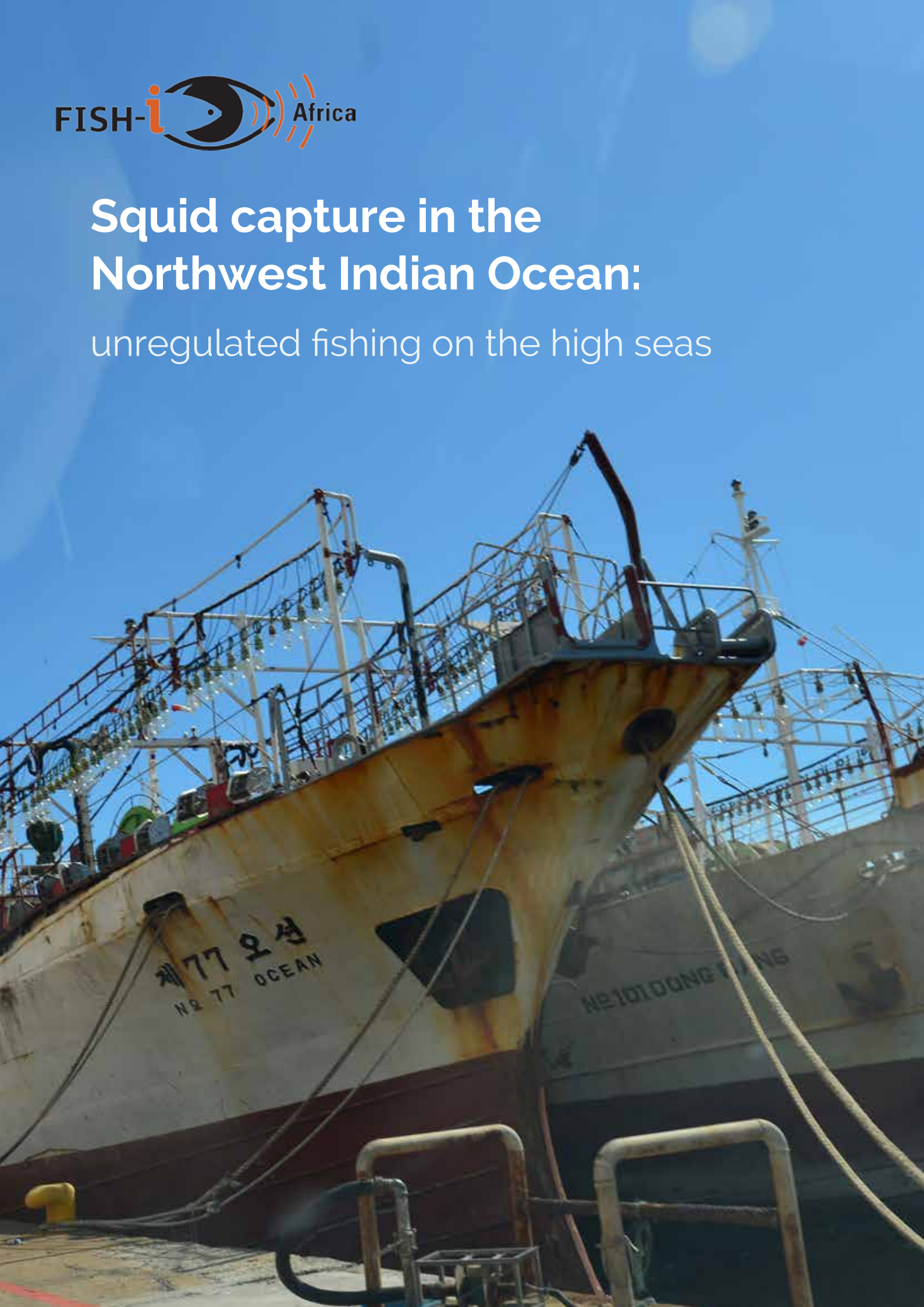
FISH-i Africa

Squid capture in the Northwest Indian Ocean:

unregulated fishing on the high seas



FISH-i Africa unites eight East African coastal countries along the Western Indian Ocean, an unprecedented alliance which is showing that regional cooperation, coupled with dedicated analysis and technical expertise can stop illegal catch getting to market, and prevent illegal operators pursuing their lucrative business unhindered.

FISH-i Africa is a Stop Illegal Fishing initiative in partnership with The Pew Charitable Trusts and a Coordination Team made up of Stop Illegal Fishing, NFDS and Trygg Mat Tracking.

Further information on FISH-i Africa and downloadable FISH-i investigations are available at www.fish-i-africa.org

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All AIS data has been supplied by exactEarth.

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1 INTRODUCTION

Through the monitoring of satellite vessel tracking data, FISH-i Africa has identified an increasing number of squid vessels operating in the Northwest Indian Ocean (NWIO).

The vessels appear to operate exclusively in the high seas, avoiding exclusive economic zones (EEZs) and therefore falling within an area beyond national jurisdiction (ABNJ). The area of operation, although physically within the area covered by the regional fisheries management organisation (RFMO) the Indian Ocean Tuna Commission (IOTC), does not fall within its area of competence as only tuna and tuna like species are included within the IOTC mandate. The squid fishery presented in this report, based on analysis of data from January 2015 to April 2017 is therefore unregulated.

Figure 1. Aggregated AIS tracks for fishing vessels (green) and reefers (red) operating in the fishery during 2015-2017

2 RAPID EXPANSION OF A NEW FISHERY

The first significant activity in the area was recorded by automatic identification system (AIS) tracks in January 2015, when four fishing vessels were identified operating in international waters in the NWIO[1] just outside Yemeni and Omani EEZs along the Owen Fracture Zone. The vessels' movements, along with transmitted identity details, indicate that they are Chinese-flagged and primarily engaging in squid fishing operations.

The fishing activity increased significantly over the following two years with 32 vessels recorded in January 2016 and 53 vessels in February 2017. During the period 2015 to 2017, 68 individual fishing vessel identities were detected through AIS, several returned to fish in more than one year.

From 2015 to 2017, 21 refrigerated cargo ships, known as reefers were also recorded in the area. Such ships generally serve fishing fleets by conducting transhipments of catch, transporting the catch to ports, and delivering supplies to the fishing vessels. This allows the fishing fleet to remain at the fishing grounds to maximise the catch.

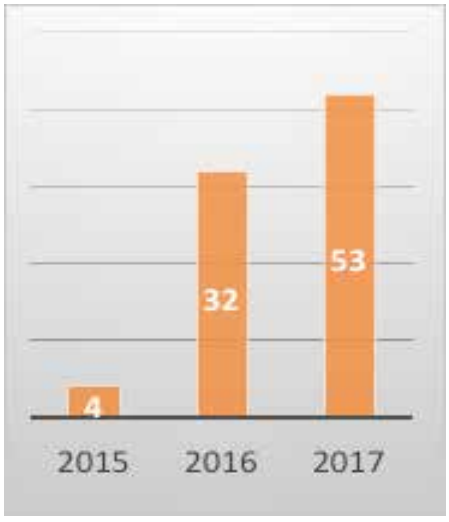

Figure 2. The number of squid vessels identified on AIS operating in the Northwest Indian Ocean 2015 - 2017

3 CHARACTERISTICS OF THE FISHING OPERATION

3.1 Seasonality and areas of operations

Between January 2015 and April 2017 satellite tracking data indicates activity in the region approximately between October to May each year (see Figure 4):

- The first group of fishing vessels that appeared in the area fished from January to March 2015 before transiting east.
- In November 2015, fishing vessels started to appear in the region with a peak of 32 vessels in January 2016, some vessels departed in April and the last vessels left the region in May 2016.
- From October 2016, activity was seen in the area with a peak of 53 vessels in February 2017

Figure 3. Areas of interest, the red area in the west is the NWIO fishing area, the red area in the east is the North Pacific fishing area and places of interest are in white

In between operations in the NWIO, AIS tracking indicates that many of the vessels operate in the North Pacific (see Figure 4) in international waters east of Hokkaido, Japan – these are fishing grounds for squid and saury.

Some of the vessels were observed on AIS making calls to ports in China – primarily in Shandong province, with a lesser number making calls to ports in Zhejiang and Fujian provinces (see Figure 3).

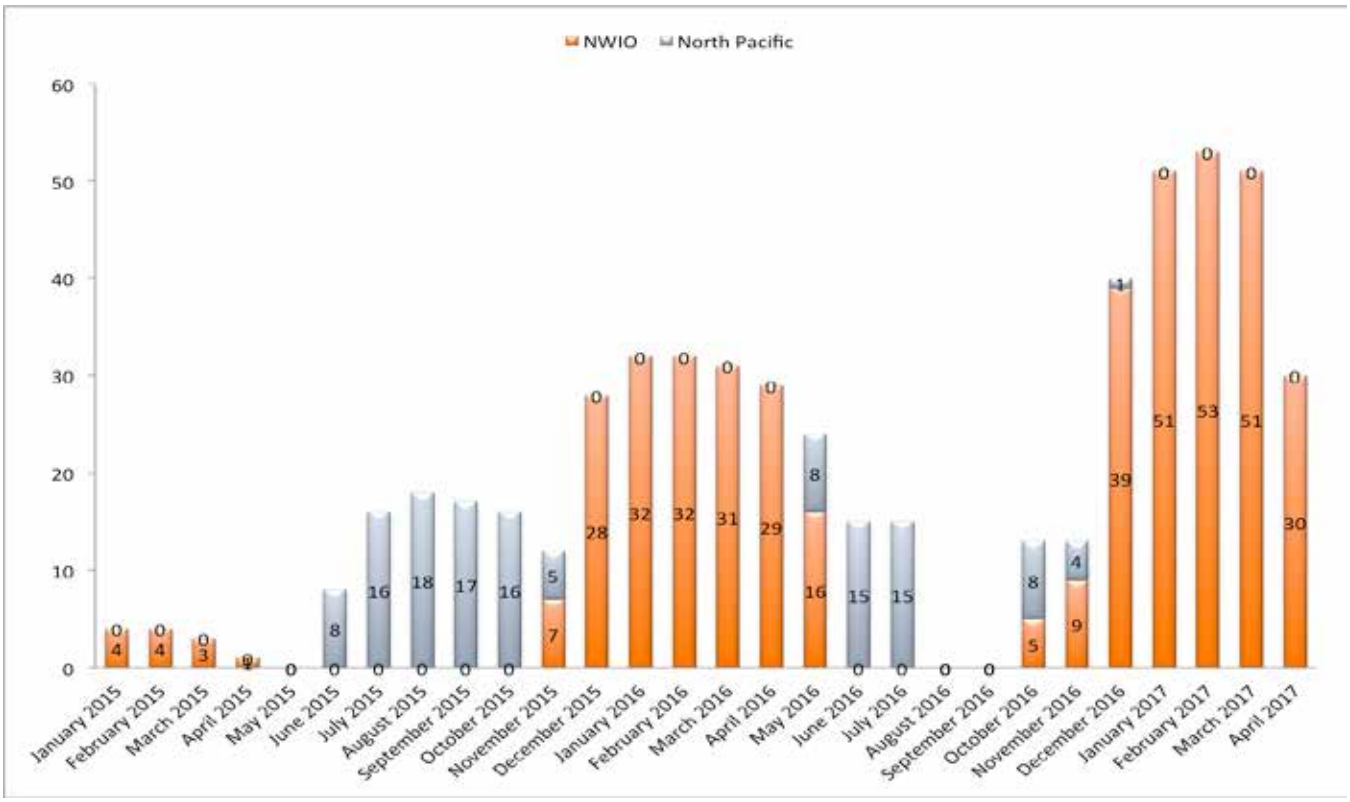

Figure 4. Vessels moving between the NWIO and North Pacific. January 2015 to April 2017

3 CHARACTERISTICS OF THE FISHING OPERATION (CONTINUED)

3.2 Visibility of operations

Sensory data obtained from satellites passing the region at night in January 2017 identifies several light emitting sources in the NWIO, which are believed to be the fishing fleet using high intensity lights to attract squid. In the large-scale image below, Figure 5, the light sources on the right of the image show the outline of India and Sri Lanka. The light emissions of the Maldives to the south are just visible. The squid fleet, by contrast, is clearly visible in the northwest (the top left corner of the image).

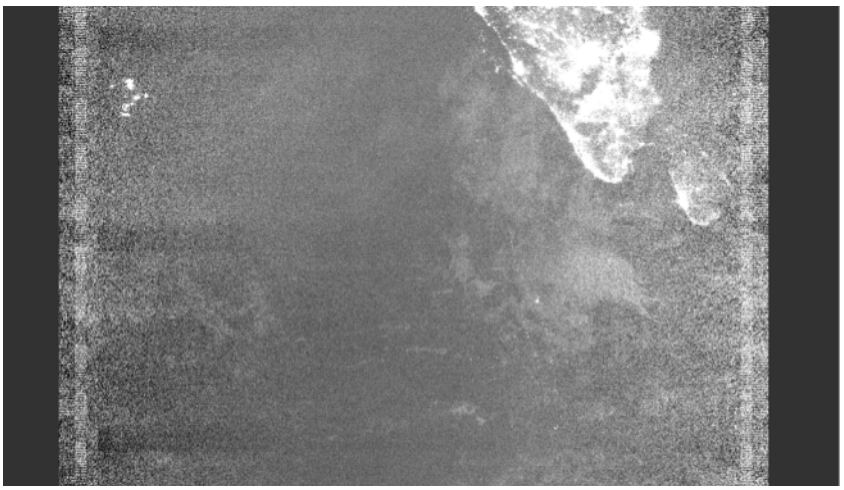

Figure 5. Sensor data from Suomi NPP VIIRS instrument, covering the NWIO

Analysis indicates 43 possible individual sources of light suggesting 43 possible vessels, the number of vessels identified in the same area on AIS was 42 (see Figure 6 below). If all the vessels were using lights – this indicates that close to 100 % of the fleet was visible on AIS.

Figure 6. Individual sources of light indicating separate fishing vessels

3.3 Characteristics of the fishing fleet

As this fishery is on the high seas and not within the remit of any RFMO or coastal State, the only information available was from cross-referencing vessel identities (primarily names and radio call signs) as seen on AIS with published information. For example, 12 vessels are on the 2016 list of authorised vessels published by the North Pacific Fisheries Commission (NPFC)[2]. Of these, six listed Zhangjiabu (Shandong Province) as their port of registry and the remainder were based in Shidao (Shandong Province), Zhoushan (Zhejiang Province) or Fuzhou (Fujian Province). This corroborates satellite tracking findings which show vessels calling in to ports in Shandong and Zhejiang Provinces, possibly their home ports.

The vessels on the NPFC list were authorised to target squid or saury. The gear type for squid fishing vessels was listed as handline and pole and line, but it is likely that these vessels are engaged in squid jigging. The gear type for vessels targeting saury was listed as stick-held dip net. It is possible that vessels could switch gear types between fisheries (e.g. from jiggers to dip nets). High intensity lights are used in both squid and saury fisheries.

The NPFC list also provides information on vessel characteristics. The tonnage, in GRT of the vessels identified ranged from 774-1 624 GRT, with most vessels over 1 500 GRT. Length ranged from approximately 50-70m. This is consistent with the size of industrial squid jiggers that have been documented in East Asian ports or identified from other sources (see Figure 7).

Vessel ownership is difficult to ascertain as most of these vessels do not appear to have IMO numbers. However, 16 of the vessels with on-board processing were identified from the list of seafood processing facilities authorised to process food for import into the European Union[4], and these vessels were owned by Shandong Blue Ocean Fishery Co. Ltd and Wendeng Kunan Aquatic Products Co. Ltd. (see Annexes for a list of vessels and known details).

Figure 7. Photograph[3] from ship brokering website advertising a '78m large ocean saury and squid fishing boat' for sale, this vessel the LU WEN YUAN YU 171, was identified as operating in the NWIO. (Image source: http://en.rczaochuan.com/products_detail/&productId=ffd7be1c-dfa2-4620-ba90-dee792814ea5.html)

3 CHARACTERISTICS OF THE FISHING OPERATION (CONTINUED)

3.4 Refrigerated cargo vessels

From December 2015 to May 2016, eight reefers were identified on AIS in the NWIO area (see Table 1). Based on tracks and operational patterns, it is likely that these vessels have been servicing the fishing fleet and transporting their catch to Chinese ports. Between the eight vessels, 14 voyages between the NWIO and Chinese ports were recorded, with nine voyages to the Shandong region and three voyages to the Fujian region. For two of the voyages, no port of call after departing the NWIO was recorded.

From November 2016 to April 2017, 19 reefers were recorded in the NWIO area, with 17 voyages between the fishing grounds and ports, six voyages were to the Fujian region and four to the Shandong region. For seven of the voyages no port of call after NWIO was recorded.

Although some of the reefers identified were flying known flags of non-compliance, all reefers were identified as having ownership domiciled in China, suggesting that the entire operation is Chinese-based (see Annexes for details on reefers).

	December 2015 – May 2016	**November 2016 – April 2017** * Numbers for 2017 are preliminary.
Number of reefers detected	8	19
Number of voyages from NWIO to port	14	17
Port calls to Fujian, China	3	6
Port calls to Shandong, China	9	4
Unknown port of call after NWIO	2	7

Table 1. Movements of reefers

Image source: INTERPOL Purple Notice

INTERPOL Purple Notice - HAI FA

One of the reefers identified as supporting the squid fleet in the NWIO is the Panama flagged HAI FA (IMO 7818561). This vessel was subject to an INTERPOL Purple Notice, issued in 2015 at the request of Indonesia due to suspected unauthorised imports/exports of goods, including fish, and unauthorised transhipment of such goods in Indonesian waters.

4 BACKGROUND ON SQUID FISHERIES

Squid species represent a relatively small but increasing proportion of landings in global wild capture fisheries. The Food and Agriculture Organization of the United Nations recorded the total global catch of all squid species at approximately 3.5 million tonnes in 2014[5]. Approximately 30 to 40 species of squid have commercial significance, ranging from artisanal fisheries in coastal waters to industrial vessels operating on the high seas[6].

Various types of fishing gear are used to catch squid. Traps and various nets are used in artisanal squid fisheries and in some commercial fisheries, while large industrial vessels primarily target squid using trawl nets and jigging.

Squid jigging uses a hook and lure attached to a line that is jerked up and down in the water to attract and hook the squid. Fishing takes place at night as squid are attracted to the vessel using high intensity lights and then caught using the jigs. Jigging is an effective method to catch larger squid and causes less damage to the squid, often resulting in a higher value product.

Several species of squid are targeted by commercial and artisanal fisheries in the Western Indian Ocean, using a variety of gear types. However, there appears to have been no major industrial fishery for oceanic squid species until the early 2000s. During 2003 and 2005, Chinese vessels conducted scientific fishery surveys for Sthenoteuthis oualaniensis (purple back flying squid) in the NWIO and a Chinese commercial jigging fishery commenced operating in 2005[7].

S. oualaniensis is a large, muscular, pelagic squid, which has been recorded growing to a mantle length of 82 cm. It is a highly productive species that is abundant across the equatorial waters of the Indian and Pacific oceans, found usually in waters warmer than 20-22˚C[8]. Initial exploratory fishing for S. oualaniensis in the NWIO was undertaken by vessels from Japan and the USSR from the 1970s[9].

Squid represent an important link between the massive biomass of lower trophic levels and oceanic predators in many if not all pelagic food webs. Squid are important prey for 12 predatory species in the Western Indian Ocean, especially bigeye tuna and swordfish[10].

Squid stocks are difficult to manage as their biomass cannot be assessed prior to fishing seasons due to their short life cycle. This makes protecting fisheries from negative impacts upon target species and related ecosystems challenging, with excess capacity, excessive fishing effort, and poor enforcement all exacebating the situation.

5 CONCLUSION

As demand for seafood increases, fishing operators are searching for new fisheries including in previously less explored areas on the high seas. Some of these areas and/or some of the species in these fisheries fall outside of any management frameworks. Operations such as the squid fishery presented in this report are an example of this gap and of the challenge to monitor and manage these fisheries when information on catch and effort are only available to the flag State.

There is a risk that with no applicable regulations and no conservation and management measures governing this emerging squid fishery, that overexploitation could occur that may lead to a demise or even crash of the squid stock. Squid represent an important link between the large biomass at lower trophic levels and oceanic predators in many if not all pelagic food webs. Squid are important prey for 12 predatory species in the Western Indian Ocean, including commercially significant species such as bigeye tuna and swordfish.

A clear understanding of sustainable yields is needed and appropriate management frameworks are required to sustainably manage this fishery.

1. Other sources indicate that fishing activities did take place before 2015, but the vessels did not appear on AIS between 2012 to 2015 – this may reflect changes in the fishery or in the use of AIS by participating vessels.
2. http://npfc.r-cms.jp/VesselList_detail/id=834
3. http://en.rczaochuan.com/products_detail/&productId=ffd7be1c-dfa2-4620-ba90-dee792814ea5.html
4. https://webgate.ec.europa.eu/sanco/traces/output/CN/FFP_CN_en.pdf
5 FAO. 2016. The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all. Rome. 200 pp. http://www.fao.org/3/a-i5555e.pdf
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7 Chen, X. J., B. L. Liu, and Y. Chen. A review of the development of Chinese distant-water squid jigging fisheries. Fish. Res., 89: 211–221
8. Jereb, P., and C. F. E. Roper (Eds). Cephalopods of the world. An annotated and illustrated catalogue of cephalopod species known to date. Volume 2. Myopsid and Oegopsid Squids. FAO Species Catalogue for Fishery Purposes. No. 4, Vol. 2. Rome, FAO, (2010)
9 Chen, X. J., B. L. Liu, and Y. Chen. A review of the development of Chinese distant-water squid jigging fisheries. Fish. Res., 89: 211–221
10 Young et al., Deep-Sea Research II 95 (2013) 3–64, The role of squids in pelagic ecosystems: An overview,

6 ACRONYMS AND ABBREVIATIONS

ABNJ	Area beyond national jurisdiction
AIS	Automatic identification system
EEZ	Exclusive economic zone
FAO	Food and Agriculture Orgnization of the United Nations
GRT	Gross registered tonnage
IMO	International Maritime Organization
IOTC	Indian Ocean Tuna Commission
MMSI	Maritime Mobile Service Identity
NFDS	Nordenfjeldske Development Services
NPFC	North Pacific Fisheries Commission
NWIO	Northwest Indian Ocean
RFMO	Regional fisheries management organsiation

7 ANNEXES - VESSEL DETAILS

Vessel details in the table below are based on known identifiers at time of publication. Vessel types are based on various vessel records, but also on the type of activity observed through AIS.

Name	MMSI	IMO	CALL SIGN	VESSEL TYPE	FLAG	OWNER DOMICILE [i]	OWNER	OPERATOR
BLUE OCEAN 110[ii]	645378000		3BSE	Fishing	Mauritius	China	XINFA OVERSEAS COMPANY LTD	
DAFENG MARINER	371719000	8319031	3FIO6	Carrier	Panama	China	Hongkong He Yue Shipping Ltd	Fuzhou Lucky Ocean Ship-ping
FU YUAN YU 085	412440481		BVMS5	Fishing	China			
FU YUAN YU 163	412888163			Fishing	China			
FU YUAN YU 701	412440494			Fishing	China			
FU YUAN YU 702	412440495			Fishing	China			
FU YUAN YU 703	412440496			Fishing	China			
FU YUAN YU 705	412440497			Fishing	China			
FU YUAN YU 706	412440498			Fishing	China			
FU YUAN YU 707	412440499			Fishing	China			
FU YUAN YU 769	413076356			Fishing	China			
FU YUAN YU 868	585856888			Fishing	Unknown			
FU YUAN YU F53	412440033		BMWA	Carrier	China			
FU YUAN YU LENG 999	412440493			Carrier	China			
HAI FA	371295000	7818561	3EAY	Carrier	Panama	Hong Kong, China	Hai Yi Ship-ping Ltd	Greatsources Shipping
HAI FENG 9	800668688			Carrier				
HAI LI 18	412420013	8775869	BZU6O	Fishing	China	China	Zhoushan Haili Ocean Fish	Zhoushan Haili Ocean Fish

[i] Indicated if different to flag State

[ii] It is uncertain if the vessel is connected to the fishery or groups of vessels operating in the area even though it was seen operating there in the first quarter of 2017.

Name	MMSI	IMO	CALL SIGN	VESSEL TYPE	FLAG	OWNER DOMICILE [i]	OWNER	OPERATOR
HAN XING	374173000	9586332	3FYT4	Carrier	Panama	China	Han SJ	Shun Xin Shipping HK Co Ltd
HUA JIAN 109	529268000	7929762	T3UC	Carrier	Kiribati	Hong Kong, China	United Ocean Transportation	United Ocean Transportation
LU HUANG YUAN YU 115	412328739	9752929	BZTE6	Fishing	China	China	Qingdao Zhongtai Oceanic	Qingdao Zhongtai Oceanic
LU HUANG YUAN YU 117	412328737	8685478	BZTE8	Fishing	China	China	Qingdao Zhongtai Oceanic	Qingdao Zhongtai Oceanic
LU HUANG YUAN YU 118	412328736	9769556	BZTE9	Fishing	China	China	Qingdao Zhongtai Oceanic	Qingdao Zhongtai Oceanic
LU RONG YUAN YU 102	412328752		BBDP2	Fishing	China			
LU RONG YUAN YU 103	412328751		BBDK3	Fishing	China			
LU RONG YUAN YU 105	412328749		BBDK5	Fishing	China			
LU RONG YUAN YU 106	412328748		BBFB6	Fishing	China			
LU RONG YUAN YU 107	412328747		BBFB	Fishing	China		Shandong Blue Ocean Fishery Co. Ltd	
LU RONG YUAN YU 109	412328745		BBGB3	Fishing	China			
LU RONG YUAN YU 119	412328735		BBGA5	Fishing	China			
LU RONG YUAN YU 120	412328734		BBFA	Fishing	China			
LU RONG YUAN YU 728	412331126	8775338	BCFG3	Fishing	China	China	Rongcheng Lianhai Fishery Co	Rongcheng Lianhai Fishery Co
LU RONG YUAN YU 729	412331127	8775340	BCFG4	Fishing	China	China	Rongcheng Lianhai Fishery Co	Rongcheng Lianhai Fishery Co
LU RONG YUAN YU 838	412331168	8774815	BCFE1	Fishing	China	China	Rongcheng Huahai Fisheries	Rongcheng Huahai Fisheries
LU RONG YUAN YU 839	412331169	8775211	BCFE2	Fishing	China	China	Rongcheng Huahai Fisheries	Rongcheng Huahai Fisheries
LU RONG YUAN YU 881	412331175	8775352	BCFG1	Fishing	China	China	Rongcheng Lianhai Fishery Co	Rongcheng Lianhai Fishery Co

Name	MMSI	IMO	CALL SIGN	VESSEL TYPE	FLAG	OWNER DOMICILE [i]	OWNER	OPERATOR
LU RONG YUAN YU 882	412331176	8775364	BCFG2	Fishing	China	China	Rong-cheng Lianhai Fishery Co	Rongcheng Lianhai Fishery Co
LU RONG YUAN YU YUN 158	412329639	9736339	BBZS3	Carrier	China		Qingdao Deep-Sea Fisheries Co	Qingdao Deep-Sea Fisheries Co
LU RONG YUAN YU YUN 777	412331211	9819521	BBIS8	Carrier	China		Rong-cheng Lianhai Fishery Co	Rongcheng Lianhai Fishery Co
LU RONG YUAN YU YUN 789	412330149			Carrier	China			
LU WEI YUAN YU YUN 777	412331208	8782654	BBIT7	Carrier	China		Weihai Huanhai Aquatic	Weihai Huan-hai Aquatic
LU WEN YUAN YU 171	412329677		BBIM3	Fishing	China			
LU WEN YUAN YU 172	412329678		BBIM4	Fishing	China			
LU WEN YUAN YU 175	412329679		BCFF1	Fishing	China			
LU WEN YUAN YU 176	412329681		BCFF2	Fishing	China			
LU WEN YUAN YU 177	412329682		BCFF3	Fishing	China			
LU WEN YUAN YU 178	412329683		BCFF4	Fishing	China		Wendeng Kunan Aquatic Products Co. Ltd	
LU WEN YUAN YU YUN 888	412331177			Carrier	China			
LURONGYUANYU-YUN899	412331493			Carrier				
LURONGYU-YUN56219	412276434			Carrier				
OCEAN MARINER	351527000	8217104	H8IL	Carrier	Panama	China	Hongkong He Yue Shipping Ltd	Fuzhou Lucky Ocean Ship-ping
PU YUAN LENG 7	412423656			Carrier	China			
RONG DA YANG 29	412328795		BBGA9	Fishing	China			
TAI YU	412202350	8810657	BAIL	Carrier	China		Liaoyu Group Co Ltd	Liaoyu Group Co Ltd
UNION ONE	518100019	7809390	E5U2964	Carrier	Cook Islands	China	Union In-ternational Shipping	Dalian Jia-jia Shipping Tech-UK
UNKNOWN	200008248			Fishing	Unknown			
UNKNOWN	200014528			Fishing	Unknown			

Name	MMSI	IMO	CALL SIGN	VESSEL TYPE	FLAG	OWNER DOMICILE [1]	OWNER	OPERATOR
UNKNOWN	200016845			Fishing	Unknown			
UNKNOWN	800025747			Fishing	Unknown			
UNKNOWN	800025754			Fishing	Unknown			
UNKNOWN	800029894			Fishing	Unknown			
UNKNOWN	900028878			Fishing	Unknown			
UNKNOWN	900030427			Fishing	Unknown			
UNKNOWN	900030430			Fishing	Unknown			
UNKNOWN	900030432			Fishing	Unknown			
UNKNOWN	900030433			Fishing	Unknown			
UNKNOWN	900030436			Fishing	Unknown			
UNKNOWN	900028872			Unknown	Unknown			
UNKNOWN	412999999			Carrier				
UNKNOWN	412000001			Fishing				
UNKNOWN	412000010			Fishing				
UNKNOWN	412000002			Fishing				
UNKNOWN	200018092			Unknown				
XING WANG 111	412410062			Fishing	China			
XING WANG 333	412410064			Fishing	China			
YANG FENG	412440004	8414295	BAWE	Carrier	China	China	Dalian Yang Feng Intl Shpg	Fujian Minfeng Shipping Ltd
YUAN TONG YU 22	412439763			Fishing	China			
YUAN TONG YU 23	412439764			Fishing	China			
YUAN TONG YU 24	412439765			Fishing	China			
YUAN TONG YU 25	412439766			Fishing	China			
YUAN TONG YU 26	412439767			Fishing	China			
YUAN TONG YU 27	412439768			Fishing	China			
YUNG DA FA 102	355141000	8323599	3FEJ5	Carrier	Panama	Taiwan	Eternal Master Corp	Eternal Master Corp
ZHEJIAOYU91007	412411796			Fishing				
ZHOUYU651	412658989			Fishing	China			
ZHOUYU652	412569986			Fishing	China			
ZHOUYU653	412008003			Fishing	China			
ZHOUYU655	412565656			Fishing	China			
ZHOUYU658	412611200			Fishing	China			
ZHOUYU659	412202864			Fishing	China			

FISH-i Africa is a partnership between Western Indian Ocean countries to stop large-scale illegal fishing in the region. FISH-i Africa is achieving success through strengthened regional coordination and information sharing, which in turn supports targeted enforcement actions against illegal operators.

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Squid capture in the Northwest Indian Ocean: unregulated fishing on the high seas. (2017)