

Illegal Fishing in the Exclusive Economic Zone of Japan



Photo: Japan Fisheries Agency (<http://www.jfa.maff.go.jp/release/19/011703.pdf>)

Shelley Clarke
Visiting Researcher, Imperial College London

Prepared for MRAG, Ltd.

24 August 2007

TABLE OF CONTENTS

1	Introduction.....	3
2	Materials and Methods.....	4
3	Results	6
3.1	Monitoring, Surveillance and Enforcement Resources	6
3.2	Description of Recorded Illegal Fishing Incidents in the Japanese EEZ.....	6
3.2.1	Type of IUU Fishing.....	6
3.2.2	Location of Illegal Fishing.....	9
3.2.3	Flag States of Illegal Fishing Vessels	11
3.2.4	Gear Types and Target Species of Illegal Fishing	11
3.2.5	Types of Violations.....	13
3.3	Estimates of Illegal Fishing Catch Quantity and Value.....	13
3.3.1	Estimates based on High and Medium Quality Data.....	14
3.3.2	Estimates based on Low Quality Data	19
3.3.3	Tally of High, Medium and Low Quality Data.....	21
3.3.4	Comparison to National Catch Quantities and Values	21
4	Discussion	23
4.1	Uncertainties in Estimates of Illegal Fishing.....	23
4.2	Recent Trends in IUU Fishing Activity in the Japanese EEZ	24
4.3	Impact on Target Species Populations and the Ecosystem.....	26
4.4	Mitigation Strategies for Illegal Fishing.....	27
4.5	Summary.....	27
5	References.....	29

1 INTRODUCTION

The problems of illegal, unreported and unregulated (IUU) fishing are steadily gaining greater attention, in part due to efforts by the United Kingdom government to establish a network for information sharing. This IUU Monitoring Network also aims to facilitate production of a global estimate of IUU catch, and the associated economic loss, by late 2007. In previous years investigation of IUU issues has focused on remote fishing grounds, such as the Southern Ocean and the Barents Sea where high value stocks including toothfish (*Dissostichus eleginoides*) and cod (*Gadus morhua*) are vulnerable to unauthorized fishing (e.g. Payne et al. 2005, NDF 2007). More recently, studies of African coastal states estimated illegal catches and uncovered a strong relationship between high levels of IUU fishing and poor governance structure (MRAG 2005). With the exception of a study of illegal salmon fishing in the Russian Far East based on market data from East Asia (Clarke, in press), studies of IUU fishing in Asia are generally lacking.

This report attempts to construct an estimate of IUU fishing catch quantity and value in the Japanese Exclusive Economic Zone (EEZ). Japan is atypical of Asian countries in many respects including its economic development, high level of education and, particularly in terms of marine resource use, its technologically advanced, yet still largely community-based fisheries. For these reasons, it is not a particularly representative choice to fill the gap in information for Asian states. However, the availability of fisheries data in Japan arguably exceeds that of any other Asian country and thus was thought to suggest a higher probability of a successful study. Research on IUU fishing in Japan also provides useful insights into how relationships with neighbouring countries, in this case disputed sea boundaries with China, Korea and Russia, can exert a strong influence on IUU fishing patterns.

This study supports the work of the IUU Monitoring Network by compiling existing information on IUU incidents in the Japanese Exclusive Economic Zone. Information gaps in the existing data are filled using assumptions, usually based on other published sources, and resulting estimates are tallied to produce an overall estimate. Since the estimate is based on conservative extrapolations and only on IUU incidents which were detected, it represents a minimum estimate. In addition to the estimates, trends in IUU activities are highlighted and mitigation strategies currently used or under consideration within Japan are discussed. The products of this study will be incorporated into a larger program of work, supported by the IUU Monitoring Network, to improve the accuracy and availability of IUU data and to prepare a global review of IUU fishing activities.

2 MATERIALS AND METHODS

Monitoring, surveillance and control of illegal fishing activities in Japan's EEZ is undertaken by the Japan Fisheries Agency, the Japan Coast Guard, and prefectural authorities in the 39 prefectures adjoining the coast. The distribution of incidents among these three authorities is shown in *Table 1*.

Table 1. Domestic and foreign-flagged vessel fishing violations recorded by the Japan Fisheries Agency, prefectural authorities and the Japan Coast Guard, 2001-2006. Data sourced from Japan Coast Guard 2006a, 2007a and Japan Fisheries Agency 2006a, 2007a, 2007b.

	2001	2002	2003	2004	2005	2006
Domestic Incidents						
Fisheries Agency	14	29	11	16	na	na
Prefectural Authorities	351	389	331	294	na	na
Coast Guard	1,051	1,080	1,233	1,241	1,471	1,584
SUBTOTAL	1,416	1,498	1,575	1,551		
Foreign Incidents						
Fisheries Agency	21	38	35	29	16	10
Prefectural Authorities	0	0	0	0	na	na
Coast Guard	14	16	8	5	14	11
SUBTOTAL	35	54	43	34	30	21

These data indicate the following features of IUU fishing interdiction in Japan:

- Incidents involving domestic parties are most frequently detected by the Coast Guard (annual average of 76%, 2001-2004);
- Incidents involving foreign-flagged vessels are most frequently detected by the Fisheries Agency (annual average of 66%, 2001-2004);
- Prefectural authorities do not detect foreign-flagged IUU fishing operations but account for the second-largest share of detected domestic IUU fishing operations (annual average of 23%, 2001-2004).

Both the Fisheries Agency and the Coast Guard publish annual summaries of enforcement activities as well as statistics and incident reports. These sources provided the majority of information used in this study and are referenced throughout the report. Public information on enforcement activities by Japan's 39 prefectural authorities is very limited and is not available in a centralized, standardized form. Therefore, due to the number and variety of potential prefectural data sources, only Hokkaido, Japan's largest prefecture, was investigated individually. Other prefectural information was compiled opportunistically from press accounts.

The Fisheries Agency issues an annual summary of enforcement activities related to illegal fishing activities by foreign-flagged fishing vessels (Japan Fisheries Agency 2005a, 2006a, 2007b). It does not publicize any information about domestic illegal fishing incidents because it believes that such information may assist individuals engaging in illegal fishing activities in evading detection (pers. comm., K. Mitsutomi, Japan Fisheries Agency). The annual summary of foreign-flagged incidents is issued in the form of a press release briefly reviewing annual trends and reiterating the Agency's mission statement. In association with this annual summary, statistics are provided on the number of foreign vessel-related enforcement incidents (i.e. seizures or attempted seizures) by flag, and the number of incidents and amount of gear recovered for incidents involving illegal setting of gear. In addition, for every vessel-related incident, a press release is produced. These press releases usually contain the date of the incident, the location, the vessel name and flag, the gear type and the nature of the

violation (e.g. fishing in a closed area or fishing without a permit). Information on the nature of the catch is rarely released but in some cases species names or quantities are provided. A summary of the 55 foreign vessel-related incidents described in press releases by the Fisheries Agency from 2004-2006 is provided in *Annex A*.

The Coast Guard also publishes annual summaries of interdiction incidents, but these summaries include both domestic and foreign-flagged operations. An overview of the general situation and highlighted incidents, as well as graphics illustrating trends, are published in the form of press releases each year (Japan Coast Guard 2005a, 2006a, 2007a). The information content for each press release varies but in some cases information on species, or weight or value of catch, is provided. Additional anecdotal information on key incidents is sometimes provided in Coast Guard Annual Reports (Japan Coast Guard 2005b, 2006c, 2007c). Another source of information is Coast Guard statistical yearbooks which are currently available for 2004 and 2005 (Japan Coast Guard 2006b, 2007b). These data tabulate the number of incidents and the number of individuals involved by the eleven Coast Guard districts and type of fishing gear; and by violation and type of fishing gear. A tabulated summary of incidents reported by the Coast Guard in annual press releases and Annual Reports is provided in *Annex B*. Summarized data from Coast Guard statistical yearbooks showing the number of incidents by fishing gear, region and violation type are shown in *Annexes C and D*.

In addition to these governmental sources of published data, major Japanese and English language newspaper archives were searched for additional relevant information. Interviews were arranged with section chiefs from the Japan Fisheries Agency's Resources Management Division Enforcement Offices for domestic and foreign fishing enforcement and with a representative of the Japan Coast Guard's Policy Assessment and Public Information Office. Additional information on sea boundary and fishing treaty agreements with neighbouring countries was sourced via the internet. An exchange rate of 120 yen to 1 USD was applied consistently in all calculations.

3 RESULTS

3.1 Monitoring, Surveillance and Enforcement Resources

This section provides background information on the resources devoted to monitoring, surveillance and enforcement in the Japanese EEZ. In assessing these levels it is important to understand that the priority attached by the government to fisheries control may be strongly related to issues of territorial sea boundaries in disputed areas. Therefore, it is likely that that government's policy toward fisheries enforcement is strengthened, perhaps more than in other countries, by the high priority attached to reinforcing various territorial claims in surrounding waters.

The Fisheries Agency maintains a fleet of vessels for the express purpose of fisheries monitoring and surveillance. As of the end of 2005, the fleet comprised 38 vessels with a total of 85 crew. With regard to location of deployment, 15 vessels and 44 crew are deployed out of Sakaiminato and Kyushu, i.e. in the sea areas containing the provisional zones (see *Figure 1* and *Section 3.1.1*) and 4 vessels and 12 crew are deployed out of Hokkaido. In 2006, a budget of 10.1 billion yen (84.2 million USD) was devoted to fisheries enforcement, within which 7 billion yen (58.3 million USD) was expended on vessel activities (Japan Fisheries Agency 2007d).

Coast Guard resources are also deployed in support of fisheries monitoring and surveillance but since Coast Guard vessels enforce a variety of regulations other than fisheries regulations, it is impossible to distinguish the exact amount of effort devoted to fisheries issues per se. Nevertheless, nationwide the Coast Guard fleet adds another 392 boats and aircraft to the at-sea patrol presence (Japan Coast Guard 2007e). The numbers and class of craft are as follows:

- Large Patrol Vessel with Helicopter - 6
- Large Patrol Vessel - 21
- Medium Patrol Vessel, 500 t - 26
- Medium Patrol Vessel, 350 t - 5
- Small Patrol Vessel, 180 t - 18
- Patrol Craft, 30 m - 69
- Large Craft, 20 m - 188
- Large Craft, 15 m - 4
- Large Airplane - 3
- Medium Airplane - 12
- Small Airplane - 1
- Medium Helicopter - 28
- Small Helicopter - 11

The largest number of craft are deployed in District 7 out of Kita-Kyushu (n=65) and District 3 out of Yokohama (n=59); 46 craft are deployed out of District 1 in Hokkaido (see *Figure 2*). No information was compiled on the enforcement resources of prefectural authorities.

3.2 Description of Recorded Illegal Fishing Incidents in the Japanese EEZ

3.2.1 Type of IUU Fishing

According to the United Nations Food and Agriculture Organization's definition of IUU fishing activity, *illegal* fishing activities are those conducted without the permission of the

relevant state authority, whereas *unreported* fishing activities are a separate category of activities consisting of those which are unreported, or misreported, to the relevant state authority (FAO 2007). However, as described in MRAG (2005), unreported fishing activities within EEZs should be considered illegal activities when there national laws, regulations or permit conditions which require reporting.

In the case of IUU activities within the Japanese EEZ, there is obviously potential for illegal fishing. Unreported fishing in line with the FAO definition, e.g. by vessels holding otherwise valid permits for their operations, may also occur. However, all foreign vessels licensed to fish in the Japanese EEZ are required to maintain accurate logbooks, as are most domestic fishing vessels. Therefore, if these vessels are not reporting or are misreporting, their activities they are in contravention of national regulations and thus illegal. Furthermore, if the fishing activity is not required under Japanese regulations to maintain a logbook (e.g. a limited number of small coastal vessels), then their activities could be considered to be unreported fishing, but they would not appear in the violations databases compiled for this study. Thus by definition, all of the government-detected violations cited in this report are considered examples of illegal fishing. While it is theoretically possible to make a separate assessment for unreported fishing (e.g. domestic vessels operating legally in the EEZ without logbook requirements), estimating the extent of such unreported fishing would require information on logbook coverage by fleet and area which is not publicly available. Also, since fisheries managers are often able to estimate catches by these vessels through landing records and thus account for this “unreported” catch, the issue is to some extent already addressed through management procedures. For these reasons, unreported catches are not estimated in this report.

The concept of *unregulated* fishing does not generally apply within EEZs (MRAG 2005, FAO 2007). However, Rosenberg (2005) points out that for Japan there is at least one area of territorial dispute in which, due to bilateral agreements which allow traditional fishing activities to continue unimpeded, fishing activities are basically unregulated even though the area is considered to be within the Japanese EEZ by the Japanese government. The cited area, i.e. the disputed Senkaku (in Japanese)/ Diaoyu (in Chinese) Islands, is an example of an area where the usual regulation of fisheries resources within the Japanese EEZ is secondary to issues of territorial claims and bilateral relations. In this and potentially other cases, while it is acknowledged that some amount of unregulated fishing occurs, it is impossible to describe or estimate it.

A related issue, involving semi-regulated areas, is the existence of provisional areas within the Japanese EEZ. These are areas of territorial dispute for which fisheries agreements have been negotiated between Japan and another country (Figure 1). Two provisional areas were designated in the Japan-Korea fisheries agreement in 1998 and two further provisional areas designated in a Japan-China fisheries agreement signed in 1997 and implemented in 2000 (Rosenberg 2005, Japan Fisheries Agency (undated)). These agreements, which are designed to facilitate continued operations of fisheries in the areas, allow each countries’ vessels to fish in the provisional areas under their respective country’s sovereignty and control (Japan Ministry of Foreign Affairs 1998). In general practice, Japan will not intercept a partner country’s vessel in a provisional zone, although it will intercept third-party flagged vessels. It is noted that Korea does not accept the Japan-China fisheries agreement as it claims part of the northern provisional area designated under that agreement as its own. These provisional areas cannot be considered unregulated like the Senkaku/Diaoyu Islands. Nevertheless regulation can be considered to be less stringent and thorough than in undisputed areas of the EEZ since the lack of a joint enforcement mechanism in the provisional areas creates an obstacle to usual enforcement practices in the Japanese EEZ (Rosenberg 2005, T. Tomita, Japan Fisheries Agency, pers. comm.). Under the agreements, joint fisheries committees meet regularly to share data and control fishing operations in the provisional areas.

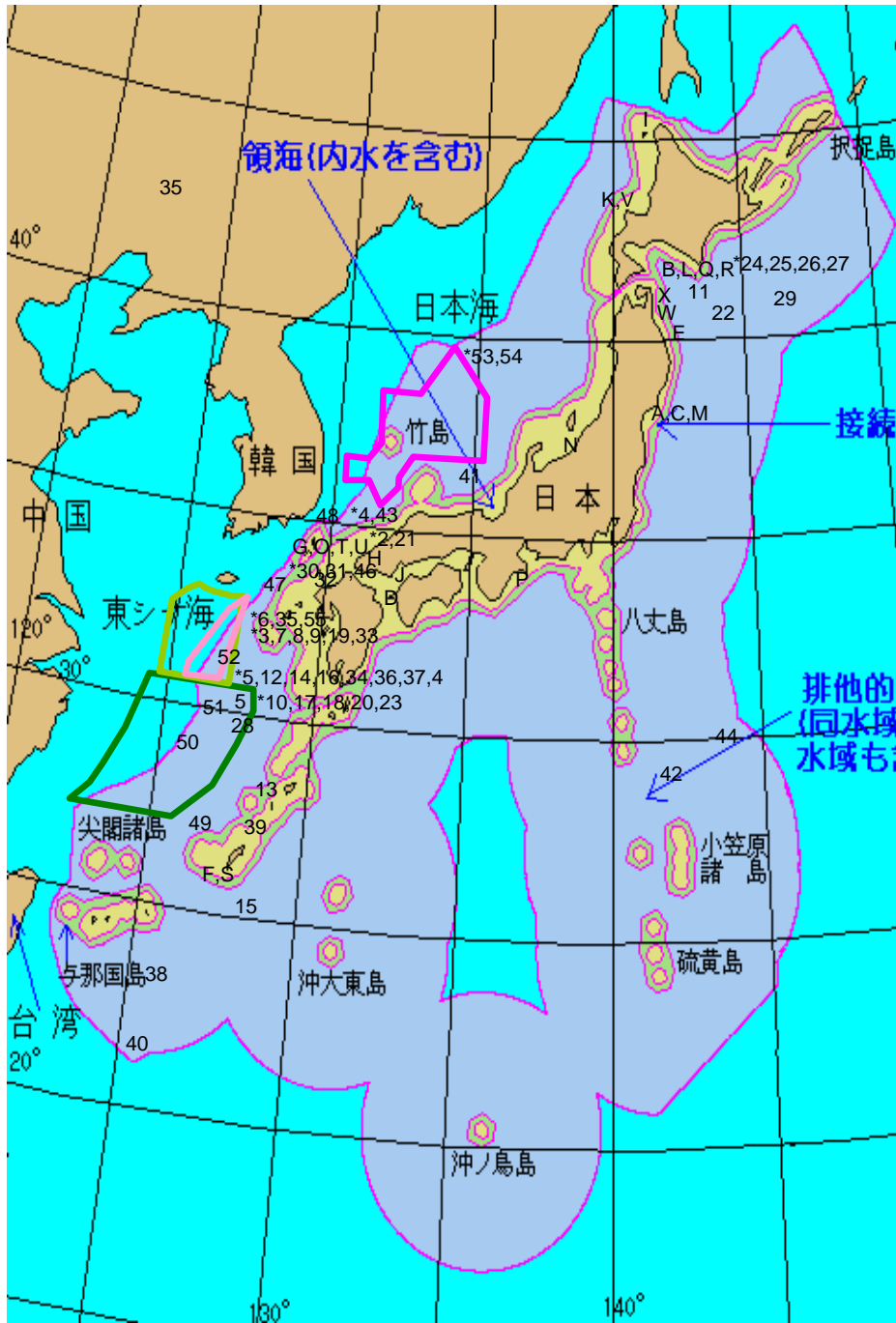


Figure 1. Japan's Exclusive Economic Zone boundaries (according to the Japan Government), and provisional areas of fishing agreements between Japan and Korea (light and dark pink polygons) and Japan and China (light and dark green polygons). Numbers refer to individual incidents involving foreign vessels detected by the Fisheries Agency (see Annex A); letters refer to major incidents involving both foreign and domestic vessels detected by the Coast Guard (see Annex B). Asterisks indicate the location of multiple incidents in the same area. Base map sourced from Japan Coast Guard (2007d). Provisional areas are drawn from Japan Fisheries Agency (undated) and may not be to scale.

For the purposes of this report it is assumed that all non-party vessels fishing in the provisional area portions of the Japanese EEZ are illegal. All vessels flagged by the cooperating governments are regulated by the joint fisheries committees and to be considered legal must operate in compliance with the stipulations of these committees. However, as the requirements of these committees and the compliance of national fleets with these requirements are not made public, treatment of the provisional areas in this report is limited to published incident information involving third party fishing vessels within the provisional area boundaries.

In summary, all of the information and estimates provided in this report pertain to illegal fishing. While unreported and unregulated (or semi-regulated) fishing is likely to occur in the Japanese EEZ at some level, there are no data with which to describe or characterize it.

3.2.2 Location of Illegal Fishing

Detailed information on the location of illegal fishing in the Japanese EEZ is available from Fisheries Agency press releases concerning foreign vessel incidents (n=55) and Coast Guard press releases and Annual Reports for key domestic and foreign vessel incidents (n=24; Figure 1). When examining these locations, it is important to bear in mind that they do not form a representative subsample of the locations of all illegal fishing activity since they exclude all domestic incidents detected by the Fisheries Agency and prefectural authorities, as well as all but the most prominent issues handled by the Coast Guard. These caveats notwithstanding it is possible to identify several problem areas. The majority of foreign vessel incidents detected by the Fisheries Agency (n=27) occurred in the triangular area lying between Japan, Korea and China where there are several overlapping territorial claims. The fact that Japan does conduct monitoring and surveillance within at least one of the provisional areas is illustrated by incidents 28, 51 and 52 which involved one Taiwanese and two Korean vessels fishing inside the Japan-China provisional area. It is noted that all three incidents occurred in the eastern portion of the area which is inside the boundary of the EEZ asserted by Japan.

In contrast to the East China Sea area where all incidents were detected by the Fisheries Agency, two other illegal fishing trouble spots were identified through both Fisheries Agency and Coast Guard records. The first of these is Tsushima Island lying within the narrowest portion of the channel between Japan and Korea. All incidents involved Korean vessels. Although the sea territory around Tsushima is not officially disputed, some Korean organizations have claimed the island (Japan Times 2006). It is likely that the complicated zoning of the area contributes to violations: there are three prohibited zones lying the buffer zone between the high seas and the Japanese EEZ surrounding Tsushima.

Another trouble spot lies in the waters off southeastern Hokkaido. In this area the eight reported incidents by the Fisheries Agency all occurred in 2004 and involved mainly Chinese and Russian vessels. A fixed number of Chinese trawlers and squid jiggers are permitted to operate within the Japanese EEZ each year under a bilateral agreement which specifies catch levels and operational constraints but does not restrict species (Japan Fisheries Agency 2007c). The Chinese violations in this area consisted of logbook irregularities and one instance of using a prohibited drift net. Russian trawlers are permitted to operate in Japanese waters to catch fixed quotas of longfin codling (ITOHKIDARA, *Laemonema longipes*), Pacific saury (SANMA, *Cololabis saira*), herring (IWASHI, *Sardinops melanostictus*) and mackerel (SABA, *Scomber* spp.; Japan Fisheries Agency 2006b). The detected Russian violations included logbook irregularities and retention of non-permitted species. In contrast, the Coast Guard violations in the area involved unauthorized take of hair crabs (KEGANI, *Erimacrus isenbeckii*), sea urchin (UNI, family Perischoechinoidea) and sea cucumber (NAMAKO, class Holothuroidea) and are presumed to have occurred considerably inshore of the Fisheries Agency-detected incidents.

Comprehensive information is also available by Coast Guard district for all incidents involving the Coast Guard in 2004 and 2005 (Figure 2, *Annexes C and D*). Ideally, for the purposes of trouble spot identification, the number of incidents by district would be standardized by sea area, level of fishing vessel activity, or patrol effort in each area but the necessary information is not available. Therefore, this discussion is limited to general, apparent patterns. Given that Coast Guard incidents tend to involve domestic vessels, patterns of locational activity different to those in Figure 1 would be expected. Indeed, the East China Sea area registers a low number of incidents. However, incidents of illegal fishing in the Hokkaido area appear to be high in Figure 2 (domestic only) as well as in Figure 1 (most foreign and some high-profile domestic incidents). Other areas of high illegal fishing activity (i.e. over 100 incidents in each year) appear to be the southern coasts of Honshu and Shikoku (Districts 3-5) and particularly the Inland Sea area (District 6).

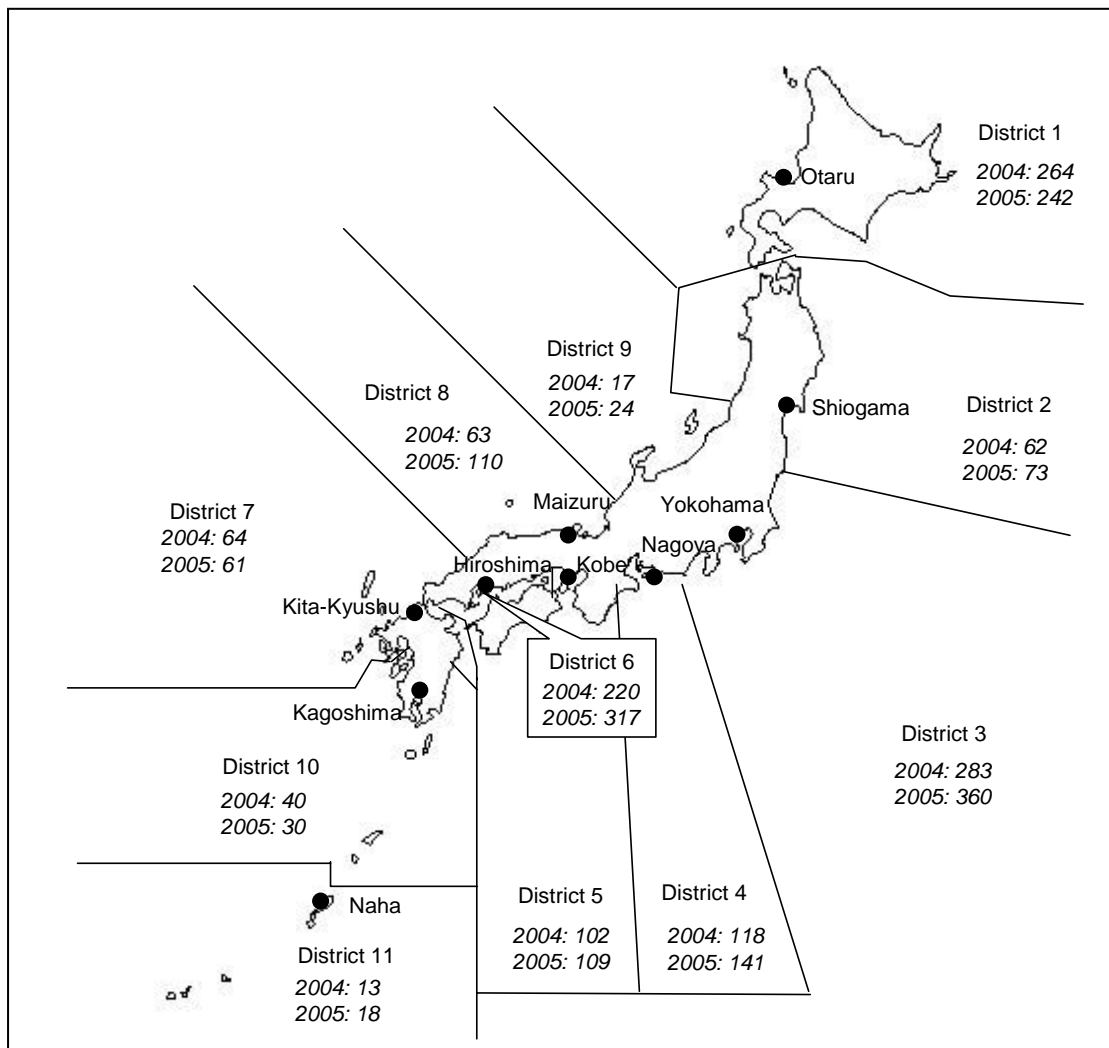


Figure 2. Number of total incidents (domestic and foreign, minor and major) detected by the Japan Coast Guard by district in 2004 and 2005.

3.2.3 Flag States of Illegal Fishing Vessels

Based on statistics presented in *Table 1* for 2001-2004, 97 to 98 percent of all detected incidents of illegal fishing in the Japanese EEZ are by domestic vessels. The 2 to 3 percent of incidents involving foreign vessels are tabulated for 2002-2006 in Figure 3. In each year, the largest number of detected incidents involves Korean vessels. As described in the previous section, this may be due in part to territorial conflicts between the two countries. In the early part of the time series Chinese flagged vessels were the second most frequently detected parties in illegal fishing activities, but in recent years Taiwan has replaced China in the second rank. The number of incidents involving Russia is small despite substantial tensions along the sea border between the Nemuro area of eastern Hokkaido and the Russian controlled Kurile Islands and the Wakkanai area of northern Hokkaido and Sakhalin Island (Pilling 2006, Hokkaido Government 2006). The identity of the other flags included in the summaries is not known for the incidents handled by the Coast Guard. In the one incident reported by the Fisheries Agency in 2004, the vessel was a Cambodian-flagged transport ship, captained by a Chinese national, which was observed transshipping from permitted Chinese squid jiggers but did not itself have the required permit for transshipping within the Japanese EEZ.

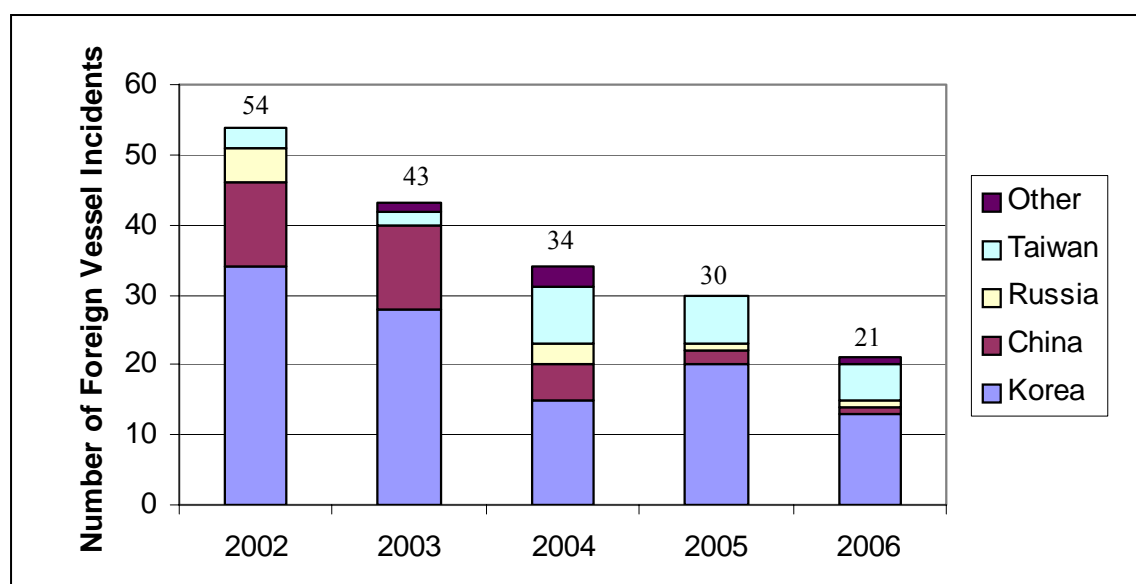


Figure 3. Illegal fishing incidents involving foreign vessels as detected by both the Japan Fisheries Agency and the Japan Coast Guard by flag state, 2002-2006 (Source: Japan Fisheries Agency 2007b, Japan Coast Guard 2007a). Annotations above each column indicate the total number of incidents.

3.2.4 Gear Types and Target Species of Illegal Fishing

As described above, information about domestic incidents of illegal fishing intercepted by the Fisheries Agency are not reported. For foreign vessels, the type of gear deployed is usually described in the press releases (*Annex A*), and basic statistics on abandoned fishing gear set illegally by foreign vessels are released in annual summaries¹. For six of the Coast Guard detected incidents given in *Annex B*, gear type information was provided. *Figure 4* presents the foreign vessel incidents by gear type for the sixty incidents for which this information was

¹ It is not clear how the ownership of abandoned gear is determined.

available. Although the proportion varies by year, longlines are the most common gear type in all years.

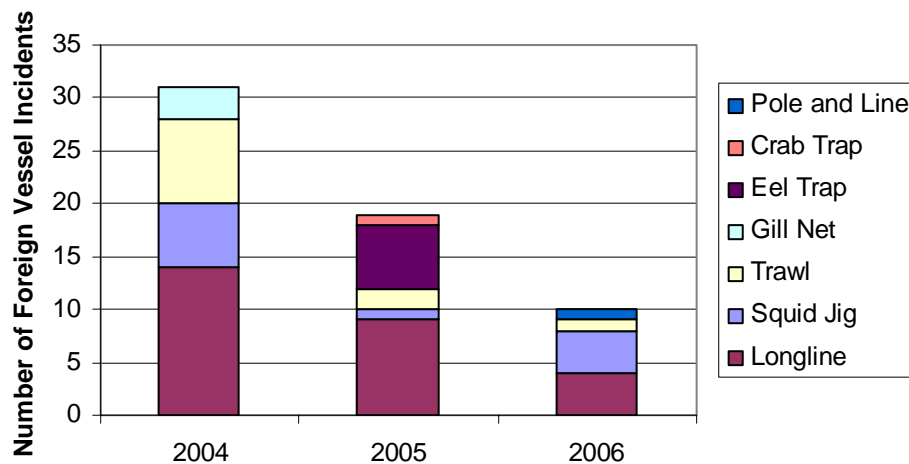


Figure 4. Illegal fishing incidents involving foreign vessels and detected by the Japan Fisheries Agency and Japan Coast Guard by gear type, 2004-2006 (Source: *Annexes A and B*). Note that non-fishing violations (e.g. transshipment) are not included.

A summary of fishing gear abandoned by foreign vessels is presented in *Table 2*. In line with the decrease in incidents over time as illustrated in *Figures 3 and 4*, the number of incidents and the amount of confiscated gear also shows a decline since 2004. Although no information on the catch composition of abandoned gear is provided, inferences can be made. For example, gill net incidents listed in *Annex A* are reported as catching shrimps, crab and splendid alfonso (KINMEDAI, *Beryx splendens*). In addition, the annual report for 2006 (Japan Fisheries Agency 2007b) mentions a continuing problem with Korean gill netters illegally fishing for snow crab (ZUWAIGANI, *Chionoecetes opilio*) in the Sea of Japan north of southern Honshu (called the YAMAKAGE area). Information on species targeted by longlines in the East China Sea is limited but there are several instances of largehead hairtail (TACHIHO, *Trichiurus lepturus*) and one incident mentions catches of sharks and dolphinfish (SHIIRA, *Coryphaena hippurus*). Based on observed longline catches in northern Taiwan (pers ob.), tuna and billfishes are also likely targets. Most recorded incidents involving traps are believed to have been targeting conger eels (ANAGO, *Conger* spp.); some targeting of hair crabs is probably also included in this category.

Table 2. Seizure of illegal gear set by foreign vessels, 1999-2006. (Source: Japan Fisheries Agency 2007b).

Year	Incidents	Gill Net (km)	Longline (km)	Traps (number)	Catch (at time of gear seizure)(in t)
1999	7	44	4	17	0.6
2000	14	55	4	5,472	11.6
2001	36	131	141	388	22.2
2002	49	235	196	4,025	10.3
2003	67	272	367	17,675	155.5
2004	57	137	166	26,960	70.0
2005	44	88	105	9,124	35.2
2006	35	50	54	7,569	13.4
Total	309	1,012	1,037	71,230	318.8
Average 2004-2006	45	92	108	14,551	40

All Coast Guard detected violations are shown by gear type in *Annex C*. Despite the long list of gear types tabulated, more than half of the incidents in both 2004 and 2005 are classified in the “other” category. The most frequently recorded gear type involved in violations in both years is small-sized bottom trawls. However, according to Coast Guard accounts of major incidents, as summarized in *Annex B*, the gear types of greatest concern are dive apparatus, which is used to target abalone (*AWABI*, *Haliotis* spp.), sea urchin or sea cucumber, and eel traps targeting conger eels.

3.2.5 Types of Violations

Of the 54 incidents detected by the Fisheries Agency with violation type recorded, 24 incidents (44%) involved fishing without a permit (*Annex A*). The next most common types of violations were missing logbook entries (15 or 28%) and incorrect logbook entries (10 or 18%). Aside from a few violations involving closed seasons or areas, most of the major incidents detected by the Coast Guard involved fishing without a permit (*Annex B*). Comprehensive Coast Guard statistics indicate that approximately 85% of all detected violations in 2004 and 2005 fell within the traditional concept of illegal fishing activities (including violation of national fishing rights (trespassing in the EEZ); operating without a permit; operating in contravention of permit operational, boundary or time limits; or illegal possession or sales) or the unspecified “other” category (*Annexes C and D*).

It is noted that not all of the violations recorded in the Annexes would normally be considered examples of illegal fishing. For example, data in the Coast Guard statistical database (*Annexes C and D*) include evasion of inspection, anchoring violations, and formal crimes (such as theft or murder on fishing vessels). The Coast Guard and Fisheries Agency incidence reports treat transshipment of catch within the EEZ and illegal port calls as violations even though they do not necessarily indicate illegal fishing within Japanese waters. Using summary figures which include such peripheral issues creates bias and data should be adjusted if possible.

3.3 Estimates of Illegal Fishing Catch Quantity and Value

This section attempts to construct an estimate of the quantity and value of illegal fishing in the Japanese EEZ from the information available. This information can be classified into three categories:

- Incidents for which catch quantity and/or value estimates have been published (mainly major incidents detected by the Coast Guard, *Annex B*);
 - Incidents for which partial information is available allowing a reasonable estimate of catch quantity and value to be calculated (some Coast Guard detected incidents (*Annex B*), and some Fisheries Agency detected incidents (*Annex A*);
- and
- Incidents for which available information is too limited to construct an individual estimate (many of the more recent Fisheries Agency detected incidents (*Annex A*) and all of the Coast Guard statistical data (*Annexes C and D*).

Each type of data is handled separately but the results are compiled in a consistent format in *Table 6*. In the following calculations of catch value, unit weight market values are applied without adjusting for the difference between whole and processed weight. It is acknowledged that this can lead to an upward bias in value estimates for those species which may be sold in processed form.

3.3.1 Estimates based on High and Medium Quality Data

High Quality Data: Incidents with Published Catch Quantity and Value Data

There are eight incidents for 2004-2006 which provide published catch quantity and/or value data and thus consist of high quality data. Six of the incidents are from published Coast Guard accounts of major incidents which are detailed in *Annex B*. However, the Coast Guard reporting format appears to be limited to the 3 or 4 most serious incidents each year, and other incidents were located in miscellaneous press reports. In each case, details were checked to ensure that double counting was not occurring.

One account of illegal fishing for hair crab (Table 3, Row2) gave the value of the catch as 13.5 t as 68 million yen. This value was used to derive a unit value for hair crab of 5,000 yen per kg and thus calculate the quantity from the value given in Row 1, and the value from the quantity given in Row 2. Similarly unit values for sea urchin (1,000 yen per kg), sea cucumber (1,200 yen per kg), and abalone (6,000 yen per kg) were derived from information in Rows 3, 4 and 6, respectively. The abalone unit value was applied to the quantity given in Row 5 to produce an estimated value. For Row 6 the total catch quantity and value over the period of operations (January 2005-October 2006) was proportioned to each year in a ratio of 55:45. For the sea cucumber incident in Row 8, the newspaper account stated that the operation began in 2004 and continued until arrests in late 2006 and early 2007 (Asahi Shinbun 2007). The annual catch quantity and value cited were thus applied to both 2005 and 2006.

Based on the results of the high quality data alone, during the period 2004-2006 a total of 420.5 t (average 140.2 t per year), valued at 702.3 million yen (average 234.1 million yen per year) equating to 5.8 million USD (average 1.95 million USD per year) of illegal fishing occurred in the Japan EEZ. All of this amount involved luxury seafood items such as abalone, hair crab, sea cucumber and sea urchin.

Medium Quality Data: Incidents with Partial Catch Quantity and Value Data

Partial catch quantity and/or value data were located for an additional 14 incidents (Table 3). These data are considered medium quality data and derive from Coast Guard, Fisheries Agency and press accounts.

Row 9 describes domestic illegal fishing, usually involving size limit violations, for the Japanese littleneck clam. In 2006, 16 people were arrested in Fukuoka prefecture for illegal fishing (Yomiuri Shinbun 2007). The article states that that season lasts for 4 months (March-June) and a fishermen operating illegally can earn 1 million yen per month by selling small clams for 100 yen per kg. If it is assumed that the 16 people represented 4 groups, and each group earned 1 million yen per month for 4 months in 2006, the total illegal catch value would be 16 million yen and the total illegal catch quantity would be 160,000 kg.

Row 10 describes 26 incidents involving 9 people taking abalone, sea cucumber and sea urchin off Hokkaido in 2005. In another incident of illegal abalone take (Japan Coast Guard 2007c) 30 incidents resulted in a total of 542 kg illegally taken. If the same amount is proportioned to 26 incidents, 470 kg is estimated for Row 10. Applying an average value to abalone, sea cucumber and sea urchin of 2,733 yen per kg (average of the unit values given in the preceding section), the total value of this incident tallies to 1.3 million yen.

Rows 11 and 12 both concern incidents of illegal take of conger eels (ANAGO). A description of conger eel fisheries in Japan in the mid-1990s states that the average number of traps deployed in one day is about 5,000 and that the catch per unit effort is about 0.1 kg per trap (Shimizu 1996). Since both incidents occurred in nearshore areas, it is assumed they would

not have been able to operate for a long period without being detected. Under these conditions, it is assumed that these vessels were operating for 2 days before their arrest, this would equate to 2,000 kg of conger eels. According to data from Tokyo's Tsukiji wholesale market in March 2005, the average price per kg for conger eels was 1,770 yen per kg (Tokyo Central Wholesale Market 2007). Therefore, the value of each incident can be estimated at as 3.5 million yen.

An incident involving purse seining off Mie prefecture south of Nagoya is described in Row 13. According to the website of a fishing company operating 4 purse seines in Mie prefecture (Shotokumaru 2007²), the February-March catch consists of mainly herring (IWASHI) and horse mackerel (AJI) and the daily landings range from 2 to 80 t. It is very difficult to estimate for how long the violation might have occurred before detection. Assuming it occurred at least once before detection would result in 2 days of violations for 4 groups of vessels. Assuming each group can take approximately 30 t per day, and applying a unit price of approximately 400 yen (i.e. February market value of 394 yen per kg for herring, and 401 yen per kg for horse mackerel (Tokyo Central Wholesale Market 2007)) results in an estimate of 240 t worth 96 million yen taken illegally.

An incident of illegal operations by a Taiwanese longliner in the East China Sea in February 2004 was described as catching of sharks and dolphinfish without a permit (Row 14). The press release gives the size of the longliner as 50 t. This size would equate to a Japanese offshore (KINKAI) longliner. According to Japanese government statistics (MAFF 2007) this fleet in 2004 caught 11,446 t of sharks and 51 t of dolphinfish in a total of 90,875 days of fishing. If it is assumed that the longliner had been fishing for 7 days undetected in an offshore area, and pro rata catch rates from the Japanese fleet (i.e. 126 kg of shark and 0.6 kg of dolphinfish per fishing day) are applied, the illegal take would amount to 886 kg. Since this amount is primarily shark, if the average price of shark in February 2002 (550 yen per kg) is applied (Tokyo Central Wholesale Market 2007), the estimated value of the catch is 0.5 million yen.

An incident of illegal trawling for shrimp and crab in the East China Sea in April 2004 reportedly involved under-reporting over a 5-day period resulting in an illegal catch of 546 kg (Row 15). While the shrimp species is unknown, based on the location of the incident, it is expected that the crab was snow crab. Based on unit prices of 1,295 yen per kg for all types of shrimp and 3,030 yen per kg for snow crab in April 2004 (Tokyo Central Wholesale Market 2007), and assuming the catch was half shrimp and half crab, results in an estimated value of 1.2 million yen.

Few details were given about a incident of illegal gill net fishing north of Okinawa in April 2004 other than that the vessel was catching splendid alfonsino (Row 16). There is no separate category for reporting catches of splendid alfonsino in the Japanese government statistics because the quantity caught in Japanese waters is very low (F. Muto, National Research Institute of Far Seas Fisheries, pers. comm.). Due to the lack of catch rate information, the vessel characteristics were used to estimate the weight of fish onboard if the vessels' hold were full. Due to the remote location of the incident it is considered possible that the vessel could have filled its hold without being detected. A factor of 0.54 representing the ratio between vessel gross tonnage and the round weight of fish capacity was applied (NDF 2005) to the fishing vessel size of 33.85 t resulting in a fish round weight estimate of 18 t. Since the price of splendid alfonsino in May 2004 was 1,010 yen per kg, the value of the illegal catch is estimated at 18 million yen.

² Use of information from the Shotokumaru website is in no way meant to imply that this company was involved in the violation. The identity of the vessels has not been made public.

The next two incidents (Rows 17 and 18) involved under-reporting of crab (HIRATSUME) and horse mackerel (AJI) catches. Since both incidents occurred in November 2004, unit values of WATARIGANI (which includes HIRATSUME, 1,196 yen per kg) and MAAJI (which includes AJI, 384 yen per kg) from the Tokyo Central Wholesale Market (2007) in 2004 were applied to the published catch quantities to generate total catch value estimates. The results of the calculations indicated that the illegal take values were 2.4 and 1.1 million yen, respectively.

The penultimate three incidents involve illegal fishing for hairtail (Row 19, 20 and 21). The simplest incident to estimate is in Row 21 where an under-reporting figure of 645 kg is given. According to Tokyo Central Wholesale Market (2007), the unit price of hairtail in May 2006 was 1,418 yen per kg, equating to a value of 0.9 million yen in this case. Since the incidents in Rows 19 and 20 also involved Korean vessels with permits near the territorial sea border of Korea, and provide no further details, similar estimates are applied.

The final incident involved a Korean squid jigger which, based on the area of fishing, was probably catching Pacific squid (SURUMEIKA, *Todarodes pacificus*). According to the press release the vessel had 18 t of catch on board but had only recorded 4.5 t in its logbook. The value of Pacific squid in the market in August 2006 was 368 yen per kg, equating to an illegal take worth 5.0 million yen in this incident.

The total illegal catch represented in *Table 3* is 863 t over a three year period or an average of about 288 t annually. The value of this catch totals 854 million yen (7.1 million USD) over three years or 285 million yen (2.4 USD) annually.

Table 3. Estimates of illegal catch and value for high and medium quality data given in *Annexes A* and *B*. Estimated values are shown in parentheses and explained in the text.

	Area	Gear	Species	Catch (in kg)			Value (in million yen)			Reference
				2004	2005	2006	2004	2005	2006	
Quality of Data: High										
1	s. Hokkaido		Hair crab	(4,000)			>20			<i>Annex B</i> , Incident B
2	s. Hokkaido		Hair crab		17,300			(87)		<i>Annex B</i> , Incident L
3	s. Hokkaido	Diving	Sea urchin			89,000			85	<i>Annex B</i> , Incident Q
4	s. Hokkaido		Sea cucumber			19,000		23		<i>Annex B</i> , Incident R
5	n. Honshu		Abalone			542			(3.3)	<i>Annex B</i> , Incident W
6	n. Honshu		Abalone		2,585	2,115		15.4	12.6	<i>Annex B</i> , Incident X
7	Hokkaido		Sea cucumber			32,000			96	Japan Times (2007a)
8	n. Honshu	Diving	Sea cucumber		127,000	127,000		180	180	Asahi Shinbun (2007)
Quality of Data: Medium										
9	n. Kyushu	Clam dredge	Japanese littleneck clam (ASARI, <i>Ruditapes philippinarum</i>)			(160,000)			(16)	Yomiuri Shinbun (2007)
10	w. Hokkaido		Abalone, sea cucumber, sea urchin		(470)			(1.3)		<i>Annex B</i> , Incident K
11	n. Honshu	Eel trap	Conger eel		(2,000)			(3.5)		<i>Annex B</i> , Incident M
12	Nw Honshu	Eel trap	Conger eel		(2,000)			(3.5)		<i>Annex B</i> , Incident N
13	s. Honshu	Purse seine				(240,000)			(96)	<i>Annex B</i> , Incident P
14	East China Sea	Longline	Sharks, dolphinfish	(886)			(0.5)			<i>Annex A</i> , Incident 8
15	East China Sea	Trawl	Shrimp, crab	(546)			(1.2)			<i>Annex A</i> , Incident 12
16	North of Okinawa	Gill net	Splendid alfonsino	(18,000)			(18)			<i>Annex A</i> , Incident 13

	Area	Gear	Species	Catch (in kg)			Value (in million yen)			Reference
				2004	2005	2006	2004	2005	2006	
17	East China Sea	Large-sized trawl	Crab (1959 kg) and horse mackerel (162 kg)	2,121			(2.4)			<i>Annex A, Incident 23</i>
18	East China Sea	Large-sized trawler	Crab (808 kg) and horse mackerel (306 kg)	1,114			(1.1)			<i>Annex A, Incident 28</i>
19	East China Sea	Longline	Largehead hairtail		(645)			(0.9)		<i>Annex A, Incident 35</i>
20	Tsushima	Longline	Largehead hairtail			(645)			(0.9)	<i>Annex A, Incident 46</i>
21	East China Sea	Pole and Line	Largehead hairtail			645			(0.9)	<i>Annex A, Incident 50</i>
22	Sea of Japan	Squid Jig	(squid)			13,500			(5.0)	<i>Annex A, Incident 53</i>

3.3.2 Estimates based on Low Quality Data

Incidents with Low Quality Data in Annexes A and B

There are many remaining incidents for which it is impossible to make individual estimates of catch quantities or values. The first group of these include the remaining 46 of the 55 incidents listed in *Annex A* (85%), and the remaining 14 of the 24 incidents listed in *Annex B* (58%). As there is no empirical means of calculating estimates for these incidents individually, a proportioning approach is applied.

Since *Annex B* incidents are, by definition, those that are highlighted by the Coast Guard in their annual summaries or reports, they will tend to be larger scale and more egregious than incidents in *Annex A* which form a complete set of Fisheries Agency vessel seizure records. Based on the data and estimates in Table 3, per incident catch quantities and values were calculated separately for the *Annex A* and *B* incidents and applied to the remaining *Annex A* and *B* incidents for which there were major data gaps (*Table 4*). The per incident catch quantity and value amounts for *Annex A* incidents were approximately one-tenth of the amounts calculated for *Annex B*. When these per incident values are applied to the remaining low quality data incidents the extrapolated catch value results in another 226 t and 201 million yen (1.7 million USD) per year to be added to the annual estimate of illegal fishing.

Table 4. Calculation of additional catch quantity and value for low quality data incidents in *Annexes A* and *B*.

	Catch Quantity (t)	Catch Value (million Yen)	Catch Value (million USD)
Sum of High and Medium Quality Data Incidents			
Table 3, <i>Annex A</i> only	38.1	30.9	0.258
Table 3, <i>Annex B</i> only	379.0	350.6	2.922
Per Incident Value			
<i>Annex A</i> incidents (n=9)	4.2	3.4	0.028
<i>Annex B</i> incidents (n=11)	34.4	31.9	0.266
Extrapolation to Low Quality Annex A&B Incidents			
Additional <i>Annex A</i> (3 yrs)	4.2 x 46 = 194.7	3.4 x 46 = 157.9	1.31
Additional <i>Annex B</i> (3 yrs)	34.4 x 14 = 482.4	31.9 x 14 = 446.2	3.72
Total Estimate			
Annual Amount (A+B)/3	225.7	201.4	1.68

Low Quality Data concerning Vessels which Evaded Patrol Craft

Another category of low quality information consists of Fisheries Agency reports of the number of foreign vessels which managed to escape from patrol boats. These incidents are not included in *Annex A*. Only one such incident, involving a collision between a Korean gill netter and a Fisheries Agency patrol vessel, was reported in a press release (Japan Fisheries Agency 2005b). Annual reports stated there were 11 incidents in 2004 (6 Korean and 5 Chinese), 10 incidents in 2005 (7 Korean vessels and 3 Chinese vessels) and 7 incidents in 2006 for which flag information was not given (Japan Fisheries Agency 2005a, 2006a, 2007b). Applying per incident values from *Annex A* (*Table 4*) to these additional 28 incidents results in a total of 117.6 t worth 95.2 million yen over three years, or annual amounts of 32.9 t worth 31.7 million yen (0.26 million USD)³.

³ It is noted that if a vessel suddenly abandoned its gear and escaped the patrol vessel, and the patrol vessel subsequently recovered the gear, the illegal catch may be accounted for both under the escape incident and under the abandoned gear incident. However, there is not sufficient information available to adjust for this potential double-counting.

Low Quality Data from Statistical Tables

Annexes C and D also contains statistics on confirmed incidents of illegal fishing but insufficient information is available to calculate individual estimates. These data are Coast Guard data and represent a complete set of enforcement incidents in 2004 and 2005. Therefore, they would include, i.e. double-count, incidents in *Annex B*. However, they could not be assumed to be represented by the data in *Annex B* since many of the incidents in *Annexes C and D* are likely to be minor infractions with perhaps only negligible or nil catch quantity or value. Given the information available many assumptions are necessary to develop a calculation methodology. The resulting estimates should be treated with a considerable degree of caution.

The first step is to adjust the number of incidents in 2004 and 2005 to avoid double-counting and remove offences which are likely to be unrelated to illegal fishing. The number of Coast Guard detected incidents already accounted for in *Table 3* is 10, 1 of which occurred in 2004 and 7 of which occurred in 2005. Furthermore, in *Section 3.1.5* it was noted that anchoring violations, evasion of inspection and formal crimes are not necessarily connected with illegal fishing. The number of incidents in these categories is 18 in 2004 (*Annex C*) and 46 in 2005 (*Annex D*). These adjustments result in incident numbers of 1,227 for 2004 and 1,432 for 2005. To these incident counts, it is necessary to add other counts from the Fisheries Agency and prefectural authorities (*Table 1*; Japan Fisheries Agency 2007a). These incident counts were available only for 2004 and totalled 16 and 294 respectively. If a similar number of incidents is assumed for 2005, the total number of incidents in 2004 is 1,537 for 2004 and 1,742 for 2005. Based on the complete lack of information on the catch quantity or value associated with all of these incidents, it is assumed that 50% of them have similar values to the average values calculated for *Annex A*. (*Annex A* per incident amounts are used rather than *Annex B* per incident amounts because they are not expected to be biased toward major events). It is also assumed that another 20% of the unknown incidents have average values equal to half of the *Annex A* averages. The remainder of the incidents are assumed to involve administrative violations or have a negligible catch. The results of these calculations are shown in *Table 5*. When averaged, these estimates add another 4,132 t of catch and 3,344 million yen (27.9 million USD) annually to the total.

Table 5. Calculation of additional catch quantity and value for incident statistics in *Annexes C and D* and *Table 1* - domestic violations detected by the Fisheries Agency and prefectural authorities.

	2004	2005
Incident Numbers		
Annex C or D total	1,246	1,485
Already counted in Table 3	-1	-7
Not necessarily illegal fishing	-8	-46
Fisheries Agency domestic	16	(16)
Prefectural Authorities	294	294
Total	1,537	1,742
Applying Averages		
Per Incident Catch Quantity, Annex A Incidents (from Table 4)	4.2 t	4.2 t
Per Incident Catch Value, Annex A Incidents (from Table 4)	3.4 million yen	3.4 million yen
Quantity: Assume 50% of incidents of "average" magnitude and 20% have half "average" value	$(1,537 \times 0.5) 4.2 \text{ t} + (1,537 \times 0.2) (4.2 \text{ t} \times 0.5) = 3,874 \text{ t}$	$(1,742 \times 0.5) 4.2 \text{ t} + (1,742 \times 0.2) (4.2 \text{ t} \times 0.5) = 4,390 \text{ t}$
Value: Assume 50% of incidents of "average" magnitude and 20% have half "average" value	$(1,537 \times 0.5) 3.4\text{M} + 1,537 \times 0.2) (3.4\text{M} \times 0.5) = 3,135 \text{ M}$	$(1,742 \times 0.5) 3.4\text{M} + (1,742 \times 0.2) (3.4\text{M} \times 0.5) = 3,554 \text{ M}$

Low Quality Data concerning Abandoned Gear

The final type low quality data to be accounted for is the abandoned gear statistics shown in *Table 2*. These data provide the exact amount of catch involved. However, to estimate value the species composition of the catch is needed. This can be addressed using assumptions regarding the species most likely to be targeted by each gear type. Nevertheless, since it is not possible to know the relative catch deriving from each gear type, the average market value of the species expected to be targeted will be applied.

The target species for each gear type and their unit prices as given in the preceding sections are assumed to be:

- Gill net – snow crab (3,030 yen/kg) (Japan Fisheries Agency 2007b);
- Longline – sharks (550 yen per kg) and largehead hairtail (1,418 yen per kg) (*Annex A* and *Table 3*);
- Traps – hair crab (5,000 yen per kg) and conger eel (1,770 yen per kg) (*Annex B*, *Table 3* and Hokkaido Government 2006).

From these data an average catch value of 2,354 yen per kg is calculated and applied to the annual catch quantities shown in *Table 2*. The resulting annual estimates are 165 million yen, 83 million yen and 32 million yen for 2004, 2005 and 2006, respectively. Averaging to annual values results in 40 t per year at 93 million yen (or 0.8 million USD) per year.

3.3.3 Tally of High, Medium and Low Quality Data

A tally of estimates from the high, medium and low quality data is given in *Table 6*. Approximately 93% of the catch quantity and value estimates derive from low quality data. The large contribution from the low quality data in *Annexes C* and *D* reflects the fact that, as shown in *Table 1*, 79% of all violations are detected by the Coast Guard, but most of these are made public only through statistical tables which have a low information content for calculating catch quantity and value.

Table 6. Summary of high, medium and low quality estimates comprising a tally of estimates for all known illegal fishing occurrences. Figures represent annual amounts.

	Catch Quantity (t)	Catch Value (M yen)	Catch Value (M USD)
High Quality Data (<i>Annexes A</i> and <i>B</i> ; see <i>Table 3</i>)	140.2	234.1	1.95
Medium Quality Data (<i>Annexes A</i> and <i>B</i> ; see <i>Table 3</i>)	147.5	50.4	0.42
Low Quality Data (<i>Annexes A</i> and <i>B</i> ; see <i>Table 4</i>)	225.7	201.4	1.68
Low Quality Data (incidents of vessel escape)	32.9	31.7	0.26
Low Quality Data (incident statistics, see <i>Table 5</i>)	4,132.0	3,344.5	27.9
Low Quality Data (abandoned gear; see <i>Table 2</i> and text)	39.5	93.0	0.78
TOTAL	4,717.8	3,955.1	32.99

3.3.4 Comparison to National Catch Quantities and Values

This section presents a comparison of the illegal catch and value estimates to national fisheries catch quantities and values using two methods. First, total national production

figures will be compared to the total estimates produced in *Table 6*. Second, the high quality data for luxury seafood items including abalone, hair crab, sea cucumber and sea urchin, will be compared to the total national production figures for those products.

Japan's total marine catch quantity in recent years is only available through 2004 (MAFF 2007). Furthermore, these data are reported by prefecture and by fleet but there is no means of determining whether the catch occurred in Japanese territorial waters. A rough estimate of production in national waters was obtained by taking the total reported national production in 2004, i.e. 4,455,064 t, and subtracting the production of fisheries listed as "far seas (ENYO)" fisheries in the statistical yearbook preface, i.e. far seas trawl (80,841 t), western trawl (7,780 t), large and medium size bonito-tuna purse seine (168,526 t), north Pacific gill net (180,751 t), far seas tuna longline (135,080 t), far seas bonito pole and line (86,762 t), far seas squid jigger (55,067 t) and other longlines (41,935 t)⁴. The adjusted amount of national production, 3,698,322 t, is expected to contain some extra-territorial catches, especially from the "offshore" (KINKAI) fleet as these fleets, in contrast to the far seas fleets, uses both territorial and high seas fishing areas.

The value of production from marine fisheries (excluding mariculture) in 2004 is given as 1,065 billion yen (MAFF 2007). Subtracting from this amount the production value for the far seas fisheries, i.e. far seas trawl (9.4 billion yen), western trawl (2.2 billion yen), large and medium size bonito-tuna purse seine (37.1 billion yen), north Pacific gill net (6.0 billion yen), far seas tuna longline (92.7 billion yen), far seas bonito pole and line (18.3 billion yen), far seas squid jigger (8.4 billion yen) and other longlines (20.8 billion yen), results in 870 billion yen (or 7.25 billion USD).

When contrasted against these national production quantity and catch estimates, the estimates of illegal fishing from *Table 6* are very small. The quantity of estimated illegal catch, i.e. 4,718 t, represents only 0.01% of the 3.6 million t of national production. In terms of value, the estimated illegal catch value, i.e. 4.0 billion yen, is similarly only 0.4% of the total value of national production (870 billion yen).

Comparison of illegal fishing losses for high-value luxury seafoods to national production figures is shown in *Table 7*. The illegal catches are assumed to be maximum annual amount reported in high quality data, and in this sense these estimates are different from the previous estimates because only a small number of recorded incidents are included (i.e. there is no extrapolation to other incidents). While it is likely that high-value luxury seafoods are also illegally taken in minor incidents which do not get reported in detail, it is not possible to estimate the extent of this additional take or to apportion it by species. National statistics for *Table 7* were sourced from MAFF (2007) except for hair crab for which no national statistics were found for this species individually. As an alternative a report indicating recent catches of hair crabs in Hokkaido are about 2,500 t per year was used as a reference point (Nishiuchi 2003). The extent to which this may underestimate the total national production is likely to be small since the hair crab is primarily a Bering Sea species and it would be expected that the majority of Japanese catch would occur off Hokkaido. In addition to the data gaps regarding national hair crab catch quantities, no national production values are available for any individual species. Therefore the unit values used in *Table 3* were again applied here, i.e. hair crab (5,000 yen per kg), sea cucumber (1,200 yen per kg), sea urchin (1,000 yen per kg), abalone (6,000 yen per kg).

⁴ No production figures could be found for two fisheries also listed as "far seas", i.e. north Pacific longline and north Atlantic longline.

Table 7 Comparison of illegal take and national production for hair crab, sea cucumber, sea urchin and abalone. Illegal take values are the maximum annual incident values from Table 3, Rows 1-8. National production values were sourced from MAFF (2007) except where noted in the text.

	Catch Quantity (t)	Catch Value (M yen)	Catch Value (M USD)
<i>Hair Crab</i>			
Illegal Take	17.3	87	0.72
National Production	2,500	12,500	104.17
<i>Sea Cucumber</i>			
Illegal Take	127	180	1.50
National Production	9,268	11,122	92.68
<i>Sea Urchin</i>			
Illegal Take	89	85	0.71
National Production	12,716	12,716	105.97
<i>Abalone</i>			
Illegal Take	2.6	15.4	0.13
National Production	1,996	11,976	99.8

Once again, the estimates of illegal take are small compared to the total national production, even for these species which are involved in major illegal incidents. The most serious problem appears to lie in the illegal take of sea cucumber for which it is estimated, both in terms of catch quantity and value, that approximately 1.5% of the national production is illegal take. For hair crab and sea urchin the percentage of illegal take is about 0.7%, and for abalone it is only 0.1%.

4 DISCUSSION

4.1 Uncertainties in Estimates of Illegal Fishing

The preceding sections have described issues associated with missing information in relation to illegal fishing incidents in some detail. Overall, the most glaring data gap lies in the lack of catch quantity information for each incident. A related data gap involves the lack of species composition information but this can sometimes be assumed based on gear type and location (if available). These data gaps are partially attributable to a Fisheries Agency policy of not disclosing details of domestic illegal fishing incidents. It is not known whether the Coast Guard has a similar policy, but it is noted that in the 3-4 major domestic and foreign incidents publicized by the Coast Guard each year this information is often not provided. Regarding foreign vessels, the Fisheries Agency did report catch quantities and species composition for some incidents in 2004. After this time, however, this information appears to be routinely excluded from press releases, although in rare cases it can be found in local newspaper articles. The reason for this apparent trend toward less specific reporting of foreign vessel incidents is unknown. In interviews with Fisheries Agency personnel it was mentioned that occurrences in which fishing boats jettison illegal catch before the patrol vessel can reach them contribute to the lack of specific information on catch quantity and composition. It was also mentioned that for domestic vessel incidents, calculation of the illegal catch quantity can involve complicated total allowable catch (TAC) comparisons and thus is not often performed (pers comm., T. Tomita, Japan Fisheries Agency).

Another serious data deficiency is the lack of information on the probability of undetected illegal fishing events. While the preceding estimates have taken account of all recorded enforcement incidents by the Fisheries Agency, the Coast Guard and prefectural authorities, as well as incidents of foreign vessels escaping from patrols and/or abandoning gear in the

EEZ, it was not possible to account for incidents of illegal fishing which have occurred without detection. No information was available on surveillance patrol routes or frequencies, thus there was insufficient data to support methods used by Agnew and Kirkwood (2002) to calculate the probability of detection of illegal fishing incidents based on retrospective patrol tracks. It was also not possible to extrapolate from detected to undetected incidents because, unlike in some of the case studies in MRAG (2005), no estimates by Japanese government personnel regarding the number or frequency of undetected incidents were available.

The first data gap was addressed through a series of assumptions and extrapolations. Ultimately, a rough estimate of catch quality and value was obtained for all government-recorded incidents using a methodology which can be re-visited if more information becomes available. The second data gap involving undetected incidents was not successfully addressed. Mitigating this shortcoming is the fact that Japan devotes a large amount of resources to fisheries monitoring and surveillance within its EEZ. In combination with this, there is a strong presence of local fishermen and a tradition of community management in coastal areas which assists in detecting violations and enforcing fisheries regulations (Ruddle 1987). In offshore areas, illegal fishing seems concentrated in areas of territorial boundary disputes, but monitoring and surveillance efforts also appear to be concentrated in these areas. For these reasons, it is likely that the probability of undetected incidents of illegal fishing is relatively low. While it would be desirable to somehow quantify this and develop a factor for extrapolating detected incidents to a more realistic total encompassing both detected and undetected incidents, this is not possible given the data available. In any case, it is noted that even if the illegal fishing catch quantities and values given in *Tables 6* and *7* were doubled, they would still account for only 0.26-2.6% of national production.

4.2 Recent Trends in IUU Fishing Activity in the Japanese EEZ

Government agencies and the press have highlighted several trends in illegal fishing activities during the period 2004-2006. Most of the trends relevant to foreign fishing vessels relate either to activities in the waters between Japan and Korea (the YAMAKAGE area) and the East China Sea, or to the waters surrounding Hokkaido. Notable trends in domestic illegal fishing include organized crime gangs turning to easily harvested invertebrates for the luxury market in China.

Seizures of foreign vessels for fisheries violations decreased substantially from 34 incidents in 2004 to 21 incidents in 2006. This is attributed to two factors. First, according to the Fisheries Agency, the rules applicable to the provisional zones between Japan and China, and Japan and Korea, became clearer starting in 2005 due to improved consultation between the respective countries. Therefore, while fisheries activity patterns may not have changed, the regulatory system now allows for activities which were previously unauthorized. This is thought to be responsible for the decreased number of violations involving Korean and Chinese flagged vessels (Japan Fisheries Agency 2007b). Second, both the Fisheries Agency and the Coast Guard attribute the decrease in foreign vessel seizures to increased vigilance in patrols in the Sea of Japan and the East China Sea. This deterrent effect is thought to also have reduced the number of incidents involving Korean and Taiwan vessels.

One particularly noteworthy incident in 2005, referred to as the Shinpun incident, may have had an especially strong influence on the behaviour of Korean vessels. The Shinpun incident began on 31 May 2005 when a Korean-flagged vessel fishing for conger eel was intercepted by the Japan Coast Guard off Nagasaki prefecture. The vessel attempted to flee the scene and headed for Korean waters but was pursued and boarded by two Japan Coast Guard officers. During the course of the boarding, the Shinpun managed to free itself and escape across the border with the two officers still on board. Further pursuit required the cooperation of the Korean authorities but eventually the vessel was apprehended by the Korean marine police,

the collateral payment required by law was paid to the Japanese government, and the Korean authorities took control of the case. According to Japan Coast Guard authorities, this incident provided an opportunity for strengthening of Korean fisheries law, including provisions for arrest and penalties, as well as growth in enforcement capacity through this cooperative experience (Japan Coast Guard 2007a). Perhaps more importantly, however, it sent a signal to Korean fishing vessels that the tactic of fleeing across the Japan-Korea sea boundary would not be a sufficient guarantee of immunity from prosecution from that time onward.

Although it does not directly relate to illegal fishing inside the Japanese EEZ, other trends were noted with regard to Japan's neighbour to the north, Russia. The Fisheries Agency stated that beginning in 2004 there were increased incidents of illegal transshipment from Russian fishing vessels to third-party transport vessels inside the Japanese EEZ (Japan Fisheries Agency 2005a). In the same year the Coast Guard reported that Cambodian-flagged vessels with Chinese crew and owners, or Korean crew, were accepting illegally transferred catch from Russian vessels (Japan Coast Guard 2005a). One such incident was reported to have occurred after midnight near Rebun Island, off the northern tip of Hokkaido, involving illegal transfer of snow crab caught in Russian territorial waters by a Russian vessel to a Cambodian-flagged vessel with a Chinese captain and crew and a Korean ringleader on board (*Annex B*, Incident I). Interviews with Fisheries Agency personnel indicated that Georgian and Belarus-flagged vessels have been involved in similar incidents (pers. comm., T. Tomita, Japan Fisheries Agency). In another violation in November 2006, a Russian vessel which had received transferred catch from a number of vessels in the Sea of Okhotsk area was arrested for making an unauthorized port call in Otaru, western Hokkaido (Japan Coast Guard 2007a; *Annex B*, Incident V). Both agencies suggest that the nature of these illegal transshipments are becoming more diverse and complex with time.

The prefectural government of Hokkaido reports that Japanese-Russian relations regarding fisheries issues have taken a turn for the worse in recent years (Hokkaido Government 2006). This is due not only to several high profile cases of Russian seizure of Japanese vessels for fisheries violations, including the fatal shooting of Japanese crab fishermen off Nemuro in September 2006 (Pilling 2006) and a recent case brought by Japan against Russia in the International Tribunal for the Law of the Sea (Japan Times 2007b). There are also increasing reports of thefts of crab pots in the trouble spots between Nemuro (eastern Hokkaido) and the Kuriles, and between Wakkanai (northern Hokkaido) and Sakhalin (Hokkaido Government 2006).

Turning to domestic incidents, the Coast Guard reports highlight a particular concern with gang-related illegal fishing activities. Heavy media coverage of illegal fishing incidents in 2005 is believed to have sparked a diversification in the nature of these activities (Japan Coast Guard 2007a). While the Coast Guard indicates the largest gang-related activities are centred on sea urchin, abalone and top shell (SAZAE, *Batillus cornutus*), the latest worrying trend is toward gang-related harvest of sea cucumber to serve the rapidly expanding demand in China (Japan Coast Guard 2007a). Since demand for abalone would also be expected to be skyrocketing in China, it is interesting to consider why sea cucumber is a more popular target for illegal fishermen. One source explains that in Hokkaido, harvest and sale of crab, sea urchin and abalone are controlled by access rights, but there are no such rights assigned for sea cucumber leaving them vulnerable to unauthorized take. Furthermore, in comparison to illegal fishing for crab which remains a major issue in Hokkaido, sea cucumber harvesting requires considerably less gear and has a lower risk of detection (Asahi Shinbun 2006a).

According to other reports, long-standing problematic illegal fishing activities are also continuing. In particular, illegal take of abalone and sea urchin by recreational fishermen or divers occurs frequently during the boating season and there is a trend toward better organized and more sinister illegal activities targeting hair crab off southeastern Hokkaido (Hokkaido Government 2006). There is also reportedly rampant, small-scale illegal take of salmon eggs

(SUJIKO (in the form of whole salmon ovaries)) in Hokkaido. These eggs are reportedly consumed by the poachers or their families, or sold to small-scale local restaurants and shops, thereby bypassing the formal market (Asahi Shinbun 2006b).

4.3 Impact on Target Species Populations and the Ecosystem

From the mission statements of the various governmental departments responsible for fisheries enforcement it is obvious that protecting marine resources is one of the prime motivating factors for the enforcement programs. However, stemming the supply of capital to criminal gangs which threaten public safety, and reinforcing territorial sea claims in boundary waters appear to be important secondary considerations (Japan Fisheries Agency 2007b, Japan Coast Guard 2006a, Hokkaido Government 2006).

One government report states that good condition of Japanese fish stocks, relative to stocks in the waters of Korea, China and Taiwan, is the reason why vessels from these countries risk illegal fishing within the Japan EEZ (Japan Fisheries Agency 2005a). It is probably true that that opposite situation occurs with regard to Russia and its stocks. This could well be the reason why no incidents involving unpermitted Russian vessels were recorded during 2004-2006 (*Annex A*).

Despite general references to resource protection issues, most agencies' enforcement policies make no specific mention of the impacts of illegal fishing on target species or the ecosystem. It is possible that allowances are made for illegal take when performing stock assessments but this was not investigated on a case-by-case basis due to the number of stocks involved. In one case involving a snow crab fishery, despite a vast amount of available information on the fishery, the degree to which catches, both legal and potentially illegal, in the provisional area between Japan and Korea are accurately known and accounted for the management procedures remains unclear (TQCSI 2007). This may stem from the non-public nature of the management arrangements, an actual lack of information about catches in the area, or a combination of these factors.

The only specific reference to enforcement's role in protecting particular fish stocks and fisheries was the policy statement of the Hokkaido government (Hokkaido Government 2006). This policy specifically mentions the need for fisheries enforcement in three areas:

- To strengthen, preserve and manage stocks: N. Pacific and Sea of Okhotsk hair crab and hanasaki crab (HANASAKIGANI, *Paralithodes brevipes*); chum salmon (SHIROZAKE, *Oncorhynchus keta*) in spawning rivers; and sea urchin and abalone in the Japan Sea and off eastern Hokkaido.
- Where maintenance of a harmonious relationship with fisheries connected to coastal fisheries is necessary: offshore trawl fisheries in the Japan Sea and off eastern Hokkaido.
- Where it is necessary to maintain international obligations: small-sized salmon and trout fisheries east of Hokkaido and the Nemuro and Wakkanai border areas where border transgressions occur. Hair crabs off eastern Hokkaido, and all operations in the Nemuro area will be a particular enforcement focus.

There is no mention of particular management goals, or assessment of the policy's progress in curbing illegal activities. Several references to the necessity of further strengthening of enforcement activities suggest that progress to date is not yet sufficient.

4.4 Mitigation Strategies for Illegal Fishing

Aside from strengthening existing enforcement programs and relationships between cooperating agencies, several other strategies for combating illegal fishing in Japan were described. While most of them originate with government, one example of action within the fishing community itself was noted.

The Hokkaido government has for many years enlisted the support of local fishermen in detecting and discouraging illegal fishing activities. Recently, it has expanded these efforts to include an educational pamphlet for distribution to non-fishermen and traders (Hokkaido Government 2006). These efforts are designed to reduce illegal take by recreational fishermen and boaters (e.g. abalone and sea urchin) and presumably discourage black market or casual trade of illegal products (e.g. salmon eggs as described above).

Many government officials have begun calling for stronger legal instruments, in the form of jail sentences or fines, to deter first-time and repeat offenders. It was reported in February 2007, that the Fisheries Agencies was proposing legislation to increase the penalties for illegal fishing offences by raising the maximum jail term from six months to three years, and the maximum fine from 100,000 yen (833 USD) to 2 million yen (16,666 USD) (Japan Times 2007). The need for penalty revision is supported by the case of the gang targeting sea cucumber described in Table 3, Row 8. During the trial of the gang leader it came to light that he had been arrested in 2000 for gang-related illegal take of abalone but had received a suspended sentence (Asahi Shinbun 2007). Under the current system, the lack of substantial penalties is thought to embolden small-scale poachers as well as contribute to a proliferation of spin-off crimes such as thefts from processing factories and warehouses (Asahi Shinbun 2006a, 2006b).

Improved international relations on fisheries issues may also be considered a means of mitigating the effects of illegal fishing. For example, improved consultations between Japan and China and Japan and Korea are cited as resulting in a decline in violations (Japan Fisheries Agency 2007c). Whether this is merely a statistical effect (i.e. previously unauthorized fishing became authorized) or whether it actually resulted in better compliance with the catch limits set by the joint fisheries committees managing each provisional area is not clear. According to Rosenberg (2005), Japan and China are currently working toward reducing fishing capacity in their provisional areas, a important step toward making fisheries in those areas more sustainable. It is thus expected that improved management systems will both reduce illegal fishing and bring legal catches under a control scheme based on sustainable catch limits for the provisional areas.

Finally, there is evidence in at least one case of local fishermen imposing their own penalties for violation of regional fisheries regulations (Yomiuri Shinbun 2007). In one case in Fukuoka prefecture (Kyushu), the local fishermen's cooperative imposes its own fine of up to 200,000 yen (1,666 USD), in addition to penalties applied by prefectural authorities, for taking clams (ASARI) below the 3 cm size limit. These penalties are referred to as "carelessness fees" (KATAIKIN, 過怠金).

4.5 Summary

This report aims to estimate the extent of illegal, unreported and unregulated fishing in the Japanese EEZ using information on fisheries violations from government authorities and press reports. All of the violations involved fishing without a permit, contravention of permit conditions or other illegal activities. Therefore, all of the results represent estimates of illegal (rather than unreported or unregulated) fishing. Complete information is lacking for most

incidents, but assumptions and extrapolations were applied to present an estimate of the overall situation.

The target species of illegal fishing activities vary by area but the most conspicuously targeted species are abalone, sea cucumber, sea urchin and hair crab taken illegally by domestic, often gang-related, operations off Hokkaido. The first three targets are usually taken in diving operations; the hair crabs are usually taken with traps. Foreign violations involving illegal catch of snow crab, largehead hairtail and conger eel were cited as issues in the East China Sea and the waters between Japan and Korea. Korean-flagged vessels were the most frequently seized fishing vessels in enforcement actions. The second most frequently seized vessels were Chinese in 2002-2003, and Taiwanese in 2004-2006. The most common gear type involved in these seizure incidents was longlines.

Estimates of the catch quantity and value were compiled from high and medium quality data given in incident reports. A proportioning approach was then used to estimate quantities and values associated with incomplete incident reports, cases where the vessel escaped or abandoned its gear, and tabulated statistics on numbers of incidents. As shown in *Annex E*, based on data compiled for 2004-2006, the total annual illegal take was estimated at 4,718 t valued at 4.0 billion yen (33.3 million USD). These values represent 0.01% of the national fisheries production quantity and 0.4% of its value. Tabulation of documented incidents for the high-value hair crab, sea cucumber, sea urchin and abalone fisheries indicate that annual illegal take ranged from 2.6 t for abalone (worth 15.4 million yen (130,000 USD)) to 127 t (worth 180 million yen (1.5 million USD)) for sea cucumber (*Annex F*). These figures represent 1.5% of the national production for sea cucumber and less than or equal to 0.7% of the national production for the other high-value species.

These ratios of illegal catch to total production appear low compared to those prepared for other countries, e.g. 19% for Africa (MRAG 2005) and 6.6% for British Columbia (Ainsworth and Pitcher 2005). This can be partially attributed to the many data gaps which were filled using conservative estimates, and the fact that only detected incidents of illegal fishing were taken into account. For these reasons, these estimates are considered to be minimum estimates. While it would be desirable to develop estimates which encompass detected as well as undetected events there were insufficient data available to accomplish this. Furthermore, given that illegal catch by foreign vessels would not be landed in Japan, and there is evidence suggesting that domestic illegal catch is exported (abalone and sea cucumber) or sold through the black market (salmon eggs), use of a market approach is not recommended in this instance.

While appreciating the limitations of the data and the methodology, it is also important to consider other special features of Japan which could act to suppress these ratios. First, Japan has one of the world's most highly developed fishing industries and has historically made heavy use of its marine resources for food. Therefore, it would be expected that the degree to which available marine resources are already used by legitimate fisheries is very high, leaving little remaining catch for illegal actors. Second, Japanese society has long valued detailed record-keeping. While Japan's catch recording may not always be exact, it is recognized as having some of the longest fisheries data time series of any country, i.e. in some cases over a century. Therefore, the value placed on logbooks might be expected to be higher and more universally shared in Japan as compared to other countries. Third, Japan devotes a large amount of resources to fisheries enforcement. These monitoring and surveillance systems operated by government authorities are assisted by the maintenance of traditional community fisheries management systems which serve to guard resources from outsiders. For these reasons, it might be expected that the ratio of illegal to legal fishing in Japan would still be lower than in other countries, even if methodological biases toward under-estimation were overcome.

5 REFERENCES⁵

- Agnew, D. and G.P. Kirkwood. 2002. A statistical method for analysing the extent of IUU fishing in CCAMLR waters: application to Subarea 48.3. CCAMLR Document WG-FSA-02/4.
- Ainsworth, C.H. and T.J. Pitcher. 2005. Estimating illegal, unreported and unregulated catch in British Columbia's marine fisheries. *Fisheries Research* **75**: 40-55.
- Asahi Shinbun. 2006a. ナマコ盗難・密漁頻発 (Sea cucumber theft and illegal fishing a frequent occurrence). 20 September 2006. Accessed on-line at http://mytown.asahi.com/hokkaido/news.php?k_id=01000390609200001
- Asahi Shinbun. 2006b. 絶えない「筋子」狙いのサケ密漁 (The illegal take of salmon for sujiko is not dying out). 28 September 2006. Accessed on-line at http://mytown.asahi.com/hokkaido/news.php?k_id=01000390610030003
- Asahi Shinbun. 2007. ナマコ大量密漁グループ 公判進む (Public trial of large-scale sea cucumber illegal fishing group continues). Asahi Shinbun, 27 March 2007. Accessed on-line at http://mytown.asahi.com/aomori/news.php?k_id=0200140703270001
- Clarke, S. 2007. Trading tails: linkages between Russian salmon fisheries and East Asian markets. TRAFFIC East Asia, Hong Kong. (in press).
- FAO (Food and Agriculture Organization). (2007b). International Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing, National Plans of Action. Accessed online at http://www.fao.org/fi/website/FIRetrieveAction.do?dom=org&xml=ipoa_IUU.xml
- Hokkaido Government. 2006. 取締の重点的取組：漁業秩序の確立について (Primary issues with enforcement: establishing a fisheries control system). Accessed on-line at <http://www.pref.hokkaido.lg.jp/sr/ggk/ggs/new/torisimari/titsujo.htm>
- Japan Coast Guard. 2005a. 平成 16 年の海上犯罪取り締り状況 (The control situation regarding crimes at sea in 2004). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/kouhou/h17/k20050223-2/index.html>
- Japan Coast Guard. 2005b. 海上保安レポート 2005 (Japan Coast Guard Annual Report 2005). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/books/index.htm>
- Japan Coast Guard. 2006a. 平成 17 年の海上犯罪取り締り状況 (The control situation regarding crimes at sea in 2005). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/kouhou/h18/k20060222/h17-torishimari.pdf>
- Japan Coast Guard. 2006b. 海上保安統計年報 - 平成 16 年 1 月 1 日 - 平成 16 年 12 月 31 日 (Coast Guard Statistical Yearbook for 2004). Accessed on line at <http://www.kaiho.mlit.go.jp/info/tokei/index.htm>

⁵ Non-English language documents are cited in bilingual format; all other documents are in English. Translations into English do not necessarily represent official names or titles.

Japan Coast Guard. 2006c. 海上保安レポート 2006 (Japan Coast Guard Annual Report 2006). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/books/index.htm>

Japan Coast Guard. 2007a. 平成 18 年の海上犯罪取り締り状況 (The control situation regarding crimes at sea in 2006). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/kouhou/h19/k20070314/h070314.pdf>

Japan Coast Guard. 2007b. 海上保安統計年報 - 平成 17 年 1 月 1 日-平成 17 年 12 月 31 日 (Coast Guard Statistical Yearbook for 2005). Accessed on line at <http://www.kaiho.mlit.go.jp/info/tokei/index.htm>

Japan Coast Guard. 2007c. 海上保安レポート 2007 (Japan Coast Guard Annual Report 2007). Accessed on-line at <http://www.kaiho.mlit.go.jp/info/books/index.htm>

Japan Coast Guard. 2007d. 日本の領海等概念図 (Japan's Sea Boundary and other area General Map). Accessed on-line at http://www1.kaiho.mlit.go.jp/JODC/ryokai/ryokai_setsuzoku.html

Japan Coast Guard. 2007e. Information on enforcement vessels and aircraft compiled from Coast District websites accessed on-line at <http://www.kaiho.mlit.go.jp>

Japan Fisheries Agency. (undated). 水産庁-漁業取締りの現状 (Japan Fisheries Agency – the Present Situation concerning Fishery Enforcement). Japan Fisheries Agency, Tokyo.

Japan Fisheries Agency. 2005a. 平成 16 年の水産庁による外国漁船取締実績について-プレスリリース (Press Release regarding enforcement activities by the Fisheries Agency involving foreign fishing vessels for 2004), 19 January 2005. Accessed on-line at <http://www.jfa.maff.go.jp/release/17/17.0127.01.htm>

Japan Fisheries Agency. 2005b. 水産庁漁業取締船に対する韓国底刺網漁船の衝突事件について (Press Release regarding the collision incident between the Fisheries Agency patrol vessel and a Korean bottom gill net vessel on 10 April 2004), 13 April 2004. Accessed on-line at <http://www.jfa.maff.go.jp/release/16.0412.04.htm>

Japan Fisheries Agency. 2006a. 平成 17 年の水産庁による外国漁船取締実績について-プレスリリース (Press Release regarding enforcement activities by the Fisheries Agency involving foreign fishing vessels for 2005), 18 January 2006. Accessed on-line at <http://www.jfa.maff.go.jp/release/18/012001-01.htm>

Japan Fisheries Agency. 2006b. 日口漁業委員会第 2 3 回会議の結果について (Results of the 23rd Japan-Russian meeting of fisheries delegates), 14 December 2006. Accessed on-line at <http://www.jfa.maff.go.jp/release/18/121402.htm>

Japan Fisheries Agency. 2007a. 漁業関係法令に係る水産庁、都道府県の検挙実績及び海上保安庁の送致実績 (Enforcement results for the Fisheries Agency, prefectural authorities and the Coast Guard, 2001-2004). Unpublished data.

Japan Fisheries Agency. 2007b. 平成18年の水産庁による外国漁船取締実績について-プレスリリース (Press Release regarding enforcement activities by the Fisheries Agency involving foreign fishing vessels for 2006), 17 January 2007. Accessed on-line at <http://www.jfa.maff.go.jp/release/index.html>

Japan Fisheries Agency. 2007c. 第8回日中漁業共同委員会の結果について (Results of the 8th Japan-China meeting of cooperative fisheries delegates, 19 January 2007. Accessed on-line at <http://www.jfa.maff.go.jp/release/19/011902.htm>

Japan Fisheries Agency. 2007d. 水産庁漁業取締関係資料 (Japan Fisheries Agency Fisheries Enforcement Data). Unpublished data.

Japan Fisheries Agency. 2007e. 国際漁業資源の現況 (平成17年度) (

Japan Ministry of Foreign Affairs. 1998. Press Conference 25 September 1998: Details of the Japan Republic of Korea fisheries agreement. Accessed on-line at <http://www.mofa.go.jp/announce/press/1998/9/925.html>

Japan Times. 2006. Tsushima rejects claim isles belong to South Korea. 29 September 2006. Accessed on-line at <http://search.japantimes.co.jp/cgi-bin/mn20060929a5.html>

Japan Times. 2007a. Illegal luxury seafood catches to draw harsher punishment. 25 February 2007. Accessed on-line at http://www.illegal-fishing.info/item_single.php?item=news&item_id=1342&approach_id=

Japan Times. 2007b. Japan takes Russia to maritime court. 7 July 2007. Accessed on-line at <http://search.japantimes.co.jp/mail/mn20070707b2.html>

MAFF (Ministry of Agriculture, Forestry and Fisheries). 2007. 漁業・養殖業水産統計年報 (Fisheries and Aquaculture Production Statistics Yearbook). Accessed on-line at <http://www.tdb.maff.go.jp/toukei/a02smenu?TouID=C001&TokKbn=B>.

MRAG (Marine Resources Assessment Group). 2005. Review of Impacts of Illegal, Unreported and Unregulated Fishing on Developing Countries (Final Report). MRAG, London. Accessed online at http://www.illegal-fishing.info/item_single.php?item=document&item_id=28&approach_id=

NDF (Norway Directorate of Fisheries). 2005. Status Report for 2004 – Russian cod fishing/transshipment at sea. Accessed on-line at www.fiskeridir.no/fiskeridir/content/download/5375/42831/file/russian_cod_fishing.pdf

NDF (Norway Directorate of Fisheries). 2007. Russian Fishing of cod and haddock in 2006 – transshipment at sea. Status Report, March 2007.

- Nishinippon Shinbun (2005). 韓国はえ縄漁船を拿捕 (Korean longliner seized). 西日本新聞 (Nishinippon Shinbun), 10 March 2005. Accessed on-line at <http://d.hatena.ne.jp/unkotamezou/20050310>.
- Nishiuchi, S. 2003. A study on size-selectivity of hair crab pots. 北水試研報 (Sci. Rep. Hokkaido Fish. Exp. Stn) 64, 1-103.
- Payne, A.G., D.J. Agnew and A. Brandão. 2005. Preliminary assessment of the Falklands Patagonian toothfish (*Dissostichus eleginoides*) population: use of recruitment indices and the estimation of unreported catches. *Fisheries Research* 76: 344-358.
- Pilling, D. 2006. Japan Russia territorial dispute escalates. Financial Times, 16 August 2006.
- Rosenberg, D. 2005. Managing the Resources of the China Seas: China's Bilateral Fisheries Agreements with Japan, South Korea, and Vietnam. Accessed on-line at <http://www.zmag.org/content/showarticle.cfm?ItemID=8205>.
- Ruddle, K. 1987. Administration and conflict management in Japanese coastal fisheries. FAO Fisheries Technical Paper 273, FAO, Rome. 93 p.
- Sankei Shinbun. 2006. 違法操業で韓国人船長逮捕 (Korean captain arrested for illegal operations), Sankei Shinbun (産経新聞), 4 January 2006. Accessed on-line at <http://news18-2ch-news4plus.blogspot.com/2006/01/0104.html>
- Sanyo Shinbun (2006). 水産庁が韓国漁船を拿捕 - 操業日誌に過少記載 (Fisheries Agency seizes Korean fishing vessel – catch under-reported in logbook). 三陽新聞(Sanyo Shinbun), 8 May 2006. Accessed on-line at <http://www.sanyo.oni.co.jp/newspack/20060508/20060508010045491.html>.
- Shimizu, Takamichi. 1996. 東京湾のマアナゴ資源について-I漁業の実態と資源管理に関する予察 (On the Resource of White-spotted Conger *Astroconger myriaster* (Brevoort) in Tokyo Bay-I The State of Fisheries and the Preliminary Report for Resource Management. 神水研研報第1号 (Kanagawa Fisheries Research Bulletin, No. 1). Accessed on-line at <http://www.agri.pref.kanagawa.jp/suisoken/pdf/SUISKN/suiskn1-02.pdf>
- Shotokumar (2007). Company website. Accessed on-line at <http://www.shotokumar.com>
- Tokyo Central Wholesale Market. (2007). Market Statistical Information (市場統計情報). Accessed on-line at <http://www.shijou-tokei.metro.tokyo.jp/asp.htm>.
- TQCSI. 2007. Kyoto Danish Seine Fishery Federation – Public Comment Draft Assessment Report [in support of certification to the Marine Stewardship Council standard for sustainable fisheries]. Accessed on-line at <http://eng.msc.org/>
- Yomiuri Shinbun. 2007. アサリ 密漁、地道な摘発。。。福岡県警察大牟田署 (Fukuoka prefectural police steadily exposing littleneck clam illegal fishing). Yomiuri Shinbun, 1 February 2007. Accessed on-line at http://www.kyushu.yomiuri.co.jp/magazine/ru/0702/ru_702_070201.html

Annex A. IUU fishing incidents involving foreign-flagged vessels reported by the Fisheries Agency in individual press releases, 2004-2006. All press releases were accessed on-line at <http://www.jfa.maff.go.jp>; additional information was sourced from press accounts as noted. See legend below table for violation codes. See Figure 1 for the location of each incident.

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
1	2004-1	Korea	na	na	na	na	No press release
2	2004-01-30	Korea	303 ユダル	#303 Yudaru	Squid jig	M	
3	2004-01-29	Korea	307 ソンチヨン	#307 Sonchon	Longline	G	Found gear; then found vessel nearby.
4	2004-02-09	Korea	チンヨン	Chinyon	Squid jig	E,M	Permit not available, fish species and weights not recorded; fish hold blueprint not available
5	2004-02-11	Korea	na	na	Small-sized trawl	A	Dumped gear and nipped across border (not caught)
6	2004-02-12	Korea	503 チョンイル	#503 Chon-il	Longline	E	Fish species and weights not recorded
7	2004-02-16	Korea	307 ソンチヨン	#307 Sonchon	Longline	H	Previous violation by same vessels on January 29th
8	2004-02-22	Taiwan	金順豊 (ジンスウンフォン) 66号	#Jinsunfon	Longline	A	Were catching sharks and shiira (<i>Coryphaena hippurus</i>)
9	2004-03-03	Korea	201 テグアン	#201 Teguman	Longline	A	
10	2004-03-18	Korea	1 テヨン	#1 Teyon	Large-sized trawl	E	Logbook entries not by species
11	2004-03-18	Russia	クリリ	Kurile	Large-sized freezer trawler	F	Catch number and weight not recorded

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
12	2004-04-16	China	チオタイユイ 8070	Chotaiyui #8070	Trawl	F	5-day catch of shrimp and crab was under-recorded by 546 kg
13	2004-05-27	Taiwan	金日進 (チンリチン) 116号	Chinrichin #116	Gill net	A	Catching kinmedai (<i>Beryx splendens</i>)
14	2004-06-06	Korea	707 スンヒョン	#707 Sunhyon	Longline	E	Logbook entries not by species
15	2004-06-15	Taiwan	明連發 33 號 (ミンレンファ 33 ハオ)	Minrenfa #33	Longline	A	
16	2004-06-24	Taiwan	新全福 102 號 (シンチュエンフ 102 号)	Shinchuenfu #102	Longline	A	Longlining without a permit
17	2004-06-27	Korea	702 トクヤン	#702 Tokuyan	Longline	E	Logbook entries not by species
18	2004-06-30	Korea	707 クムヤン	#707 Kumuyan	Longline	E	Logbook entries not by species
19	2004-07-11	Korea	109 テソン	#109 Teson	Longline	E	Logbook entries not by species
20	2004-07-29	Taiwan	漁満載 (ユイマンツァイ)	Yuimantsai	Longline	A	

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
21	2004-10-18	Korea	2サムヨン	#2 Samuyon	Longline	E	Logbook entries not by species
22	2004-10-25	Russia	カピタン・クズネツォフ (Капитан Кузнецов)	Kapitan Kuznetsov	Large-sized freezer trawler	C	Found processing bycatch which should be discarded according to their permit
23	2004-11-04	Taiwan	フォンツンイ 32号	Fontsun #32	Large-sized trawler	A	Caught with 1959kg hiratsume (crab <i>Ovalipes punctatus</i>) and 162kg maaji (<i>Trachurus trachurus</i>)
24	2004-11-06	Cambodia	リラッキー	Rirakki	Reefer/transport vessel	A	caught loading akaika (<i>Ommastrephes bartramii</i>)
25	2004-11-06	China	プユ 6008	Pyu #6008	Squid jig	A,E	
26	2004-11-06	China	ジョウドンユエン 821	Shodonyuen #821	Squid jig	A,E	
27	2004-11-20	China	ジャダイユエンユ 828	Jiadaiyuenyu #828	Squid jig	C,E	Caught using a drift net when not permitted to do so
28	2004-11-22	Taiwan	イヨンフォン 67号	Yiyongfung #67	Large-sized trawler	A	Caught with 808 kg of HIRATSUME (crab <i>Ovalipes punctatus</i>) and 306 kg of MAAJI (<i>Trachurus trachurus</i>)
29	2004-11-22	China	ジョウシュンユイ 2001	Jiushunyui #2001	Squid Jig	E	Set start and end times not recorded
30	2005-01-17	Korea	918 ソングァン	#918 Songuan	Longliner	G	Found in a prohibited area with illegal gear
31	2005-01-21	Korea	2003 デジン	#2003 Dejin	Longliner	M	

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
32	2005-02-05	Korea	21 ヨンギヨン	#21 Yongyon	Eel Trap	A	
33	2005-02-16	Korea	38 カンドン	#38 Kandon	Eel Trap	I, A	
34	2005-02-22	Taiwan	金福漁陸拾陸號 (チンフウユイ 66 号)	Chinfuyui #66	Longline	A	
35	2005-03-09	Korea	901 ドンソン	#901 Donson	Longline	E, F	Violation involved under-reporting of TACHIHO (largehead hairtail, <i>Trichiurus lepturus</i>) ⁶
36	2005-04-14	Korea	303 チョンイル	#303 Chon-il	Longline	E, F	
37	2005-04-24	China	チオリンユイ 23681	Chorinyui #23681	Trawl	K, J, L	
38	2005-05-12	Taiwan	永鴻財 2 號 (ヨンホンツアイ 2ハオ)	Yonhontsai #2	Longline	A	
39	2005-05-14	Korea	337 デチヨン	#337 Dechon	Eel Trap	A	
40	2005-05-26	Taiwan	載億漁 1 號 (ツアイイ)	Tsai Iyui #1	Longline	A	

⁶ Source of details is Nishinippon Shinbun (2005).

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
			ユイ 1 ハオ)				
41	2005-07-02	Korea	7 ボムヤン	#7 Bomuyan	Crab Trap	A	
42	2005-10-02	Taiwan	新凌波 8 號 (シンリンポ 86 ハオ)	Shinrinpo #86	Longline	A	
43	2005-10-15	Korea	7 プギョン	#7 Pugyon	Squid Jig	G	
44	2005-10-25	Taiwan	曾金順 168 號	Tseng Jin Shun #168	Longline	A,N	
45	2005-11-20	China	チヨリンユイ 23675	Chonrinyui #23675	Trawl	J,F	
46	2006-01-03	Korea	333 ギプン	#333 Gipun	Longline	G	Catching tachiuo (largehead hairtail, <i>Trichiurus lepturus</i>) ⁷
47	2006-01-28	Korea	トンヤン 77	Tonyan #77	Squid Jig	C,F	
48	2006-02-02	Korea	5 テチョン	#5 Techon	Squid Jig	B,M	
49	2006-03-11	Taiwan	シントンチユエン 68 ハオ	Shintonchuen #68	Longline	A	
50	2006-05-08	Korea	102 グムジョン	#102 Gumujon	Pole and Line	F	Found with 1075 kg of largehead hairtail (<i>Trichiurus lepturus</i>) but logbook recorded only 430 kg ⁸

⁷ Source of details is Sankei Shinbun (2006).

⁸ Source of details is Sanyo Shinbun (2006).

Incident Number	Date	Flag	Vessel Name (as given)	Vessel Name (romanized)	Type of Fishing	Violation Code	Details
51	2006-05-14	Korea	2002 ジュンソン	#2002 Junson	Longline	F	
52	2006-06-24	Korea	103 コグム	#103 Kogumu	Longline	E, F	
53	2006-08-27	Korea	903 オデ	#903 Ode	Squid Jig	C, F	Actual catch was 18 t but only 4.5 t was recorded in logbook
54	2006-09-03	Korea	13 スオ	#13 Suo	Squid Jig	A	
55	2006-12-13	China	チオリンユイ 23615	Chorinyui #23615	Trawl	A, D	

Violation legend:

- | | | |
|----|-------------------|---|
| A. | 許可証不備付罪・無許可操業罪 | no permit |
| B. | 許可不表示罪 | permit not displayed |
| C. | 制限又は条件違反 | violation of permit conditions |
| D. | 操業日誌不所持 | no logbook |
| E. | 操業日誌不記載罪 | no logbook entry |
| F. | 操業日誌不実記載罪 | incorrect logbook entry |
| G. | 禁止海域内操業罪・操業水域外操業罪 | operations within a prohibited area, or outside the authorized area |
| H. | 領海侵犯操業罪 | operations trespassing across sea boundaries |
| I. | 立入検査拒否罪 | refused inspection after being found in trespass |
| J. | 船長身分証明書不保持罪 | captain had no identification papers |
| K. | 船舶の国籍を証明する書類 | no registration of the ship's nationality |
| L. | 乗組員名簿不保持罪 | no crew registry |
| M. | 船艙図面不保持罪 | unable to produce copy of the fish hold specifications |

N. 立入検査忌避、てい泊命令違反等

evasion of inspection or order to halt

Annex B. IUU fishing incidents reported by the Coast Guard in annual enforcement summary press releases and Annual Reports covering 2004-2006 (Japan Coast Guard 2005a, 2005b, 2006a, 2006c, 2007a, 2007c). See *Figure 1* for the location of each incident.

Map Key	Source	Date	Flag	Location	Violation	Gear	Species	Quantity	Value
A	JCG 2005a	Apr-04	Japan	Miyagi		Diving			
B	JCG 2005a	Nov-04	Japan	south of Sapporo			kegani (hair crab)		20M yen+
C	JCG 2005a	Nov-04	Japan	Miyagi		Diving	awabi (abalone)		
D	JCG 2005a	Jan-04	Japan	Matsuyama (West Shikoku)	w/o permit	Bottom trawl			
E	JCG 2005a	Jan-04	Japan	Iwaki (Nat'l park)		drag net (eiki ami/hiki ami)		6 boats	
F	JCG 2005a	May-04	Taiwan	Off Okinawa	EEZ	longliner			
G	JCG 2005a	Nov-04	Korea	Tsushima	EEZ	large trawler			
H	JCG 2005a	Nov-04	Korea	off Shimane	EEZ	gill netter			
I	JCG 2005a	Dec-04	Russia, Cambodia	Rebun	Transshipment; not IUU				
J	JCG 2006a	Apr-05	Japan	Hiroshima	no permit	Diving			
K	JCG 2006a	Jun-Sep 05	Japan	Otaru	Prohibited gear		awabi (abalone), namako (sea cucumber), uni (sea urchin)	9 people/26 incidents	
L	JCG 2006a	Jun-Jul 05	Japan	south of Sapporo			kegani (hair crab)	13.5+3.8t	13.5t=68Myen
M	JCG 2006a	Feb-05	Korea	Miyagi	EEZ	anago trap	anago (eel)	2 boats	

Map Key	Source	Date	Flag	Location	Violation	Gear	Species	Quantity	Value
N	JCG 2006a	Apr-05	Korea	Niigata	EEZ	anago trap	anago (eel)	2 boats	
O	JPCG 2006a	May-05	Korea	Tsushima	EEZ	anago trap			
P	JCG 2007A	Feb-06	Japan	east of Mie	Outside permitted area	purse seine		17boats in 4 groups	
Q	JCG 2007a	Jun-06	Japan	south of Sapporo		Diving	uni (sea urchin)	89 t	85M yen
R	JCG 2007a	Oct-06	Japan	south of Sapporo	no permit		black namako (sea cucumber)	19t	23M yen
S	JCG 2007	Dec-05	Taiwan	Okinawa	EEZ				
T	JCG 2007	Jul-06	Korea	Tsushima	EEZ				
U	JCG 2007	Dec-06	Korea	Tsushima	EEZ				
V	JCG 2007	Nov-06	Russia	Otaru	port call --Not IUU				
W	JCG 2006c	Aug-Oct 06	Japan	Hachinohe	closed season		Awabi (abalone)	6 people, 30x,542 kg	
X	JCG 2007c	Jan 05-Oct 06	Japan	Aomori-ken			Awabi (abalone)	4.7 tonnes	28M yen

Annex C. Number of incidents of IUU fishing activities recorded by the Japan Coast Guard (2006b) by fishing gear, Coast Guard district (see Figure 2) and violation for 2004.

District / Violation	Total	Skipjack or tuna gear	Squid gear	Offshore Trawl	Small-sized Trawl	Other Trawl	Gill Net	Boat Trawl	Purse Seine	Set Net	Weir	Dip Net	Hand Seine	Sheet Net	Diving Apparatus	Other	Foreigners
Otaru (District 1)	264		30				8								12	212	2
Shiogama (District 2)	62	2					4								2	54	
Yokohama (District 3)	283	2			1			1	1			5			8	265	
Nagoya (District 4)	118				46			20	2						4	46	
Kobe (District 5)	102				72		6	12							2	10	
Hiroshima (District 6)	220			3	118		18	13				1	16		18	33	0
Kita-Kyushu (District 7)	64		17		9		7		2				4		19	4	2
Maizuru (District 8)	63		3		2				8							50	
Niigata (District 9)	17			1	5		1	4					1			5	
Kagoshima (District 10)	40				2		3	2		1		3			5	24	
Naha (District 11)	13						2								2	8	1
Total	1,246	4	50	4	255	0	49	52	13	1	0	9	21	0	72	711	5
Violation of national fishing rights	206				1										10	195	
Operating without a permit	114		4		27		19	15		1			2		33	13	
Violation of operational limits	112		10		67		6	3					7		3	16	
Boundary or time violation	113	2	6	1	55		9	24	7			1	4			4	
Gear or method of capture violation	48				40		3								1	4	
Other operational violation	9	1			6											2	
Violation of permit conditions	131	1	25	2	37		7	9	6				4		6	34	
Anchoring violation																0	
Evasion of inspection	2				1								1			0	
Illegal possession/sale	257						2					6			6	243	
Other	233				17							2	2		12	200	
Violation of foreign fishing law	5																
Formal crime	16		5	1	4		3	1					1		1		
Total	1,246	4	50	4	255	0	49	52	13	1	0	9	21	0	72	711	0

Annex D. Number of incidents of IUU fishing activities recorded by the Japan Coast Guard (2007b) by fishing gear, Coast Guard district and violation for 2005.

District / Violation	Total	Skipjack or tuna gear	Squid gear	Offshore Trawl	Small-sized Trawl	Other Trawl	Gill Net	Boat Trawl	Purse Seine	Set Net	Weir	Dip Net	Hand Seine	Sheet Net	Diving Apparatus	Other	Foreigners
Otaru (District 1)	242						12								2	227	1
Shiogama (District 2)	73				3	1	6								4	57	2
Yokohama (District 3)	360	1				29	1								10	318	1
Nagoya (District 4)	141				99		1	30			2	2			3	4	
Kobe (District 5)	109			1	55		18	7				2			13	13	
Hiroshima (District 6)	317				159		16	39				7	5	5	17	69	
Kita-Kyushu (District 7)	61		10	1	4		13		2			4	5	2	1	15	4
Maizuru (District 8)	110		3		5				2						6	93	1
Niigata (District 9)	24		2		14								2			4	2
Kagoshima (District 10)	30	2					1		2						2	23	
Naha (District 11)	18	2													3	10	3
Total	1,485	5	15	2	339	30	68	76	6	0	2	15	12	7	61	833	14
Violation of national fishing rights	231				3										6	222	
Operating without a permit	178	3	3	1	62	1	18	28			2	1	4	1	24	30	
Violation of operational limits	152	1	1		112		1	6	1				3	1	9	17	
Boundary or time violation	169	1	1	1	91		11	34	2				3	4	5	16	
Gear or method of capture violation	34				12		1								4	17	
Other operational violation	22		1		9		1								2	9	
Violation of permit conditions	94		6		21		19	4	2			4	1	1	6	30	
Anchoring violation	1								1								
Evasion of inspection	11				3										1	3	4
Illegal possession/sale	274					29	7	2				2			1	233	
Other	275				14		4					7			3	247	
Violation of foreign fishing law	10																10
Formal crime	34		3		12		6	2				1	1			9	
Total	1,485	5	15	2	339	30	68	76	6	0	2	15	12	7	61	833	14

Annex E. Summary table (in IUU Monitoring Network format) for minimum overall assessment for all species in the Japanese EEZ (includes estimates in *Annex F*).

Type of Effect	Illegal
Target Species	All species included (prime targets include abalone, sea cucumber, sea urchin, hair crab, snow crab, hairtail and conger eel).
Time/Period	Data from 2004-2006; estimates presented are annual average (current) values
Area/Country/Region	Japanese EEZ
Gear of Fleet	Varies (main gear types implicated are diving, traps and longlines)
Vessel Number	Some vessel numbers listed in <i>Annex A</i> .
Estimate of IUU Catch Quantity	4,718 t
IUU Catch Quantity as a percentage of Total Catch	0.01%
Estimate of IUU Catch Value	4.0 billion yen (33.3 million USD)
IUU Catch Value as a percentage of Total Catch Value	0.4%
Days equivalent	na
National Catch Quantity	3.6 million t
National Catch Value	870 billion yen (7.25 billion USD)
Method used to Estimate IUU Catch	Used available incident data and assumptions to extrapolate catch quantities and values for incidents which were known to occur but insufficient published details were available.
Bycatch/Ecosystem/Habitat Impacts	Not known but expected to be of lower concern than target species impacts
Impact on Target Species Population	No details are available on the relative impact of illegal catch on target stocks, but many target species have been overfished and continued illegal take impedes their recovery.
Quality of Data (High or Low)	Most of the estimate is based on low quality data. Also, undetected incidents have not been taken into account.
Description of Incidents	See <i>Annexes A-D</i> and text.
Information Sources	Government reports, news articles and other references (see Section 5).
Vessel or Importer/Exporter Details	na
Successful IUU mitigation strategies	Public education, strengthening of penalties, improved relations with countries having adjoining territorial sea claims (excluding Russia), self-imposed compliance incentives by fisheries cooperatives. The degree of success of these strategies is unknown.
Recent IUU trends	Diversification of operation types, and gang-related operations are a concern. Foreign vessel incidents decreasing due to improved international relations (excluding Russia) and increased vigilance. Domestic incidents involving luxury seafoods for the China market, e.g. sea cucumber and abalone, appear to be increasing.
Flag states implicated in IUU Activities	Mainly domestic. Foreign-flagged vessels are mainly Korean and Taiwanese in 2004-2006.
Identify knowledge gaps	Lack of information on catch quantity and species for most incidents. Lack of information which could be used to estimate undetected events.

Annex F. Summary table (in IUU Monitoring Network format) for minimum assessment for four high value species in the Japanese EEZ.

Type of Effect	Illegal
Target Species	Abalone, sea cucumber, sea urchin, hair crab
Time/Period	Data from 2004-2006; estimates presented are annual average (current) values
Area/Country/Region	Japanese EEZ (most illegal take recorded off Hokkaido)
Gear of Fleet	Diving, traps
Vessel Number	na
Estimate of IUU Catch Quantity	2.6 t (abalone), 127 t (sea cucumber), 89 t (sea urchin), 17.3 (hair crab)
IUU Catch Quantity as a percentage of Total Catch	0.1% (abalone), 1.5% (sea cucumber), 0.7% (sea urchin), 0.7% (hair crab)
Estimate of IUU Catch Value	15.4 million yen / 130,000 USD (abalone), 180 million yen / 1.5 million USD (sea cucumber), 85 million yen / 710,000 USD (sea urchin), 87 million yen / 720,000 USD (hair crab)
IUU Catch Value as a percentage of Total Catch Value	0.1% (abalone), 1.5% (sea cucumber), 0.7% (sea urchin), 0.7% (hair crab)
Days equivalent	na
National Catch Quantity	1,996 t (abalone), 9,268 t (sea cucumber), 12,716 t (sea urchin), 2,500 t (hair crab)
National Catch Value	11,976 million yen / 99.8 million USD (abalone), 11,122 million yen / 92.68 million USD (sea cucumber), 12,716 million yen / 105.97 million USD (sea urchin), 12,500 million yen / 104.17 million USD.
Method used to Estimate IUU Catch	Used available high-quality incident data (only) to calculate annual values for 2004-2006. Estimate is based on the highest of these three values.
Bycatch/Ecosystem/Habitat Impacts	Not known but expected to be of lower concern than target species impacts.
Impact on Target Species Population	No details are available on the relative impact of illegal catch on target stocks, but many target species have been overfished and continued illegal take impedes their recovery.
Quality of Data (High or Low)	The data which were used were all high quality data; incidents with low quality data were not included nor were undetected incidents.
Description of Incidents	See Table 3.
Information Sources	Government reports, news articles and other references (see Section 5).
Vessel or Importer/Exporter Details	na
Successful IUU mitigation strategies	Public education and strengthening of penalties. The degree of success of these strategies is unknown.
Recent IUU trends	Diversification of operation types, and gang-related operations are a concern. Domestic incidents involving luxury seafoods for the China market, e.g. sea cucumber and abalone, appear to be increasing.
Flag states implicated in IUU Activities	All domestic.
Identify knowledge gaps	Incidents with low quality data were not included nor were undetected incidents.