Ministry for Food, Agriculture, Forestry and Fisheries



National Plan of Action for the Conservation and Management of Sharks

The Republic of Korea

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# I. Introduction

A number of shark species are facing real threats of overexploitation due to high levels of direct and indirect fishing pressure on the species around the world's oceans. Accordingly, there are growing concerns over the upward trend in shark catch and its possible impacts on the related ecosystems. To address the situation, many improvements need to be done in terms of data and information on shark stocks, catches and trade; conservation and management measures; and the development and application of bycatch mitigation technologies. However, the current tools at hand--expertise, financial resources and the public's awareness--are not sufficient to make such improvements. Against this backdrop, this *National Plan of Action for the Conservation and Management of Sharks* has been designed to identify shortcomings and to set priorities for necessary changes.

International organizations including the Food and Agriculture Organization (FAO), Regional Fisheries Management Organizations or Arrangements (RFMO/As) and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) have conservation and management plans and measures in place to reduce negative impacts which various shark fishing activities may have on the targeted shark species and their related ecosystems and to promote the maximum utilization of sharks that have already been caught.

Along the same lines, it is worth noting that "the United Nations Food and Agriculture Organization's International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)" was adopted at the 23rd Session of the Committee on Fisheries (COFI) of FAO, laying the foundation for ensuring the conservation and management of sharks and their long-term, sustainable use. The IPOA-Sharks calls on each state to voluntarily establish, implement and monitor their own national Shark-plans. Also, FAO, at the 29<sup>th</sup> Plenary Session of COFI in 2011, adopted "the International Guidelines on Bycatch Management and Reduction of Discards," encouraging the members to manage bycatch and to mitigate discards.

Inspired by the initiatives taken by FAO and recognizing the need to manage and conserve sharks<sup>1</sup>) (sharks, rays and skates), the Republic of Korea established its *National Plan of Action for the Conservation and Management of Sharks* (NPOA-Sharks) in August, 2011. This NPOA-Sharks aims to set the general direction for the conservation and management of sharks and is subject to review at a regular interval and subsequent amendments.

<sup>&</sup>lt;sup>1)</sup> Paragraph 11 of FAO's IPOA-Sharks says the term "shark" is taken to include all species of sharks, skates and rays and chimeras (Class Chondrichthyes).

# II. Current State of Shark Management in Korea

## 2.1. Spatial Distribution of Sharks and Related Fisheries

#### 2.1.1 Sharks

Korea's EEZ is home to around 40 shark species in 8 orders:16 are inhabiting in the eastern waters, 18 are in the western waters, 39 are in the southern waters including the waters around Jeju Island, and 12 are distributed around all three areas--east, west and south. This distribution pattern implies that most recorded shark species inhabit in the southern waters of Korea. These species include mako sharks (*Isurus oxyrinchus*), great white sharks (*Carcharodon carcharias*), blue sharks (*Prionace glauca*), hammerhead sharks (*Shpyrna zygaena*), banded houndsharks (*Triakis scyllium*), cloudy catsharks (*Scyliorhinus torazame*), starspotted sharks (*Mustelus manazo*), spiny dogfish (*Squalus acanthias*) and thresher sharks (*Alopias pelagicus*). <Refer to Figure 1, Appendix 1>

There is no fishery targeting sharks for both commercial (meat and fins) and non-commercial use in Korea's waters. In the past, some small-scale fishers used to target sharks for food, using reels and lines in the waters around Pohang in northern Gyeongsang province and Bogil Island in southern Joella province, but the impact of these subsistence fisheries on shark stocks was insignificant. The areas where shark bycatches occur relatively frequently are the waters near southern Jeolla province and northern and southern Gyeongsang province, usually by purse seiners, anchovy trawlers, small gill nets and large trawlers.

2008		2009			2010			
gear type	catch (mt)	rates	gear type	gear type catch (mt) rates gear type c		catch (mt)	rates	
purse seiner	235	18%	purse seiner	241	20%	purse seiner	160	14%
anchovy trawler	150	12%	anchovy trawl	116	10%	anchovy trawler	157	14%
small gill net	69	6%	small gill net	74	6%	small gill net	71	6%
offshore pole and line	61	5%	large trawler	62	5%	large trawler	60	5%
large trawler	57	5%	large gill net	60	5%	offshore gill net	59	5%

(Table 1) Gear-specific Sharks Bycatch Rates (in tonnage and percentage) (EEZ)

source: the Ministry for Food, Agriculture, Forestry and Fisheries (catch statistics)



Korea's distant water fisheries do not target shark species. However, sharks are sometimes caught by distant water tuna longliners and purse seiners as bycatch. In the Western and Central Pacific Ocean, blue sharks and porbeagle sharks are the major species incidentally caught by Korean-flagged longliners fishing for tuna. Thresher sharks and hammerhead sharks are also caught from time to time but not as often as blue sharks and porbeagle sharks. In the Indian Ocean, blue sharks are caught by tuna longliners as bycatch and in the Atlantic, blue sharks and mako sharks are incidentally caught.



(Figure 1) Shark species known to inhabit in the EEZ of Korea

#### 2.1.2 Skates

Korea's EEZ is home to around 27 species in 8 families of skates and rays. Among those rays and skates, the mottled skates (*Raja pulchra, Rajiformes*) are commercially sought-after species and are being sold at high prices in the market. This species is known to be widely distributed in Korea's southern and western waters, the East China Sea and the southern waters of Japan's mid-south region. The waters near Incheon in Gyeong-gi province and northern and southern Jeolla provinces are the areas where 99 percent of skates (mostly mottled skates) are caught <Figure 2>, usually by small gill nets, large gill nets and large pair bottom trawlers <Table 2>.

2008			2009			2010			
gear type	catch (mt)	rates	gear type	catch (mt)	rates	gear type	catch (mt)	rates	
small gill net	547	45%	large gill net	912	28%	large gill net	1,903	46%	
large pair bottom trawler	191	16%	small gill net	876	27%	small gill net	1,007	24%	
large longliner	139	12%	large longliner	822	25%	coastal composite gears	503	12%	
large stow net	92	8%	large pair bottom trawler	182	6%	large stow net	311	8%	
improved small stow net	85	7%	coastal composite gears	182	6%	improved small stow net	262	6%	

(Table 2) Gear-specific Skate	s ( <i>Rajiformes</i> ) Bycatch	n Rates (in tonnage and	l percentage) (EEZ)
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source: the Ministry for Food, Agriculture, Forestry and Fisheries (catch statistics)

#### 2.1.3 Rays

In the Korean EEZ, rays are often caught in the southern coastal waters <Figure 2>, usually by small gill nets, coastal composit gears and large danish seiners.



2008			2009			2010		
gear type	catch (mt)	rates	gear type	catch (mt)	rates	gear type	catch (mt)	rates
small gill net	713	32%	coastal composite gears	686	26%	coastal composite gears	538	27%
coastal composite gears	494	22%	small gill net	666	26%	small gill net	470	23%
large gill net	323	14%	large gill net	261	10%	large gill net	329	16%
large danish seiner	145	6%	large stow net	181	7%	large danish seiner	168	8%

(Table 3) Gear-specific Rays (Batiformes) Bycatch Rates (in tonnage and percentage) (EEZ)

source: the Ministry for Food, Agriculture, Forestry and Fisheries (catch statistics)



(Figure 2) Fishing Grounds for Skates

(Figure 3) Fishing Grounds for Rays

# 2.2. Shark Catch Statistics(mt)

Species		2005	2006	2007	2008	2009	2010
Sharks	Distant Waters	917	1,054	949	904	974	1,330
	EEZ	259	208	227	245	341	525
Skates	Distant Waters	1,173	907	1,301	797	1,142	952
	EEZ	255	392	375	1,2082)	3,254	4,854
Rays	Distant Waters	5,058	5,154	4,778	3,450	4,459	4,081
	EEZ	2,446	3,126	3,996	2,236	2,593	2,021
Total		10,108	10,841	11,626	8,840	12,763	13,763

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(Table 4) Shark Bycatch in Tonnage per Annum

source: the Ministry for Food, Agriculture, Forestry and Fisheries (catch statistics)

<sup>&</sup>lt;sup>2)</sup> Skate catches have sharply risen since 2008 but it does not mean that the actual catches saw such a great increase. Rather, it was because skates had been classified as rays and thus their catches had been included in ray catches until 2008.



# 2.3. Domestic and International Trade of Sharks

		Exp	port	Import		
Species	Year	amount (mt)	value (USD 1,000)	amount (mt)	value (USD 1,000)	
	2006	99	585	4,073	7,570	
	2007	543	787	3,432	7,166	
Sharks*	2008	605	1,660	3,497	10,381	
	2009	1,605	3,897	3,550	8,950	
	2010	1,259	4,883	2,626	7,348	
	2006	_*	-	11,201	26,386	
	2007	-	-	10,914	35,421	
Skates	2008	-	-	8,903	31,904	
	2009	-	-	8,737	24,204	
	2010	8	25	9,151	28,831	
	2006	149	196	9,200	16,377	
	2007	60	83	10,318	22,652	
Rays	2008	4	11	8,040	19,356	
	2009	9	8	8,779	19,200	
	2010	55	101	8,706	21,180	

(Table 5) Shark Export and Import per Annum

source: the Ministry for Food, Agriculture, Forestry and Fisheries (catch statistics)

- : less than one ton in catch weight, less than USD1,000 in value

\* sharks include spiny dogfish and others (refrigerated, frozen), shark fins and shark liver oil under HSK Code.

Sharks incidentally caught in the EEZ waters are usually sold in markets in Pohang in northern Gyeongsang province, Wando in southern Jeolla province, Seoguipo City and Jeju City in Jeju Island.

Most sharks caught as bycatch by Korea's distant water fishing fleets are exported and only a small portion of those catches is sold in the domestic market. These sharks are mainly consumed in northern Gyeongsang province as a traditional floured and pan-fried dish locally called "Jeon" and are seldom enjoyed as sashimi.

# 2.4. Management of Sharks

#### 2.4.1 EEZ Fisheries

In accordance with the Fishery Resources Management Act, the Minister for Food, Agriculture, Forestry and Fisheries (the Minister) sets up Total Allowable Catches (TACs)<sup>3</sup>) and relevant plans for certain species and/or areas when he or she deems that the stocks and/or areas need to be rebuilt and conserved. TACs and the relevant plans are subject to constant monitoring. Mayors and governors also have the authorities to establish TAC plans for species other than the ones that the Minister has already designated, considering the status and characteristics of the fisheries in the areas of their competence. However, before setting up any TAC plans, the Minister, mayors and governors should consult with stakeholders from relevant organizations and institutions and any such plans are subject to approval by the Fishery Resources Management Committee prior to implementation.

The president of the National Fisheries Research and Development Institute (NFRDI), mayors or governors are required to establish and implement plans for detailed stock/area research and assessments on a yearly basis. Authorized government officials and fishery resource monitoring agents are conducting enforcement activities including catch monitoring and boarding and inspections. Fishers, individually or collectively, are managing fishery resources in their areas of interest through various agreements and arrangements, whose objectives include the efficient management of fishery resources. Among shark species, the mottled skate is currently being managed under a TAC system.

#### 2.4.2 Distant Water Fisheries

Korea is a member of a number of regional fisheries management organizations. The Distant Water Fisheries Development Act makes it mandatory for Korean citizens to comply with conservation and management measures for sharks adopted by those organizations. The Ministry for Food, Agriculture, Forestry and Fisheries (MIFAFF) delivers the decisions adopted by RFMOs to domestic stakeholders and conducts monitoring, control and surveillance activities to ensure Korean vessels and fishers abide by conservation and management measures adopted by RFMOs. The NFRDI collects and analyzes data necessary for shark management; trains and retains observers; develops, tries and applies bycatch mitigation technologies and undertakes stock assessments. The Animal, Plant and Fisheries Quarantine

<sup>&</sup>lt;sup>3)</sup> Total Allowable Catches (TACs): A cap placed on a species limiting the number of fish that are caught within a specific period of time



and Inspection Agency (QIA) oversees the implementation of catch documentation schemes and port state measures and runs sanitation and safety tests on fish and fishery products coming into Korea's ports and airports from abroad. The Korea Overseas Fisheries Association (KOFA) collects fishery-related operational data and statistics and disseminates information regarding conservation and management measures to vessel operators so that they can be aware of what to comply with at sea and in ports. International observers go on board vessels to observe and record the vessel's fishing practices, to check their compliance with conservation and management measures and to conduct scientific research.

# III. National Plan of Action for the Conservation and Management of Sharks

## 3.1. Objectives and Scope of National Plan of Action for Sharks

#### 3.1.1 Objectives of Korea's NPOA-Sharks

Korea has established its National Plan of Action for Sharks to ensure shark resources are conserved, properly managed and sustainably used in a long term. The NPOA-Sharks also aims to mitigate negative impacts that shark catches and discards may inflict on marine ecosystems.

#### 3.1.2 Scope of Korea's NPOA-Sharks

For the purpose of Korea's National Plan of Action for the Conservation and Management of Sharks, "Shark" is taken to include sharks (*Lamniformes*), rays (*Batiformes*) and skates (*Rajiformes*) in the class of *Chondrichthye*. However, this NPOA-Sharks mainly focuses on sharks (*Lamniformes*) since skates and rays are commercially popular species in Korea and are currently being managed under various fisheries management systems including a TAC system.

"Shark catches" mean both directed and non-directed catches of sharks. The spatial scope of this NPOA-Sharks encompasses all areas (EEZ and waters outside Korea's jurisdiction) where sharks are caught by Korean-flagged vessels.

# 3.2. Data Collection, Analysis and Assessment

#### 3.2.1 Current State of Play

Shark catch data are currently being collected in accordance with the "Regulations on the Reporting of Fishing Operations in the Korean EEZ and Distant Waters (Ministerial Decree No.119)." Distant water fishing vessels provide their catch statistics on a regular basis to the NFRDI and KOFA, which then analyze those raw data and submit relevant statistics to RFMOs as required and at their request. Scientific observers are placed on board vessels to assist the crew in identifying shark species; to measure the quantity, length and weight of catches; to observe the spatial distribution and habitats of sharks; to check the effectiveness of shark bycatch mitigation devices and vessels' compliance with conservation and management measures of RFMOs. The government also requires Korean-flagged distant water purse seiners and longliners to submit their bycatch data and has provided them with a field guide book on bycatch species (published in 2008) to help them identify species on board more easily.

#### 3.2.2 Plans and Tasks for Improvement

MIFAFF has set up plans to improve shark catch-related data collected both from the distant water fisheries and EEZ fisheries. The following plans will initially be applied to the distant water fisheries and then will be subsequently extended to the EEZ fisheries.

#### 1. Improving data collection for distant water fisheries

To improve data collection from Korean-flagged distant water fishing fleets and to maintain those data more properly, the government is planning to update fishery data-related regulations and KOFA will have better data management and maintenance systems in place.

#### 2. Promoting timely provision of data from distant water fishing fleets

RFMOs are requiring their members that they provide accurate fishery-related data in a timely fashion. However, in Korea, some of the current domestic data submission regulations have yet to be updated to keep up with these requirements and thus are making it difficult for the government to provide certain data to RFMOs in a timely manner. To address this problem, the government will put shorter intervals in place for data provision.

#### 3. Improving data reporting forms

The current formats and forms for data reporting are not well-suited to extract more



detailed fishery data. To collect more accurate and finer-scale data on shark by species, the government will come up with a more improved version of reporting forms initially for the distant water fisheries and then gradually for EEZ fisheries.

#### 4. Training and retaining observers

Well-trained observers are pivotal when it comes to collecting, analyzing, assessing and monitoring shark-related data for the conservation and management purposes and checking the compliance with conservation and management measures adopted by RFMOs. With this in mind, the government has plans to enhance the current observer training programs and is finding ways to better support in retaining observers (e.g. an observer retention and training center). To collect shark-related data by species from the EEZ fisheries, fishery resource monitoring agents will be dispatched to major landing ports. Shark experts and scientists will also be tasked to identify and monitor the trends in and the distribution of shark catches by species in the EEZ waters.

#### 5. Establishing database on bycatch species

The NFRDI is planning to create a comprehensive database containing information on bycatch species including sharks, in order to obtain and utilize data on various bycatch species.

#### 6. Conducting stock and impact assessments on major shark bycatch

Using accumulated data, the government is planning to conduct stock assessments on major shark species frequently caught as bycatch by Korean-flagged distant water fishing fleets and to undertake research to identify how fishing activities are affecting individual shark species.



# 7. Research on the trends in shark trade designating separate tariff codes for each species

The government is planning to conduct research on the trends on shark trade based on shark import statistics by species and will designate separate tariff codes (HSK codes) for each shark species.

Plans and Tasks	short	term	long	term
1. Improving data collection for distant water fisheries				
2. Promoting timely provision of data from distant water fishing fleets				
3. Improving data reporting forms				
4. training and retaining observers				
5. Establishing database on bycatch species				
6. Conducting stock and impact assessments on major shark bycatch				
7. Undertaking research on the trends in shark trade and designating separate tariff codes for each species				

# 3.3. Conservation and Management Measures

#### 3.3.1 Current State of Play

The Distant Water Fisheries Development Act provides the legal ground for conservation and management of shark species which inhabit outside the Korean EEZ. Article 13 of the Act stipulates that those who conduct fishing activities outside the judicial waters of Korea must comply with fishery resources conservation measures adopted by relevant RFMOs and international institutions that govern fishing activities on high seas. Korea is a member of all five tuna RFMOs--the Inter-American Tropical Tuna Commission (IATTC), the Western and Central Pacific Fisheries Commission (WCPFC), the International Commission for the Conservation of Atlantic Tuna (ICCAT) and the Commission for Conservation of Southern Bluefin Tuna (CCSBT)--and is striving to comply with the shark conservation and management measures<sup>4</sup>) taken by those Commissions and imposing corrective sanctions on offenders of the measures pursuant to the Act.

<sup>4)</sup> WCPFC CMM 2009-04; IATTC Resolution 2005-03;ICCAT Resolution 2004-10; IOTC Resolution 2005-05, 2010-12, etc



Sharks in Korea's EEZ waters are not one of the targeted species and they are only caught as bycatch. Therefore, there are not sufficient data and statistics on their biomass, distribution patterns and individual species. The government is planning to bridge this data gap by conducting stock assessments and establishing proper management plans accordingly. Mottled skates (*Raja pulchra*) in Korea's EEZ are currently being managed under a TAC system, where the TACs were set at 200 tonnes in 2009 and 2010 respectively and 230 tonnes in 2011.

Shark species listed in the Appendices of the CITES are also listed in Ministerial Directive No. 2010-71 (June 30, 2010) of the Ministry of Environment so that the list can be publicly informed. The Wild Fauna and Flora Protection Act of Korea and its Enforcement Regulations provide that the trade of the listed sharks should be governed by the relevant provisions of the CITES Convention. Also, Article 35 of the Fishery Resources Management Act and paragraph 19 of its Enforcement Regulations give the Minister for Food, Agriculture, Forestry and Fisheries the authorities to declare certain species endangered and to prohibit the capture and harvest of those species or to make it mandatory for fishers to release the species when captured alive.

#### 3.3.2 Plans and Tasks for Improvement

Most RFMOs have shark conservation and management measures in place, with which Korean-flagged distant water fishing fleets should comply pursuant to the Distant Water Fisheries Development Act. For issues the Act is not currently covering, the government is planning to establish Ministerial Directives that deal in detail with relevant data reporting procedures, crew and observer training, checklists for monitoring and surveillance activities, the use of bycatch mitigation devices, and input/output control. Also, the government intends to establish more concrete management plans for bycatch species including sharks. It will also conduct comprehensive surveys on the trade of sharks and the management of the CITES-listed shark species<sup>5</sup>) to take additional legal and institutional measures as needed.

<sup>&</sup>lt;sup>5)</sup> Appendix I-listed (general prohibition on commercial international trade) species include all species under the family of Pristiophoridae and Appendix II-listed (international trade is allowed under certain regulations) species include Cetorhinus maximus, Carcharodon carcharias, Rhincodon typus, Pristiophorus japonicas.

Plans and Tasks	short ter	rm	medium	n term
1. Identifying the need to amend or complement domestic laws and regulations				
2. Establishing fishery management plans for sharks				
<ol> <li>Conducting surveys on shark trade and amending or complementing relevant regulations</li> </ol>				

## 3.4. Monitoring, Control and Surveillance

#### 3.4.1 Current State of Play

MIFAFF is employing a wide range of tools such as vessel monitoring systems, catch reporting, onboard observers, port state measures, high seas boarding and inspections and market measures to ensure Korean-flagged vessels' compliance with shark conservation and management measures adopted by RFMOs. When violations occur, the government takes corrective measures against offenders, including revocation and cancellation of fishing licenses, penalties, fines and confiscation of catches. Also, Korea is extending international cooperation to ensure the full compliance with conservation and management measures for sharks through RFMOs and bilateral arrangements with other states.

In the EEZ fisheries, skates are being managed and controlled in various ways pursuant to the Fishery Resources Management Act: Fishery resource monitoring agents examine catches for legitimacy; fishers make arrangements for community-based management; the implementation of allocated TACs are reported and monitored; designated government officials conduct surveillance and monitoring activities; and penalties are imposed on offenders.

#### 3.4.2 Plans and Tasks for Improvement

For more sustainable monitoring, control and surveillance (MCS) activities, the government will be tasked to do the following:

#### 1. Strengthening port state measures and improving relevant policy tools

Korea has been implementing port state measures in accordance with the Distant Water Fisheries Development Act, which incorporates relevant provisions of the 1995 UN Fish Stocks Agreement and Korea's National Plan of Action for Preventing IUU Fishing. The government is planning to train port inspectors and to supplement the Act so that



shark-related regulations can be more effectively followed and enforced. In implementing port state measures, collaboration with other states will also be more vigorously employed to step up MCS activities.

#### 2. Strengthening high seas on-board inspection

As one of the contracting parties to the UN Fish Stocks Agreement and a member of many RFMOs, Korea is intended to join the efforts in watching other vessels' compliance with internationally and regionally agreed shark conservation measures through high seas boarding and inspection. To facilitate these activities, the government is considering publishing a handbook for conducting and responding to boarding and inspection to facilitate seamless communications between inspectors and the crew.

# 3. Strengthening monitoring, control and surveillance through Vessel Monitoring Systems

The Distant Water Fisheries Development Act provides that vessels, which operate in the areas under the purview of RFMOs or fish for species managed under regional/international Conventions and Agreements, must be equipped with vessel monitoring systems.

#### 4. Strengthening monitoring, control and surveillance through observers

The government is planning to gradually increase observer coverage for Korea's distant water fishing fleets to better monitor the vessels' compliance with shark conservation and management measures and to ensure their proper implementation. Observers will be given stronger authorities by law in conducting their observation missions. To enhance MCS activities to manage the EEZ fisheries, fishery resource monitoring agents will be given more power in conducting monitoring and surveillance activities.

Plans and Tasks	short term	medium term
1. Strengthening port state measures and improving relevant institutions		
2. Strengthening high seas on-board inspection		
3. Strengthening monitoring, control and surveillance through Vessel Monitoring Systems		
4. Strengthening monitoring, control and surveillance through observers		

# 3.5. Maximizing the Utilization of Sharks Caught

#### 3.5.1 Current State of Play

In Korea, shark meat has long been a part of the country's culinary tradition and most small-sized sharks caught in the EEZ waters are not discarded but used for human consumption.

Some RFMOs are prohibiting the discard of dead sharks and requiring the weight of retained shark fins to be less than 5 percent of the weight of the carcasses on board, encouraging the full utilization of retained sharks. Korean-flagged distant waster fishing vessels are following these rules and all sharks brought to Korean ports are either exported or domestically consumed.

#### 3.5.2 Plans and Tasks for Improvement

When it comes to the full utilization of retained sharks, Korea is keeping a good record. Sharks caught as bycatch are used for human consumption and relevant conservation and management measures are being properly followed. However, there is still room for improvement in terms of public information and awareness regarding relevant regulations. Also, more and better ways to utilize retained sharks need to be explored.

Plans and Tasks	short term	medium term
Stepping up public information and awareness enhancement efforts regarding relevant regulations and exploring more ways to utilize retained sharks		

## 3.6. Research and Development

#### 3.6.1 Current State of Play

The NFRDI is putting much effort into research and development activities to improve data collection and analyses, stock assessments, development and application of new technologies such as bycatch mitigation technologies. The institute is also exploring ways to better utilize retained sharks.



#### 3.6.2 Plans and Tasks for Improvement

#### 1. Creating an expert group and recruiting and retaining dedicated workforce

The government is intended to create an expert group comprising shark taxonomists, biologists, ecologists, stock assessment experts, fishing gear engineers, data managers, policy makers, MCS managers and fishers. This group will be tasked to identify needs in shark-related research and development and take necessary steps. Also, researchers dedicated to shark-related fields will be recruited and retained to collect relevant biological data, to undertake research and to analyze the trade and market distribution of sharks.

#### 2. Technological development

The government is continuously encouraging the development of bycatch mitigation technologies. Other technologies, such as more selective gears and modified gears designed to increase the survival rates of captured sharks; biodegradable gears; and discard mitigation technologies, will also be developed and applied.

Plans and Tasks	short term	medium term
1. Creating a group of experts and recruiting and retaining dedicated workforce		
2. Technological development (e.g. bycatch mitigation technologies)		

# 3.7. Public Information and Promotion

#### 3.7.1 Current State of Play

The government is carrying out a wide spectrum of promotion activities to raise the public's awareness on the need for the conservation and management of sharks and to assist fishers to better comply with shark-related conservation and management measures. A case in point is the publication of a field guide book on bycatch species for distant water fishing fleets (2008) by the NFRDI. This pocket-sized field guide illustrates and describes species frequently caught as bycatch by Korea's distant water fishing fleets in detail thereby assisting fishers to identify various species more easily. The field guide has also been circulated around government offices, schools and public establishments with the view to enabling the general public to access to and better understand this information.

#### 3.7.2. Plans and Tasks for Improvement

The government will step up its efforts to enhance the public's awareness on this NPOA-Sharks and help fishers to follow relevant conservation and management measures without confusion and keep them updated with new or amended measures. The field guide will be revised from time to time to include newly adopted conservation and management measures and will be used to educate and train the crew and observers. New education programs will also be developed to educate public officials and the general public so that they can be fully aware of the need for the conservation, management and long-term and sustainable use of sharks.

Plans and Tasks	short term	medium term
1. Revising the field guide		
2. Developing new programs		
3. Enhancing the public's awareness		

## 3.8. International Cooperation

#### 3.8.1 Current State of Play

So far, Korea has acceded to 11 regional fisheries management organizations, including the five tuna RFMOs and currently is sitting at the discussion tables of the South Pacific Regional Fisheries Management Organization(SPRFMO) and the North Pacific Fisheries Commission (NPFC), both of which are at their nascent stages. As a responsible member of these organizations and arrangements, Korea is encouraging its vessels to fully comply with shark-related conservation and management measures and to meet data requirements. Also, the government is cooperating with other states in terms of monitoring, control and surveillance to ensure the effectiveness of those conservation and management measures.



Figure 2, Field guide on bycatch species for distant water fishing fleets



#### 3.8.2 Plans and Tasks for Improvement

The Korean government is exploring ways to reinforce international cooperation for the conservation and management of sharks. At the global level, the government is considering the implementation of capacity building projects for developing countries on shark-related conservation and management measures in collaboration with international organizations including FAO. At the regional level, the government is looking to step up cooperation with regional fisheries management organizations in terms of shark-related information exchange, scientific analyses of relevant data, and evaluation of the effectiveness of shark bycatch mitigation technologies. Cooperation with other states will also be expanded to increase the level of monitoring, control and surveillance. Joint research on shark bycatch mitigation technologies through bilateral arrangements is also on the government's to-do list.

Plans and Tasks	short term	medium term
1. Carrying out joint projects with international fisheries organizations		
2. Strengthening cooperation with RFMOs		
3. Joint MCS activities and research on shark bycatch mitigation technologies through bilateral arrangements		

# 3.9. Other Issues

The Minister for Food, Agriculture, Forestry and Fisheries is responsible for overseeing the establishment and implementation of this NPOA-Sharks, which is subject to amendments through regular reviews. An amended version of this NPOA-Sharks will be transmitted to the UN FAO and will be made available to the public to keep them updated. The review will be undertaken every two years by officials from relevant organizations, ministries and external experts, who will make recommendations on the amendment of NPOA-Sharks. A 'distant water sharks management committee' will also be formed for better management of sharks subject to non-directed fishing by Korean-flagged distant water fishing vessels.



Latin Name	west sea	south sea	east sea	east, west, south seas
Heterodontiformes				
Heterodontidae				
Heterodontus japonicus	•	•		
Heterodontus zebra		•*		
Orectolobiformes				
Orectolobidae				
Orectolobus japonicus		•*		
Hemiscylliidae				
Chiloscyllium plagiosum		•*		
Rhincodontidae				
Rhincodon typus	●	•	•	•
Scyliorhinidae				
Scyliorhinidae				
Cephaloscyllium umbratile		•		
Halaelurus buergeri		•*		
Scyliorhinus torazame	•	•		
Proscylliidae				
Proscyllium habereri		•*		
Triakidae				
Hemitriakis japonica		•		
Mustelus griseus		•		
Mustelus manazo	•	•		
Triakis scyllium	•	•	•	•
Carcharhinidae				
Carcharhinus brachyrus	•	•	•	•
Carcharhinus dussumieri		•		
Carcharhinus plumbeus		•*		
Carcharhinus sorrah		•		
Galeocerdo cuvier	•*	•*		
Prionace glauca		•	•	
Rhizoprionodon acutus		•*		
Rhizoprionodon ologolinx		•*		
Sphymidae				

### (Appendix 1) Distribution of Sharks in Korea's EEZ at a Glance

Latin Name	west sea	south sea	east sea	east, west, south seas
Sphyrna lewini	•	•	•	•
Shpyrna zygaena	•	•	•	•
Lamniformes				
Pseudocarchariidae				
Pseudocarcharias kamoharai		•*		
Alopiidae				
Alopias pelagicus		•	•	
Alopias vulprnuis	•	•	•	•
Cetorhinidae				
Cetorhinus maximus	•	•	•	•
Lamnidae				
Carcharodon carcharias	•	•	•	•
Isurus oxyrinchus	•	•	•	•
Lamna ditropis			•*	
Hexanchiformes				
Hexanchidae				
Heptranchias perlo		•		
Notorynchus cepedianus	•	•		
Squaliformes				
Squalidae				
Etmoperus lucifer		•		
Squalus acanthias	•	•	•	•
Squalus japonicus		•		
Squalus megalops	•	•	•	•
Squalus mitsukurii		•		
Squathniformes				
Squatinidae				
Squatina japonicus	•	•	•	•
Squatina nebulosa	•	•		
Pristiophoriformes				
Pristiophoridae				
Pristiophorus japonicus		•	•	
total number of species	18	39	16	12

\*: species that are recorded in Jasaneobo (1814)6), but have not been officially verified by researchers

<sup>6)</sup> Jasaneobo (trans:Encyclopedia of indigenous fishes) is the first Korean ichthyology book written by Jeong, Yak-yong in 1814 and translated into the modern Korean language by a Korean ichthyologist, Jeong, Mun-gi, in 1977.