this global problem within the marine insurance sector. We believe that restricted access can be achieved through modified policies and procedures, and recommend that – at a minimum – insurers consult officially verified IUU vessel lists to make certain that listed vessels are not granted insurance coverage.

Front Ecol Environ 2016; 14(7): 357–362, doi:10.1002/fee.1293

Illegal, unreported, and unregulated (IUU) fishing activities are undermining efforts by fishers and industry stakeholders worldwide to sustainably and equitably manage ocean resources. Direct environmental consequences of such activities include habitat damage from the use of destructive gear, as well as the depletion of fished populations (MRAG 2005; Schmidt 2005). Law-abiding fishers experience reduced fishing opportunities when their targeted fish stocks are also targeted by illegal fishing vessels (Schmidt 2005). For these law-abiding fishers, costs may increase (eg higher fuel costs resulting from longer fishing trips) and profits may decrease. Fisheries are indirectly affected when unreported (and unknown) catch prevents managers from making informed resource management decisions (Pitcher *et al.* 2002). Finally, social concerns and food security issues arise when IUU vessels target waters adjacent to coastal communities that rely on fish from the oceans for food (Le Gallic 2008). Disturbingly, in recent years, IUU fishing has also been linked to human rights violations, including slavery and physical abuse, the smuggling of migrants, and illicit drugs trafficking (UNODC 2011; Pramod *et al.* 2014). Note that here, we refer to “IUU fishing” as it has been described by the Food and Agriculture Organization of the United Nations (FAO; FAO 2001; Theilen 2013), and also recognize that the term is commonly understood to refer to fishing activities that are inconsistent with, or in violation of, management or conservation measures for a particular fishery (Le Gallic 2008).

Efforts to reduce IUU fishing traditionally involve the implementation of monitoring, control, and surveillance activities by government agencies of coastal or flag States (ie the country under which a vessel is registered; Bray 2000). These efforts, along with others driven by the private sector and non-governmental organizations (NGOs), have reduced IUU activities in some parts of the world (Agnew *et al.* 2009; Österblom *et al.* 2015). Despite this progress, IUU fishing remains a serious problem internationally, largely due to weaknesses in existing legislation and limitations in the availability of resources to ensure effective policy implementation and enforcement (Bray 2000; Flothmann *et al.* 2010; Pramod *et al.* 2014).

Concern over IUU fishing has been repeatedly expressed in various international fora (Le Gallic and Cox 2006). As a result, several international agreements have emerged that explicitly address IUU fishing. Of great relevance are the non-binding FAO International Plan of Action to Prevent, Deter, and Eliminate IUU Fishing (IPOA-IUU), and the binding – but not yet in force – FAO Agreement on Port State Measures to Prevent, Deter, and Eliminate IUU Fishing (PSMA). The IPOA-IUU has led to the formal adoption of dedicated legislation (eg the European Union Regulation to prevent, deter, and eliminate IUU fishing [the EU IUU Regulation]). The EU IUU Regulation includes – among other things – measures for blocking officially blacklisted IUU vessels from accessing EU ports and EU markets. Similarly, once in force, the PSMA will require parties to the Agreement to also close their ports and deny services to IUU vessels (Flothmann *et al.* 2010). Given that the PSMA is international and legally binding, there is great potential for it to bring about long-lasting positive change to the global fishing industry. However, there are concerns that unless the agreement is widely implemented by port States, it will not have the desired effect

¹Fisheries Economics Research Unit, University of British Columbia, Vancouver, Canada (*d.miller@oceans.ubc.ca); ²Trygg Mat Tracking, Bergen, Norway; ³Sea Around Us, University of British Columbia, Vancouver, Canada; ⁴Institute of Shipping and Trade Law, Swansea University, Swansea, UK

of preventing, deterring, and eliminating IUU fishing (Flothmann *et al.* 2010).

Alternative strategies for addressing IUU fishing can potentially be found outside of the more traditional sphere of direct policy reform. Those who engage in IUU fishing are primarily motivated by economic incentives (Charles *et al.* 1999). Building on previous work, in 2005 the Organization for Economic Co-operation and Development (OECD) published a detailed report, extensively exploring the economics of IUU fishing (OECD 2005). In the years that followed, the ideas presented in this document were developed further (Schmidt 2005; Le Gallic and Cox 2006; Sumaila *et al.* 2006; Le Gallic 2008). The OECD study concluded that the first major step in combatting IUU fishing activities should be to identify measures that render them unprofitable. By altering the incentive structure of IUU fishing, the net expected benefits may become small enough so that potential IUU vessel operators will opt to engage in other, more profitable activities instead (OECD 2005).

Specifically, restricting access to insurance for IUU vessel operators was proposed by the OECD as a possible action that could increase the costs of IUU fishing (OECD 2005). Measures that restrict access to insurance would increase the expected fixed costs of IUU fishing, and this can be accomplished if premium rates are made higher for vessels having characteristics that are known for facilitating IUU fishing. Furthermore, preventing an IUU vessel operator from obtaining insurance would introduce a risk of increasing operating costs by an indeterminate amount if their vessel is involved in an accident. In accidents concerning third-party liability, losses could be potentially large enough to bankrupt the non-insured parties held liable. The perceived threat of this financial risk could be enough to alter the balance of costs and benefits in favor of reducing IUU fishing generally, if insurance is currently a service that is valued and utilized by IUU vessel operators. It may be possible to establish a real embargo within the marine insurance sector, given that the number of insurance providers is thought to be relatively small (van Anrooy *et al.* 2009) and assuming that industry stakeholders become aware of and concerned about IUU fishing activity (OECD 2005; Le Gallic 2008).

Insurance coverage is legally required for some fishing vessels under various national and international laws, contingent on the size and type of vessel, location of operation, and the nationality of the flag the vessel is flying (IMO 2001; EC 2009; van Anrooy *et al.* 2009). These legal obligations are primarily for coverage relating to third-party liability or pollution (ie liabilities that could be covered through protection and indemnity [P&I] insurance). Other common forms of marine insurance include hull and machinery (H&M) and cargo insurance, although there are no widely applicable legal requirements for vessels to obtain either. Thus, even though a legal framework requiring some fishing vessels to have insurance

exists, this is not a requirement for all and not all forms of marine insurance are obligatory. Additionally, any type of marine insurance can be provided with exclusions and conditions, which may differ from one policy to another depending on legal requirements, the needs of the insured, and the risk profile of the vessel or policy holder, as interpreted by the insurer.

Regardless of legal requirements, P&I insurance protects against potentially unforeseeable liabilities of unknown value that can be financially crippling without insurance coverage. As such, P&I insurance could be considered the most likely form of minimal insurance that IUU vessel operators might have. Because of the indeterminate nature of the risks covered by P&I insurance, it is often provided through mutual “P&I clubs”, whose members pool their risks together; any claims are later reimbursed through a communal reserve of money. P&I insurance can also be purchased through commercial insurance companies and brokers, or coverholders for Lloyd’s market syndicates (businesses authorized to accept insurance risks on behalf of capital providers), which may or may not be mutually exclusive. These entities are also the providers of H&M and cargo insurance, as well as other varieties of specialized insurance that might interest vessel owners or fishing companies.

Aiming to uncover opportunities for developing new strategies for reducing IUU fishing, this study sought to investigate the possible existence of a link between marine insurance and IUU fishing. Specifically, the objectives of this study were to: (1) develop a simplified conceptual economic model, demonstrating the relationship between insurance and IUU fishing; (2) determine whether IUU vessels are insured; and then if relevant, (3) offer policy recommendations for restricting access to insurance by IUU vessels, targeted at marine insurers and policy makers.

■ Methods

Extending the model presented in Sumaila *et al.* (2006), we developed a simplified conceptual economic model of IUU fishing under two scenarios: (1) with access to – and the ability to purchase – insurance; and (2) without access to – and therefore without the ability to purchase – insurance (see WebPanel 1 for a full description of the formal model). The difference in net benefit between an IUU vessel operator who has insurance coverage and one who does not was then considered in evaluating the potential contribution of insurance in financially encouraging IUU fishing.

Information was sought on the affiliations of 480 officially listed or suspected IUU vessels to providers of P&I insurance. Information relating to insurance was also sought for 837 “non-IUU” vessels ≥ 1000 gross tons (GT) that are licensed to fish or to support fishing activities within large, internationally shared fishing

areas (see WebPanel 2). Once both lists of vessels had been compiled and supplementary descriptive information gathered, commercial marine insurance provider and P&I mutual club websites were screened for information relating to the vessels currently under their coverage. An exhaustive online search identified 31 providers of P&I insurance that have a searchable database, accessible from their website, containing vessel information. Between August 2014 and May 2015, we searched within the 31 databases for vessels that appeared on either the IUU vessel list or the non-IUU vessel list; each time a vessel was discovered, the identity of the associated insurer was recorded. Vessels can typically be searched either by their International Maritime Organization (IMO) ship identification number or by their name. When a vessel was listed without an IMO number and a match was retrieved searching only with a vessel's name, the insurer was only recorded if the listed owner, year built, gross tonnage, and/or flag State also matched and other listed details did not contradict the match.

Comparisons were made to determine whether the same insurers were affiliated with both groups of vessels (IUU or non-IUU), potentially indicating whether deviant vessels have an affinity for particular insurers and vice versa. Non-IUU vessels of ≥ 1000 GT were considered in this study because most vessels of this size are required to have insurance under international law (IMO 2001). Thus, vessel comparisons (IUU versus non-IUU) were limited to vessel sizes ≥ 1000 GT. The proportions of all IUU vessels versus all non-IUU vessels insured by each insurer were plotted against each other, and the relationship among variables was estimated through linear regression analysis. In addition, the chi-square goodness-of-fit test was also used to determine whether the proportion of IUU vessels was significantly different from the proportion of non-IUU vessels found on insurers' websites.

Results and discussion

Through the further development of a simplified conceptual model for IUU fishing (WebPanel 1), we demonstrate that the ability to purchase insurance contributes to a more favorable economic situation for an IUU vessel operator. In comparing the net benefit of an IUU vessel operator who has insurance to the net benefit of one who does not, in general the expected damage from an accident (which could be paid for by an insurer) is larger than the expected out-of-pocket expense for buying insurance coverage (for additional details, see WebPanel 1). Theoretically, therefore, having insurance is financially beneficial and thereby encourages IUU fishing when operators have access to coverage.

We learned that 67 of the 480 IUU vessels of all sizes investigated (14%) were associated with 17 insurers, whereas 45 of the 94 IUU vessels 1000 GT or greater

Table 1. Numbers of fishing vessels found on marine insurers' websites

Insurer	IUU vessels (all)	IUU vessels (≥ 1000 GT)	Non-IUU vessels (≥ 1000 GT)
Unknown	413	49	348
A	17.5*	8.5*	69
B	13	9	122
C	7	6	23
D	6	5	57
E	4.5*	3.5*	64
F	3	2	7
G	3	2	4
H	2	0	26
I	2	2	0
J	2	2	8
K	1	1	37
L	1	0	10
M	1	1	7
N	1	1	1
O	1	1	0
P	1	1	0
Q	1	0	0
R	0	0	30
S	0	0	9
T	0	0	6
U	0	0	5
V	0	0	4
Total vessels found on websites (%)	67 (14.0)	45 (47.9)	489 (58.4)
Total vessels	480	94	837
Total insurers	17	14	18

Notes: *In two separate instances, the same vessel was found on two different insurers' websites.

(48%) were associated with 14 insurers (Table 1). By way of comparison, 489 of the 837 non-IUU vessels examined (58%) were associated with 18 insurers. As mentioned previously, insured non-IUU vessels of ≥ 1000 GT ($n = 489$) were examined in comparison to insured IUU vessels of the same minimum size ($n = 45$) because most vessels of this size are required to have insurance under international law (IMO 2001). There was no obvious difference between the group of IUU vessels and the group of non-IUU vessels (WebFigure 1; $R^2 = 0.64$). However, approximately one-half of all IUU vessels listed on insurer websites were insured by commercial insurers, with the remainder insured by P&I clubs; in contrast, only 23% of the non-IUU vessels were insured by commercial insurers, with the remainder insured by P&I clubs



© Simon Ager/Sea Shepherd Global

Figure 1. The insured and notorious IUU fishing vessel *Thunder*, observed sinking off the coast of Sao Tome in April 2015. *Thunder* was a member of the “Bandit Six”, vessels known for poaching Patagonian toothfish (*Dissostichus eleginoides*) in the Southern Ocean.

(WebFigure 2). This suggests that coverage acquired through commercial insurers may be more common among IUU vessels. Given that mutually owned P&I clubs are intended to operate without generating profit, commercial insurers may be more willing to provide coverage to higher risk vessels.

Five out of eight IUU vessels that have had so-called “Purple Notices” issued against them by the International Criminal Police Organization (INTERPOL), requesting international cooperation in obtaining information that could lead to an arrest, were found to be associated with the same insurer. Furthermore, nine vessels that are currently on Regional Fisheries Management Organization (RFMO) IUU vessel lists and the EU IUU vessel list were associated with three insurers. These vessels are of particular interest because there may be legal implications for the insurers that provided coverage. Among these nine vessels are members of the so-called “Bandit Six” – vessels known for poaching Patagonian toothfish (*Dissostichus eleginoides*) in the Southern Ocean (eg Figure 1). Other insured IUU vessels have been listed on Greenpeace International’s “Blacklist” (29), included on the Norwegian Directorate of Fisheries’ “Black List” (20), previously listed on an RFMO IUU list (12) and/or mentioned in various NGO reports, cited in observations by national or regional government authorities, and reported in news articles. Lists of vessels from these sources are not mutually exclusive and – in the instances of NGO reports, observations by national authorities, and mentions in news articles – are likely not complete.

The percentages of IUU vessels and non-IUU vessels ≥ 1000 GT that were found on insurers’ websites were not significantly different (48% versus 58%, $\chi^2 = 2.14$, degrees of freedom = 1, $P > 0.05$; Table 1). As vessels ≥ 1000 GT are required to have insurance under interna-

tional law (IMO 2001), this suggests IUU and non-IUU vessels are similarly compliant with this particular legal requirement. Nonetheless, the percentages of vessels present on insurers’ websites do not necessarily represent the percentages of vessels insured. Vessels may also be insured through providers that do not include searchable databases on their websites. This could be particularly relevant in relation to the insurers of vessels associated with China, Taiwan, Mexico, and the Philippines, as despite these vessels having a presence in internationally shared fishing areas, their insurers, in many cases, could not be identified (WebTable 1).

It is notable that 67 IUU vessels – irrespective of size – appeared on insurers’ websites, though only 45 IUU vessels were ≥ 1000 GT (Table 1). Because some of the IUU vessels included in the analysis were under 1000 GT, and were not registered under the flag of a country that would require them to have insurance (IMO 2001; EC 2009; van Anrooy *et al.* 2009), these vessels did not have any known legal obligation to have insurance. This suggests that some IUU vessel operators may view insurance, and in particular P&I insurance, as a necessary cost in order to maintain profitability and/or reduce exposure to risk and accidental losses.

Policy pathways for restricting access

In the interest of reducing IUU fishing by restricting or eliminating access to insurance for IUU vessel operators, we offer several recommendations for policy makers and insurers:

- (1) When determining vessel eligibility for coverage, insurers should consult all RFMO IUU vessel lists and the INTERPOL Purple Notice lists; the Combined IUU Vessel List (www.iuu-vessels.org) maintained by Trygg Mat Tracking consolidates these lists and crucially provides the most recent known information about the vessels. If a vessel currently appears on any of these lists, insurance coverage should not be granted;
- (2) If insurers registered in the EU are found to be in breach of Articles 44 and 42(1)(b) of the EU IUU Regulation (ie “the conduct of business directly connected to IUU fishing...”), Member States should start an immediate investigation and take immediate enforcement measures (EC 2008). Further amendments to the phrasing of Article 42(1)(b) could be made so that it also clearly applies to P&I clubs and other insurers;

- (3) When determining vessel eligibility for coverage, insurers could consult the EU's list of "non-cooperating third countries" (EC 2008). These countries have been recognized for their failed cooperation with efforts to deter and eliminate IUU fishing. If a vessel is registered under the flag of a country currently on this list, insurers could consider refusing coverage or charging higher premiums to deter registration under these flags. Moreover, Article 38 of the EU IUU Regulation could be modified so that the provision of financial services by Community legal persons (eg a company) to fishing vessels flying flags of "non-cooperating third countries" is prohibited;
- (4) Insurers should consider mandating a requirement for all vessels ≥ 100 GT to be registered with a permanently assigned IMO ship identification number. In addition, insurers should require that vessels ≥ 300 GT be equipped with and actively use Automatic Identification System (AIS) vessel tracking technology. Both of these measures would improve transparency and safety within the global fishing sector;
- (5) For fishing vessels required by law to have insurance, once the PSMA is in force, inspections carried out under this Agreement (FAO 2009) could include checking for required insurance documentation;
- (6) In the interest of transparency within both the marine insurance and fisheries sectors, providers of P&I insurance could be encouraged to voluntarily make information relating to insurance coverage publicly available;
- (7) Reinsurers of insurers that provide coverage to fishing vessels could require that the recommendations listed above are implemented by the insurers they insure. Similarly, insurers' organizations should encourage members to implement these recommendations.

■ Conclusions

Our findings indicate that IUU fishing is not an issue currently addressed by fishing vessel insurers. There is therefore an opportunity to develop new strategies to confront this global problem within the marine insurance sector. At least some IUU vessels are covered by marine insurance, and IUU vessel operators may not be preferentially choosing one insurer over another in any easily detectable manner. However, there are indications that coverage acquired through commercial insurers is more common among IUU vessels.



Figure 2. The City of London's Financial and Insurance District, as seen from across the River Thames.

A reasonably small number of insurers appear to be involved in insuring both IUU and non-IUU vessels. This may suggest that only a few insurers may be required to modify their policies and procedures in order to restrict access to insurance by IUU vessel operators. The majority of insurers associated with the vessels examined conduct business within the EU and more specifically the UK (Figure 2). This may simplify the legal aspects of addressing this issue, necessitating the interpretation and enforcement of only EU and/or UK law to stimulate meaningful procedural modifications within the insurance sector. Insurers could be legally pressured to restrict access to insurance by IUU vessel operators through clarified interpretation of the EU IUU Regulation. Furthermore, insurers could be encouraged to implement changes as a matter of corporate social responsibility. Reformed practices within the insurance sector may have the potential to deprive support from this financial service to IUU vessel operators and ultimately reduce IUU fishing.

■ Acknowledgements

This study was made possible through funding received from the Waterloo Foundation. All co-authors have contributed to this study in one or more of the following ways: providing advisory support, contributing to the writing of this report, and/or contributing to the analysis of data presented.

■ References

- Agnew DJ, Pearce J, Pramod G, *et al.* 2009. Estimating the worldwide extent of illegal fishing. *PLoS ONE* 4: e4570.
- Bray K. 2000. A global review of illegal, unreported and unregulated (IUU) fishing. Rome, Italy: Food and Agriculture Organization of the United Nations.

- Charles AT, Mazany RL, and Cross ML. 1999. The economics of illegal fishing: a behavioral model. *Mar Resour Econ* 14: 95–110.
- EC (European Commission). 2008. Council Regulation (EC) No 1005/2008 of 29 September 2008 establishing a community system to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Regulations (EEC) No 2847/93, (EC) No 1936/2001 and (EC) No 601/2004 and repealing Regulations (EC) No 1093/94 and (EC) No 1447/1999. *Official Journal of the European Union Legislation (OJ L)* 286: 1–32.
- EC (European Commission). 2009. Directive 2009/20/EC of the European Parliament and of the Council of 23 April 2009 on the insurance of shipowners for maritime claims. *Official Journal of the European Union Legislation (OJ L)* 131: 128–31.
- FAO (Food and Agriculture Organization of the United Nations). 2001. International plan of action to prevent, deter and eliminate illegal, unreported and unregulated fishing. Rome, Italy: FAO.
- FAO (Food and Agriculture Organization of the United Nations). 2009. Agreement on port state measures to prevent, deter and eliminate illegal, unreported and unregulated fishing. Rome, Italy: FAO.
- Flothmann S, Kistowski KV, Dolan E, *et al.* 2010. Closing loopholes: getting illegal fishing under control. *Science* 328: 1235–36.
- IMO (International Maritime Organization). 2001. International convention on civil liability for bunker oil pollution damage. London, UK: IMO.
- Le Gallic B. 2008. The use of trade measures against illicit fishing: economic and legal considerations. *Ecol Econ* 64: 858–66.
- Le Gallic B and Cox A. 2006. An economic analysis of illegal, unreported and unregulated (IUU) fishing: key drivers and possible solutions. *Mar Policy* 30: 689–95.
- MRAG (Marine Resources Assessment Group Ltd). 2005. IUU fishing on the high seas: impacts on ecosystems and future science needs. London, UK: MRAG.
- OECD (Organization for Economic Co-Operation and Development). 2005. Why fish piracy persists: the economics of illegal, unreported and unregulated fishing. Paris, France: OECD.
- Österblom ÖB, Sumaila UR, and Press AJ. 2015. Reducing illegal fishing in the Southern Ocean: a global effort. *Solutions* 4: 72–79.
- Pitcher TJ, Watson R, Forrest R, *et al.* 2002. Estimating illegal and unreported catches from marine ecosystems: a basis for change. *Fish Fish* 3: 317–39.
- Pramod G, Nakamura K, Pitcher TJ, and Delagran L. 2014. Estimates of illegal and unreported fish in seafood imports to the USA. *Mar Policy* 48: 102–13.
- Schmidt C-C. 2005. Economic drivers of illegal, unreported and unregulated (IUU) fishing. *Int J Mar Coast Law* 20: 479–507.
- Sumaila UR, Alder J, and Keith H. 2006. Global scope and economics of illegal fishing. *Mar Policy* 30: 696–703.
- Theilen JT. 2013. What's in a name? The illegality of illegal, unreported and unregulated fishing. *Int J Mar Coast Law* 28: 533–50.
- UNODC (United Nations Office on Drugs and Crime). 2011. Transnational organized crime in the fishing industry. Vienna, Austria: UNODC.
- van Anrooy R, Ahmad IU, Hart T, *et al.* 2009. Review of the current state of world capture fisheries insurance. Rome, Italy: FAO.

■ Supporting Information

Additional, web-only material may be found in the online version of this article at <http://onlinelibrary.wiley.com/doi/10.1002/fee.1293/supinfo>