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Action Plan

Indonesian Tuna Fisheries

Better management practices for moving toward
sustainable and responsible fisheries



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Kementerian Kelautan dan Perikanan Republik Indonesia dan WWF
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Action Plan of Indonesian Tuna Fisheries: Better management practices for moving toward sustainable and responsible fisheries

This report is compiled by Richard Banks and Anthony Lewis from Poseidon Aquatic Resource Management.

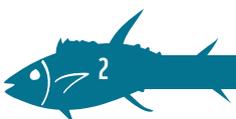
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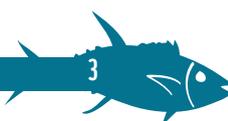
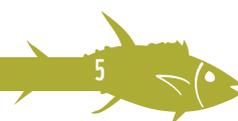


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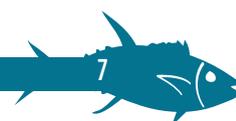
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Acronym	Bahasa	English
ASTUIN	Asosiasi Tuna Indonesia	<i>Indonesian Tuna Association</i>
ATLI	Asosiasi Tuna Longline Indonesia	<i>Indonesian Tuna Longline Association</i>
BBRSE	Balai Besar Riset Sosial dan Ekonomi	<i>Research Agency on Social and Economy</i>
BPPL	Balai Penelitian Perikanan Laut	<i>Marine Fisheries Research Agency</i>
BPSDM KP	Badan Pengembangan Sumberdaya Manusia Kelautan dan Perikanan	<i>Marine and Fisheries Human Resources Development Agency</i>
DKP	Dinas Kelautan dan Perikanan	<i>Fisheries Offices at Provincial and District level</i>
Dirjen	Direktorat Jenderal	<i>Directorate General</i>
FKPPS	Forum Komunikasi Pengelolaan dan Pemanfaatan Sumberdaya ikan	<i>Forum on Fishery Resources Utilization Management</i>
KAPI	Kapal dan Alat Penangkap Ikan	<i>Vessel and Fishing Gear</i>
KEMLU	Kementerian Luar Negeri	<i>Ministry of Foreign Affairs</i>
KKJI	Konservasi Kawasan dan Jenis Ikan	<i>Fish and Area Conservation</i>
KKP	Kementerian Kelautan dan Perikanan	<i>Ministry of Marine Affairs and Fisheries</i>
KOMNAS KAJISKAN	Komisi Nasional Pengkajian Sumberdaya Ikan	<i>National Committee on Fish Stock Assessment</i>
KTI	Komisi Tuna Indonesia	<i>Indonesian Tuna Commission</i>
PDN	Pemasaran Dalam Negeri	<i>Domestic Marketing</i>
PLN	Pemasaran Luar Negeri	<i>Foreign Marketing</i>
PSDKP	Pengawasan Sumberdaya Kelautan dan Perikanan	<i>Surveillance of Marine and Fishery Resources</i>
P4KSI	Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumberdaya Ikan	<i>Research Centre for Fishery Management and Conservation of Fishery Resources</i>
POKMASWAS	Kelompok Masyarakat Pengawas	<i>Community Surveillance Group</i>
PUP	Pelayanan Usaha Perikanan	<i>Fishing Services</i>
PUSKITA	Pusat Analisis Kerjasama Internasional dan Antar Lembaga	<i>Centre for Analysis on International Cooperation and Inter Institution</i>
SDI	Sumberdaya ikan	<i>Fishery Resources</i>
Setkab	Sekretariat Kabinet	<i>Cabinet Secretary</i>
Pengelolaan Perikanan		
CCSBT	Komisis Konservasi Tuna Sirip Biru Selatan	<i>Commission for the Conservation of Southern Bluefin Tuna</i>
CCM	Anggota Komisi Kerja Sama	<i>Cooperating Commission Member</i>
CMM	Langkah Konservasi dan Pengelolaan	<i>Conservation and Management Measure</i>
EAFM	Pendekatan Ekosistem untuk Pengelolaan Perikanan	<i>Ecosystem Approach to Fisheries Management</i>
EEZ	Zona Ekonomi Eksklusif	<i>Exclusive Economic Zone</i>
ETP	Biota yang statusnya langka, terancam, dan dilindungi	<i>Endangered, Threatened and Protected</i>
FIP	Program Perbaikan Perikanan	<i>Fishery Improvement Program</i>
FFA	Dinas Forum Perikanan	<i>Forum Fishery Agency</i>
FMA / WPP	Wilayah Pengelolaan Perikanan	<i>Fisheries Management Area</i>
ITQ	Kuota yang Dipindahtangankan secara Individu	<i>Individual Transferable Quotas</i>



MSC	Dewan Pengawas Kelautan	<i>Marine Stewardship Council</i>
MoU	Nota Kesepahaman	<i>Memorandum of Understanding</i>
NPOA	Rencana Kerja Nasional	<i>National Plan of Action</i>
NTMP	Rencana Pengelolaan Perikanan Tuna	<i>National Tuna Management Plan</i>
PSA	Analisis Produktivitas dan Kerentanan	<i>Productivity Sensitivity Analysis</i>
RBF	Kerangka Penilaian Stok Berbasis Resiko	<i>Risk Based Framework</i>
RFMO	Organisasi Pengelolaan Perikanan Regional	<i>Regional Fisheries Management Organisation</i>
SICA	Analisis Skala, Intensitas dan Akibat	<i>Scale Intensity Consequence Analysis</i>
SC	Komite Ilmiah	<i>Scientific Committee</i>
SPC	Komisi Pasifik Selatan	<i>South Pacific Commission</i>
TCC	Komite Konservasi Teknis	<i>Technical Conservation Committee</i>
TAC	Jumlah Tangkapan yang Diperbolehkan	<i>Total Allowable Catch</i>
TURF	Hak Pemanfaatan Teritorial untuk Perikanan	<i>Territorial User Rights in Fisheries</i>
UNFSA	Perjanjian Stok Ikan PBB	<i>United Nations Fish Stocks Agreement</i>
VDS	Skema Hari Kapal Berlayar	<i>Vessels Days Scheme</i>
VMS	Skema Pemantauan Kapal	<i>Vessel Monitoring Scheme</i>
WCPFC	Komisi Perikanan Samudera Pasifik Barat dan Tengah	<i>Western Central Pacific Fisheries Commission</i>
WCPO	Samudera Pasifik Barat dan Tengah	<i>Western Central Pacific Ocean</i>



FOREWORD

Following the widespread agreement that the sustainability of the fishery resources is very substantial to maintain food security and to ensure the long-term sustainable livelihood of fishers and fishing communities, many importers are now committed to only sourcing sustainable fish products/MSC-certified products.

Ministry of Marine Affairs and Fisheries/MMAF fully realises that MSC (Marine Stewardship Council) certification is one of the pre-conditions to win competition in the global markets, especially European and North American buyers where the demand for fish products taken from well-managed fisheries continues to grow. To identify barriers to sustainability, MMAF is collaborating with Marine Program of WWF-Indonesia to facilitate MSC pre-assessment in some Indonesian tuna and reef fish fisheries. This is taken as the first step to identify the improvements needed to meet MSC standard. The initial study includes data collection on stock and its exploitation, impacts on ecosystem, and management systems applied in some tuna fisheries (handline, pole and line, longline, troll line, > 30 GT purse seiner, < 30 GT purse seiner, Danish seine, and drift gillnet) and reef fish: grouper and snapper fisheries (handline, bottom trawl, and troll line).

The result of pre-assessment suggests that there are some positive points that should be maintained and some issues that should be addressed. A set of consultations were convened from September – October 2010 to identify solutions and stakeholder engagement in the design and implementation of a fishery improvement project that will move the fishery toward the MSC standard. Three key documents were prepared: Action Plan for Indonesian Tuna Fisheries Sector, Indonesian Tuna Fisheries Management Plan, and Action Plan for Indonesian Tropical Reef Fish Sector.

With considerable supports and strong commitments from all stakeholders, MMAF is optimistic that plans and associated activities specified on the three documents can be implemented successfully. It is hoped that the long term livelihood of coastal community can be preserved, and fisheries sector can contribute significant income to the nation.

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Ministry of Marine Affairs and Fisheries



INTRODUCTION

As a response to the growing demand for sustainable fish products/MS-Certified products in the global markets, Ministry of Marine Affairs and Fisheries/MMAF, facilitated by WWF, develops a fishery improvement project that will move the fishery toward the sustainable standard of MSC. MSC pre assessment was conducted from December 2009 to June 2010 in several tuna and reef fish fisheries as the first step to identify barriers to sustainability. The initial study includes data collection on stock and its exploitation, impacts on ecosystem, and management systems applied in some Indonesian tuna (yellowfin, big-eye, and skipjack) fisheries using handline, pole and line, longline, troll line, > 30 GT purse seiner, < 30 GT purse seiner, Danish seine, and drift gillnet.

MSC pre-assessment results (see Figure 1, 2, and 3) suggest some improvements that should be taken to strengthen the performance of management system applied in Indonesian tuna fisheries. Red and H (High) indicate low fisheries performance linked to some priority steps should be taken to improve the governance and management systems, yellow and M (Medium) mean medium fisheries performance linked to some components and priorities should be taken to improve the governance and management systems, and green and L (Low) show high fisheries performance linked to some related components and recommendations to maintain the good governance and management.

Indikator Pencapaian/ Performa MSC	Prinsip 1: Status Stok																	
	cakalang Pasifik			modidihiang Pasifik			mata besar Pasifik			cakalang Samudera Hindia		modidihiang Samudera Hindia						
	1.1.1. Status stok	1.1.2. Poin-poin acuan	1.2.1. Daya guna Strategi Penentuan Jumlah Hasil	1.2.2. Perangkat dan peraturan Pemanfaatan tangkapan	1.2.3. Informasi dan pemantauan	1.2.4. Penilaian	1.1.1. Status stok	1.1.2. Poin-poin acuan	1.2.1. Daya guna Strategi Penentuan Jumlah Hasil	1.2.2. Perangkat dan peraturan Pemanfaatan tangkapan	1.2.3. Informasi dan pemantauan	1.2.4. Penilaian	1.1.1. Status stok	1.1.2. Poin-poin acuan	1.2.1. Daya guna Strategi Penentuan Jumlah Hasil	1.2.2. Perangkat dan peraturan Pemanfaatan tangkapan	1.2.3. Informasi dan pemantauan	1.2.4. Penilaian
Metode Penangkapan																		
Purse seine <30 GT																		
Purse seine >30 GT																		
Pole & Line																		
Long line																		
Troll																		
Hand-line																		
Keterangan:	PRIORITAS RENDAH SEDANG TINGGI																	

Figure 1. MSC pre-assessment results of Indonesian yellowfin, big-eye and skipjack stock status

Indikator Pencapaian/ Performa MSC	Principle 2: Ecosystem impacts														
	Retained			Bycatch			ETP			Habitat			Ecosystem		
	2.1.1. Spesies non-target - status	2.1.2. Spesies non-target - pengelolaan	2.2.3. Spesies non-target - informasi	2.2.1. Spesies tangkapan sampingan - status	2.2.2. Spesies tangkapan sampingan -	2.2.3. Spesies tangkapan sampingan - informasi	2.3.1. Spesies langka & dilindungi - status	2.3.2. Spesies langka & dilindungi - pengelolaan	2.3.3. Spesies langka & dilindungi - informasi	2.4.1. Habitat - status	2.4.2. Habitat - strategi	2.4.3. Habitat - informasi & pemantauan	2.5.1. Ecosystem - status	2.5.2. Ecosystem - strategi	2.5.3. Ecosystem - informasi & pemantauan
Metode Penangkapan															
Purse seine < 30 GT	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Purse seine > 30 GT	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Pole & Line	Yellow	Yellow	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Long line	Yellow	Yellow	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Troll	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Hand-line	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Keterangan:	PRI Melebihi Standar (100) Sesuai Standar (> 80) Di Bawah Standar (60-80) Gagal (< 60)														

Figure 2. MSC pre-assessment results of ecosystem impacts caused by Indonesian tuna (yellowfin, big-eye, and skipjack) fisheries.

Indikator Pencapaian/ Performa MSC	Prinsip 3: Tata Kelola & Pengelolaan																	
	KKP					DKP Provinsi					DKP Kabupaen							
	3.1.1. Kerangka hukum adat/ setempat	3.1.2. Konsultasi, peran & tanggung jawab	3.1.3. Tujuan-tujuan jangka panjang	3.1.4. Insentif bagi perikanan berkelanjutan	3.2.1. Tujuan-tujuan pada perikanan Pemanfaatan tertentu	3.2.2. Proses pengambilan keputusan	3.2.3. Kepatuhan dan penegakkan hukum	3.2.4. Rencana penelitian	3.2.5. Evaluasi pelaksanaan pengelolaan	3.1.1. Kerangka hukum adat/ setempat	3.1.2. Konsultasi, peran & tanggung jawab	3.1.3. Tujuan-tujuan jangka panjang	3.1.4. Insentif bagi perikanan berkelanjutan	3.2.1. Tujuan-tujuan pada perikanan Pemanfaatan tertentu	3.2.2. Proses pengambilan keputusan	3.2.3. Kepatuhan dan penegakkan hukum	3.2.4. Rencana penelitian	3.2.5. Evaluasi pelaksanaan pengelolaan
Metode Penangkapan																		
Purse seine < 30 GT																		
Purse seine > 30 GT																		
Pole & Line																		
Long line																		
Troll																		
Hand-line																		
Keterangan:	PRII Melebihi Standar (100) Sesuai Standar (> 80) Di Bawah Standar (60-80) Gagal (< 60)																	

Figure 2. MSC pre-assessment results of management performance in Indonesian tuna (yellowfin, big-eye, and skipjack) fisheries.

The purpose of this document is to provide general background information on the number of ongoing and new projects tasks that were proposed during workshop on Fisheries Improvement Project for Indonesian tuna fisheries. The projects represent the outputs from a stakeholder workshop held in Bogor, Indonesia from 1-2 November 2010. This includes information on the level of priority (high or medium), current status (ongoing or new) and expected timeframe to complete the initial tasks. The priority level for each project was assigned according to the highest level within the FIP scoping document (see Appendix 1 for further details).

The following target species are included in the scoping document:

- Skipjack tuna

- Yellowfin tuna
- Bigeye tuna

The following eight fisheries are included:

- Handline tuna with target species, yellowfin tuna, and bigeye.
- Pole & line with target species, skipjack tuna.
- Troll & line with target species, skipjack tuna.
- Longline with target species yellowfin and bigeye tunas.
- Purse seine (> 30 GT) with target species skipjack, yellowfin and bigeye tunas
- Mini purse seine (< 30 GT) with target species skipjack, yellowfin and bigeye tunas
- Gillnet with target species skipjack, yellowfin.
- Ringnet with target species skipjack, yellowfin

Note that other large tuna species, albacore and bluefin were not considered in the context of the earlier pre-assessment, but actions and activities can relate equally to these species, if they are perceived to be of primary importance. Southern bluefin tuna are regularly caught by longline gear in the Indian Ocean. Similarly, a range of small tunas and tuna-like species, as well as bycatch and Endangered, Threatened and Protected (ETP) species are taken in tuna fisheries, so actions and activities will also relate to these species.

It is anticipated that the Ministry of Marine Affairs and Fisheries (MMAF) will lead the FIP Action Plan and co-ordinate the development of each task. This document serves primarily as a guide to the type and range of tasks required in the Action Plan to reach the Marine Stewardship Council (MSC) standard. The Plan itself must be further developed to include more specific timelines. The results generated from the Action Plan should have periodic internal and external reviews to ensure they will meet the MSC standard.

A summary of all tasks is provided in Appendix 1.

1. GOVERNANCE AND DEFINITION OF NATIONAL FISHERY MANAGEMENT OBJECTIVES

In order to protect fishing communities, it is important to ensure the long-term sustainability of fishery resources on which they depend. The MSC scoring guidepost focuses on fishery sustainability, precautionary harvest strategies and the ecosystem-based management approach. Adherence to these approaches require a fundamental shift in Indonesian fishery management practices, with a change in focus on sustaining fish stocks as a contributor to economic growth, as opposed to the present focus on prioritizing growth in production with only limited consideration to sustainability of



fish stocks. The change in long term policy objectives will allow for sustainable production levels for all resource users at District, Provincial and National levels.

1.1 Refine objectives to ensure that priority is given to sustainable fisheries and the ecosystem approach to fisheries management at national and local level

Law 31/2004 contains reference to fish stock sustainability. The United Nations Fish Stocks Agreement (UNFSA) was ratified by Indonesia in 2010. Implementation needs to be specifically incorporated into the management system at national and regional levels. **Policies and management actions need to focus on applying the precautionary approach, superseding current expansionist policies. There is also a need to incorporate the Ecosystem-based Approach to Fisheries Management into management measures**, consistent with the high level scoring guideposts outlined in MSC Principle 2. These may be incorporated into National Legislation or Fisheries-specific Management Plans¹. A legal expert should be engaged to determine the most appropriate areas for integration of the Precautionary approach and Ecosystem-based management into formal management decision making.

Working Group	SDI, P4KSI, MMAF, DKP Provinsi and District, PLN, KKJI, PSDKP
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<i>Intermediate:</i> 3.1.1 Legal & customary framework 3.1.3 Long-term objectives

1.2 Extension of the management system to Local level

It is also noted that Autonomy Law No 22/1999 makes reference to devolution of authority to Provincial and District administrations. This assumes that MMAF will provide a facilitation and coordination role to ensure that management strategies and measures are implemented across all spectra of governance. This Action requires that the decentralized authorities are aware of the priorities given in the National Fisheries Law and the commitment to UNSFA. It also requires that lower levels of governance are aware of International fisheries obligations in the form of Commission Management Measures (WCFPC, IOTC and CCSBT), where actions should at least support the main thrust of the (Commission Management Measures) CMMs². This requires a review of Regional/Provincial policies to ensure that the precautionary and ecosystem-based approaches are incorporated and are binding at local management level. The following actions are required:

- Guidelines produced, provided from MMAF to decentralized authorities, to ensure that core management actions and management tools are introduced to fisheries with delegated authority;
- Definition of regional specific management tools and targets required at provincial level and district level (including TURFS for small scale fisheries);
- A process of continued mentoring provided by MMAF to DKP Fisheries Offices at Provincial and District level;

¹ It is usual practice for countries to amend national fisheries legislation to include adherence to the principles of ecosystem-based fisheries management. However, the MSC guidance requires that the MSC principles are incorporated into the management system, which in this case could be the Tuna Management Plan. However, it is advisable, that with a further review of the Fisheries Act, this be amended to incorporate both the Precautionary Principle and EAFM Approach.

² RFMO CMMs are usually binding within national EEZs, but not to archipelagic or territorial waters. However, Parties/countries are requested to implement the spirit of management measures across all components of the industry.

- Assigning a dedicated fishery manager at national (MMAF) level who can oversee the implementation and performance of the relevant governance groups – National, Provincial and District;
- Introduction of peer review processes incorporating monitoring procedures to ensure compliance with set management strategies and tools;
- Penalty procedures established in the event that Provinces and Districts do not comply³.

Processes need to be enshrined through National and Provincial legislation, supported by a Memorandum of Understanding (MoU), assigning clear roles and responsibilities for each organization. The MoU, to be designed by MMAF in partnership with the regional organizations could follow the above guidelines.

The activities and tools are to be defined in the Draft Management Plan (Appendix 2), and when finalized by the KTI, will comply with the central objective and goals defined therein.

Working Group	SDI, P4KSI, Dinas, PLN, KKJI, PSDKP
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<i>High:</i> 3.1.1 Legal & customary framework 3.1.3 Long term objectives 3.2.1 Fishery specific objectives 3.2.2 Decision making processes

1.3 Endorsement of international obligations

Indonesia is a member of IOTC and CCSBT. It has also signaled its intention to join WCPFC as a Cooperating Commission Member (CCM). The national authority, as a member of the Regional Fisheries Management Organisations (RFMOs), (WCPFC, IOTC and CCSBT), is obliged to implement Conventions and Management Measures at specific levels of national jurisdictions, particularly the Exclusive Economic Zones (EEZs). The spirit of CMMs also applies to archipelagic and territorial waters, but allows for national interpretation of the aligned measure.

Currently, at the EEZ level, WCPFC has a CMM (2008-01), which lays down requirements to restrict effort to 2004 effort levels. This also includes a requirement for 2010-2011 to prohibit the use of Fish Aggregation Devices (FADs) from the period 1 July to 30 September, 100% observer coverage for purse seiners operating in the EEZ, and 20% observer coverage for longliners. In the case of southern bluefin tuna, Indonesia is required by CCSBT to adopt Total Allowable Catch (TAC) controls on the catch.

No current management conventions apply in the Indian Ocean, which are relevant to Indonesia, but it is expected that a system of national quotas may be implemented in the future.

- Participation in, and support to all RFMO working groups, including regular reporting and dissemination of data.
- Application of RFMO EEZ requirements into national legislation (e.g. 3 three month FAD closure, along with maintaining effort at 2004 levels).

³ MMAF provide some funds to Province and District. It may be that failure to implement strategies could result in withholding funding.



- Endorsement of the spirit of CMMs (management measures) on domestic fleets operating in Indonesian archipelagic waters⁴ (licence moratorium on purse seines and long lines), especially where there may be high interactions with juvenile yellowfin and bigeye tunas. Other precautionary management measures could be explored in this context, such as raising the minimum mesh size for purse seine nets (currently < 30 mm, as opposed to the common 90mm⁵ adopted by large Pacific purse seiners).
- Application of management actions to any fisheries in territorial/coastal waters where there are high interactions with juvenile yellowfin and bigeye tunas, e.g., purse seine, gill net and ring net fishing in the Indian Ocean fisheries.

Working Group	KKP (SDI, P4KSI, PUSKITA), KTI, KEMLU, SetKab
Priority	High
Status	Currently in process
Timeframe	1 year
MSC Performance Indicator(s)	<i>Intermediate:</i> 3.1.1 Legal & customary framework

1.4 Development of fisheries-specific management plans

The Fisheries Law (Law 31/2004) lays down a requirement to implement a Fisheries Management Plan without specifying whether this should be for fishery specific or not⁶. Despite international obligations (as above), and need to implement a coherent tuna management policy, no management plan has been prepared for the tuna fisheries of Indonesia. The result is that a series of management measures are implemented through Decrees, but with insufficient attention to their application, or any assessment of their impacts. Other archipelagic countries, e.g., Philippines, PNG and the Solomon all have tuna management plans in operation. These comply with the WCPO Conventions to varying degrees.

Indonesia needs to develop a national management plan for its tuna fisheries, with application including the principal tuna target species, across the range of administrative jurisdictions and fishing methods where the principal target species is/are tuna.

The management plan must contain well-defined measurable and short-term objectives, which achieve the outcomes of sustainable fisheries, and incorporate the ecosystem approach to fisheries management. The Management Plan should incorporate the following:

- Definition of goals and outcomes;
- Implementing RFMO Conventions;
- Implementing national tools based on a defined harvest strategy;
- Implementing, where appropriate, additional precautionary management measures;
- Developing bycatch mitigation measures, when needed⁷, across the range of the tuna fisheries operating within Indonesia;
- Applying a Monitoring, Control and Surveillance system across the range of the tuna

4 It is noted that a licence moratorium has reportedly been introduced for purse seiners, but not longliners (atuna.com, 17 March, 2010).

5 In the bunt (end of the net)

6 KKP is presently in the process of designing Management Plans for a series of smaller scale fisheries linked to specific FMAs.

7 The risk assessment will determine for each fishing method, if management mitigation measures are required

fisheries – EEZ, archipelagic, territorial and coastal;

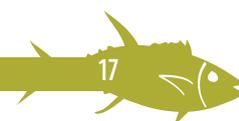
- Adopting a Management Plan review process (internal and external).

Working Group	SDI, P4KSI, PUP, PSDKP, KTI and stakeholder associations (ASTUIN, ATLI, Agency of MAF in province and district, dll) and WWF.
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<p><i>High and Intermediate:</i></p> <p>1.2.1 Harvest strategy</p> <p>1.2.2 Harvest control rules & tools</p> <p>2.1.2 Retained species management strategy</p> <p>2.2.2 Baitfish management strategy</p> <p>2.3.2 ETP species management strategy</p> <p>2.4.2 Habitats management strategy</p> <p>2.5.2 Ecosystem management strategy</p> <p>3.1.1 Legal & customary framework</p> <p>3.2.1 Fishery-specific Management System</p>

2.1 Revise the structure of the fishery management system

Figure 1 identifies an organogram for a tuna fisheries management hierarchy, recommended by the tuna fisheries FIP workshop, Bogor. The core requirement is to strengthen the role of the Indonesian Tuna Commission (KTI), an independent organization reporting to the FKPPS. The KTI will formally undertake responsibility for overseeing fisheries management planning and actions by KKP, DKP Provinsi and District. The Indonesian Tuna Commission members should be drawn from the principal stakeholders (as defined in Figure 1). It is expected that the Minister would usually make the decision on the appointment of members of the Commission. Options for the composition of the Commission to include:

- An independent chairman;
- A dedicated fisheries manager (from the Fisheries Ministry);
- Representatives from the main Provincial Dinas (up to 4 or more positions from the main production centres e.g., Manado, Kendari, Bali etc.);
- Industry champions derived from each subsector (industrial, archipelagic and artisanal);
- Representatives of the principal buying companies and middlemen;
- Two fisheries scientists (one to cover the Indian Ocean, and the other the Pacific);
- A fisheries economist;
- Gear specialists (KAPI);
- A compliance officer (Directorate General for PSDKP);
- An environmental non-governmental organisation (eNGO) e.g., WWF;
- Others, as deemed appropriate (e.g., KKP Capture fisheries, KKP Resources, BPSDMKP, PLN, PDN).



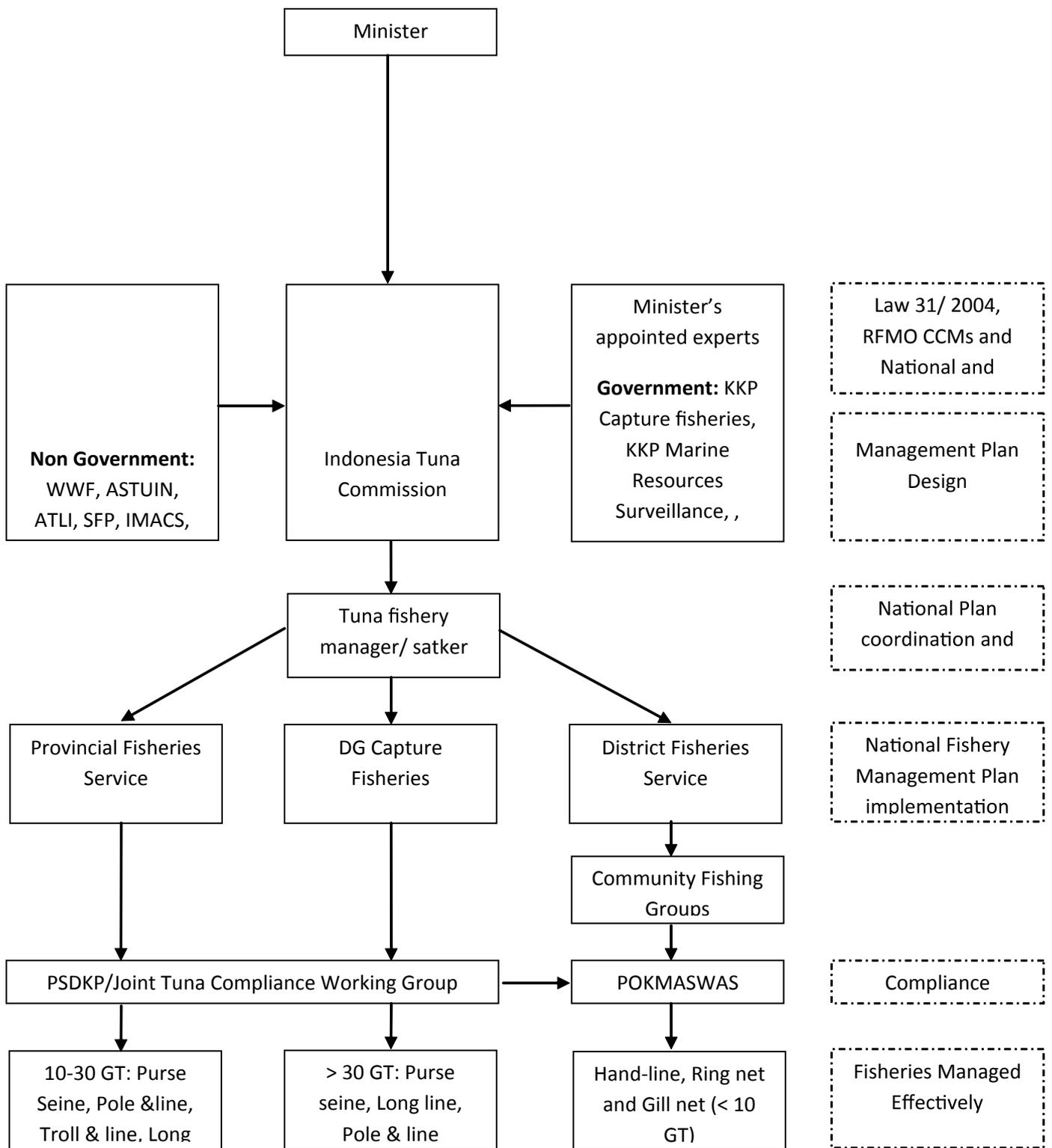


Figure 1: Proposed organogram for tuna fisheries management in Indonesia and definition of reporting structure and institutional hierarchy

The Chairman must be fully independent without any linkage to existing stakeholders. He/she must be able to promote the effective implementation of the management plan. It is important he/she and the co-opted industry members possess strong charisma to ensure the support of the wider industry, but are independent of the wider industry and able to work within the operational requirements of the FKPPS's terms of reference.

The Commission should have the following functions:

- a) to prepare the NTMP and supervise its implementation including setting of management indicators (stock abundance, catch per unit of effort, economic indicators) and making, where appropriate, revisions to the plan;
- b) to propose management measures that ensure that the plans can be implemented effectively, and where appropriate comply with RFMO management conventions;
- c) to conduct reviews of management plans based on the results from ongoing stock assessment and assessment of ecosystem impacts;
- d) to regularly seek and accept relevant information, including local knowledge, and to explain how this information has been used, or incorporated into decision making
- e) to promote research, education and training in relation to fisheries and the management of fisheries;
- f) to determine the fee structure to support a research and development fund, the operating expenses for the council and an independent peer review.;
- g) to prepare or promote codes of practice concerning matters of relevance to fishery authorities and other stakeholders.

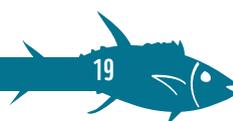
The frequency of meetings should be quarterly, as opposed to the current ad hoc process.

Provincial FKPPS are to ensure that regionally specific fisheries are managed at the provincial and district level, following pre set national requirements, as determined by the KTI. The harvest strategies and management tools will be formulated at national level, with regional actions and limits set within the National Tuna Management Plan (NTMP). Implementation of the NTMP will be a key function of the Commission.

It should be stressed that given the migratory nature of these tuna stocks, it is imperative that regional government does not operate in a manner that contradicts the national guidelines.

A NTMP should aim to achieve outcomes that are consistent with sustainability objectives for the management of the species and the supporting ecosystem. The Plan should:

- Define fisheries and target species to be covered by the plan;
- Set out the fishery-specific management objectives and implement a strategy for achieving these;
- Identify research needs and priorities, including reliable catch/effort data;
- Set out the resources required to implement the plan;
- Describe the biological, economic and social characteristics of the fishery;
- Identify the impacts or potential impacts of the fishery on its associated ecosystem or ecosystems, including impacts on non-target species of fish or other aquatic resources;
- Identify any ecological factors that could have an impact on the performance of the fishery;
- Assess the risks to the ecosystem and set out strategies for addressing those risks; and
- Set out methods for monitoring the performance of the fishery and the effectiveness of the plan, including performance indicators, trigger points for review or action, and progress



reporting.

Working Group	SDI, Agency of MAF in province and district, stakeholders as described above.
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<p><i>High</i></p> <p>3.2.2 Decision making processes</p> <p><i>Intermediate</i></p> <p>3.1.2 Consultation, roles and responsibilities</p>

2.2 Identification of responsibility and capacity building across the range of implementing bodies

The NTMP will identify clear activities, which will require allocation to specific stakeholders. Some key issues that need to be addressed are as follows:

- Small, efficient and cost effective units will have to be created to undertake specific tasks. These will cover all elements of service delivery, and will extend to community groups for small scale fisheries;
- Tasks will be defined by clear Terms of Reference for each stakeholder group;
- MMAF/DKP staff and stakeholder support groups will have to demonstrate a capacity to implement the tasks; this will almost certainly require needs assessment and capacity strengthening;
- Duplication in tasks must be avoided at all costs (e.g., important to define the relationships between national and provincial governance);
- Deliverables and timelines will be set for the various tasks to ensure appropriate support to the activities defined by the FKPPS/The Commission;
- Barriers will need to be identified and constraints unblocked (e.g. legal issues);
- Aside from reporting functions to the FKPP and ultimately the Minister, the actions will conform to the National Tuna Management Plan, without variance or reference to political interference;
- Management decisions implemented by assigned management authorities;
- Compliance functions and responsibilities set.

It is important in this situation not to re-invent the wheel. FKPPS-type service delivery is a composite part of Australian and USA fisheries management councils. These organizations, along with other similar regional specific organizations such as SPC and FFA, can assist in terms of exchanges or provision of short-term technical support.



Working Group	SDI, Dina Provinsi and Districts, stakeholders as described above.
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<i>High and Intermediate:</i> 3.1.2 Consultation, roles and responsibilities 3.2.2 Decision making processes 3.2.5 Monitoring management performance

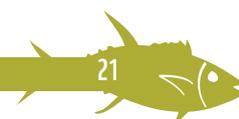
2.2.1 Establish a Tuna Fishery Management Satker⁸

A fishery manager to be appointed from DG Capture Fisheries, reporting to the KTI. He/she will be responsible for the following duties:

- Preparing Commission meeting agendas;
- Ensuring appropriate key stakeholder reports are submitted – stock assessment reports, ecosystem impact assessments, RFMO required actions, Management Plan activities and actions, compliance actions, economic reports, industry feed-back;
- Initiating consultation processes, on request from the Indonesian Tuna Commission;
- Providing technical support to the management authorities;
- Participating in PSDKP compliance risk analysis;
- Monitoring the performance of the fishery management organizations – national, provincial and district;
- Supervising support staff within the Satker;
- Informing the Commissions/RFMOs of the conservation and management measures adopted in areas under national jurisdiction, including the EEZ, archipelagic and territorial waters.

Working Group	SDI, Agency of MAF in province and district, stakeholders as described above.
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<i>High and Intermediate:</i> 3.1.2 Consultation, roles and responsibilities 3.2.2 Decision making processes 3.2.5 Monitoring management performance

⁸ A Satker is a delegated management organisation, reporting within the MMAF hierarchical system



2.2.2 Strengthening the role of National, Provincial and District KP

National, provincial and district KKP/DKPP/DKPD structures strengthened to undertake the following roles:

- Facilitating the introduction of National laws to regional decrees;
- Implementing national management harvest control tools on targeted species and baitfish including:
 - License controls
 - Spatial and seasonal closures
 - Technical gear regulations, including restrictions on the deployment of FADs;
- Undertaking a comprehensive data collection system of tuna landing sites linked to:
 - Active fleet by vessel size
 - Logbook declarations covering species caught, effort (days at sea), bycatch interactions, discards and FAD-specific interactions
 - Licensing and record of FAD deployment;
- Port sampling, linked to species and size (see 3.2.1 below);
- Implementing appropriate socialisation processes to ensure understanding of management decisions and applied systems, as well as providing stakeholder feed-back to the KTI;
- Participating in PSDKP compliance risk analysis;
- Providing support to lower level management organisations;
- Preparing activity reports to the Tuna Fishery Management Satker / KTI;
- Exploring the full range of available RBM tools for improving the basic economic performance of the fisheries and providing alternative solutions for social and cultural issues that may arise over time.

Working Group	SDI, Agency of MAF in province and district, stakeholders as described above.
Priority	High
Status	New
Timeframe	1 year
MSC Performance Indicator(s)	<p><i>High</i></p> <p>3.2.2 Decision making processes</p> <p>3.2.5 Monitoring management performance</p> <p><i>Intermediate:</i></p> <p>3.1.2 Consultation, roles and responsibilities</p>

2.2.3 Strengthening the role of Community fishing organizations

DKP District is the custodian of < 5 m vessels, but existing records on CPUE and participating boat numbers



are often determined through estimates. A critical element for community fishery managers under a system of TURFs is to prevent over exploitation of its fisheries. DKP District should support the process, and provide feed-back to the higher level managers on the level of community participation. DKP needs to also compliment the community management disciplinary system by setting strict licensing conditions on traders, i.e., ensuring that merchants purchase according to agreed standards. Such standards may require that:

- Controlling the deployment of FADs, linked to scientific evidence;
- Implementing bycatch restrictions, if appropriate, e.g. returning ETP species;
- Management localized bait fisheries at sustainable levels.

DKP, as the local government organization, will be expected to provide support to the development of Community fishery management organizations. This may be done in partnership with NGOs.

The importance of community management linked to the creation of TURFs is not to force the process, but more to create the environment for participatory management to evolve. It is important to evaluate within provincial level, the prospects for community participation. Core DKP/NGO/BPPL/Community group interactions must be mandated to:

- Set out a community consultative structure;
- Reaffirm the broad goals and strategies;
- Determine the TURF area;
- Clearly outline the management obligations for supporting TURF systems;
- Set up support structures and mentoring roles to facilitate the development of community organizations;
- Develop a culturally appropriate processes and create a community support structure to facilitate implementation of TURFs (a village Fisheries Advisory Council), and define actions to be undertaken by the community (including compliance actions) and support functions required by the higher authority;
- Set up management plans linked to target stocks and the ecosystem approach to fisheries management through community groups, facilitated by the mentors;
- Ensure continuing community commitment to the TURF system - regular contact between communities and extension staff, exchange of information between communities, a review of fisheries management structures;
- Identify research action needed to meet conservation and management data requirements;
- Ensure participation of other stakeholder – traders, DKP District and environmental groups;
- Establish communication linkages with other community groups.

Working Group	SDI, Agency of KKP in province and district, Community, processors and middlemen and NGOs
Priority	High
Status	New
Timeframe	1-3 years

MSC Performance Indicator(s)	3.1.2 Consultation, roles and responsibilities 3.2.2 Decision making processes 3.2.5 Monitoring management performance
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3. RESEARCH ACTIVITIES

3.1 Strengthening human and institutional capacity for stock assessment in Indonesia

The establishment of, and ongoing support for, tuna fishery research stations at Benoa and Bitung will be an important part strengthening the capacity to collect, collate and analyse data from Indonesian tuna fisheries.

Effective participation in, and contribution to, regional stock assessments will require capacity building at national level, both through formal tertiary level training, including a focus on encouraging young graduate entry, and assistance from RFMOs and research agencies. Indonesian scientists should also participate fully in regional collaborative stock assessments and scientific committee meetings. Associated with this, improved annual reporting to RFMOs, in accordance with the already agreed templates for the WCPFC committees (SC and TCC) is required.

Spatial structure within stock assessments provides some ability to understand stock dynamics at sub-regional scale and inform national management strategies. Tagging experiments may provide interim estimates of exploitation rates and add to the understanding of stock dynamics on that scale.

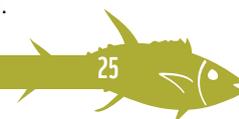
The Government of Indonesia will have to dedicate considerable more funds for all the required levels of resourcing i.e., outreach research stations, as well as training of scientists. Such an endeavor would be a small cost relative to the economic value of the tuna fishery sector. Part of this capacity building component could access institutional support from other regional centers, CSIRO, SPC, and might attract funds from International Donors.⁹

Working Group	P4KSI, BPPL, KOMNAS KAJISKAN, BPSDM
Priority	Intermediate
Status	Expanding from existing activities
Timeframe	3 years (development) and ongoing
MSC Performance Indicator(s)	1.2.4 Research capacity

3.2 Information gaps removed

Collection of catch and landings data for Indonesian tuna fisheries is primarily undertaken at provincial level by the national and provincial organizations based in the main landing sites – DG Capture Fisheries, and DKP District. Provincial data collection may be quite rudimentary, and is usually based on estimates. These data are fed to the provincial and national authorities and compiled by fishery management area (FMA). Some fishery data are collected at all levels, but with varying extents of coverage and accuracy. Current tuna fishery catch estimates are considered incomplete and uncertain, often lacking information on catch by species (identification often uncertain or species grouped), by gear (data collected in only a few provinces), size composition of the catch (recent data collection in two ports only), and operational-level data (logbooks – recent introduction to selected fisheries and ports). Incomplete data applies not only to target species, but also retained species/bycatch and ETP species. There are also significant gaps in knowledge of biological parameters of tuna stocks such as growth, reproduction, natural mortality etc which might be required inputs for

⁹ The recent Regional Plan of Action on strengthening Fisheries Management in SE Asia gave as a central objective “Strengthening scientific analytical capability and capacity to gather information” as a core activity for participating countries including Indonesia.



stock assessments.

3.2.1 Stock abundance

The current data collection and compilation system, at all levels (district, province, major fishing port, national) needs to be enhanced, such that comprehensive catch data are collected in standard format, and reliable annual catch estimates, by gear and species, are compiled for at least target and retained species.

Port sampling programmes, to provide data on size and species composition of the catch of target and retained species for each fishery, should be established in the major tuna fishery ports.

3.2.2 Fleet composition

A profile of the number of active vessels taking tuna, by each fishery/gear, should be compiled for each of the main tuna landing sites in Indonesia, to assist in the compilation of annual catch estimates.

Catch and production data should also be collected from industry sources (e.g., fish canneries/loining plants, private landing points, traders, cold storage plants etc), to complement and corroborate the catch data collected by DKP.

3.2.3 Stock productivity

Catch per effort data, to provide information on trends in catch rates as indices of stock abundance over time, should be collected through the progressive implementation of logbook programs as required by existing regulations, to cover most ports and fisheries. Appropriate databases (such as the SPC Tufman database) will need to be introduced to process these data, with training provided in their operation and maintenance.

3.2.4 Stock structure

The target species are migratory/highly mobile, and their stock structure is international rather than FMA scale. Indonesian waters are recognized as possibly key nursery/spawning areas for the WCPO-wide stocks of larger tunas, yellowfin and bigeye in particular.

Information on stock structure obtained by regional tagging programs should be applied to Indonesian tuna fisheries, with management initiatives and catch reporting applied throughout Pacific and Indian Ocean components of Indonesian waters respectively, including archipelagic waters and not restricted to FMAs.

Working Group	P4KSI, BPPL, SDI, industry (direct and via industry associations)
Priority	High
Status	Expanding from existing activities
Timeframe	3 years (development) and ongoing
MSC Performance Indicator(s)	<i>High:</i> 1.2.3 Information/monitoring

3.3 Strengthening stock assessment and the setting Target and Limit Reference Points for selected species (which may include non-target species).

No detailed stock assessments for target species or retained species have been undertaken by Indonesia, nor have target and limit reference points been established for target tuna species, although some estimates of biological potential have been made. Reliable assessments are available for most (but not all) target species at RFMO level (WCPFC, IOTC), throughout the range of the stock. Formal TRPs and LRPs have not been adopted by the RFMOs though proxy reference points are available in most cases.

3.3.1 Stock assessments

Stock assessments for the highly migratory target (P1) species need to apply throughout the range of the stock i.e., the WCPO and not necessarily be undertaken at national level. Incomplete Indonesian fishery data at various levels remains a major source of uncertainty in current regional tuna stock assessments and enhanced comprehensive fishery data from all Indonesian tuna fisheries, as anticipated under Action 3.1, should be provided to the RFMOs, as a key contribution to regional stock assessments. Reconstruction of historical fishery data may be an important component of this activity.

3.3.2 Establishment of reference points

Setting national level reference points for Indonesia which conform to UNSFA and MSC requirements, should be a priority task, for completion within two years, and for incorporation in the NTMP. RFMO reference points, once adopted, can be modified and applied at national level. Biomass-based reference points e.g., $0.5 B_{MSY} = 0.2B_0$ for the Limit Reference Point (LRP), and $B_{MSY} = 0.4B_0$ for the Target Reference Point (TRP) are more likely to be adopted.

Indonesia should further support the setting of LRP/TRPs at WCPFC meetings (SDI).

Working Group	P4KSI, BPPL, KOMNAS KAJISKAN, SDI
Priority	High
Status	Expanding from existing activities
Timeframe	2 years and ongoing
MSC Performance Indicator(s)	1.1.1 Stock status 1.1.2 Limit Reference Points 1.2.4 Research and assessment of stock status

3.4 and 3.5: Harvest control strategies adopted and rules and tools developed

These elements are incorporated into the National Tuna Management Plan (1.4). A Harvest control strategy establishes clear rules linking management measures to Limit and Target Reference Points. The harvest tools are the management measures required, and adjusted according to the changes in stock status.

Working Group	SDI, FKPPS, KTI
Priority	High
Status	Expanding from existing activities
Timeframe	2 years and ongoing
MSC Performance Indicator(s)	<i>High</i> 1.2.1 Harvest strategy 1.2.2 Harvest rules and tools 3.2.1 Management Plan

3.6 Bycatch data collection

Accurate information on total removals from the fishery i.e., including target species, retained species, baitfish species and ETP species, and any discards, is not currently available. The species composition of the catch by each fishery, notably the bycatch component, is not known with certainty. The extent of deployment of FADs (*rumpons*) and their interaction with various fisheries/species is not well understood, and the status of baitfish stocks harvested for pole-and-line, longline and handline fisheries is unknown.

3.6.1 Review of available information

All available information on retained/ by-catch (sharks (non ETP), marlins and other pelagic species, ETP (cetaceans, turtles, seabirds) and baitfish species needs to be gathered and reviewed, to identify gaps in knowledge that would be required for risk assessment/Ecosystem Approach to Fisheries Management (EAFM) and to determine if management strategies need to be implemented for particular fisheries or species (see 3.4).

3.6.2 Observer programmes

Information on ecosystem components other than target species is typically collected by observer programmes. These should be established initially for all tuna fisheries of interest, to characterize all aspects of the operation and catch details of each fishery, and identify possible interactions amongst fisheries and species. The observer programmes should build on the experience gained from previous WWF and P4KSI/ACIAR observer programmes in Indonesia on longline fisheries, extracting where appropriate some components of the WCPFC observer programmes. They would initially be scientific observer programmes rather than compliance, and may also involve collection of biological samples, including material for ecosystem studies/modelling. Target coverage levels, reflecting available resources and manpower, would need to be developed but for indicative purposes, might initially be 20% for EEZ purse seiners¹⁰, 10% for longliners and gillnetters, and 5-10% for others gears such as pole-and-line, troll-and-line and handline.

¹⁰ Possibly above a certain size initially e.g. 250 GT



Coordinated observer training will be required, which will require development of training modules and funding support from industry, NGOs and Government.

Where high ecological risk situations have been identified, observer programmes will need to be ongoing, to support management strategies introduced and ensure compliance.

Concept notes for an observer programme for Indonesian tuna fisheries are provided as Appendix 3.

3.6.3 FAD management

The spatial extent of FAD deployment needs to be established, ideally within a GIS system, but realistically likely to involve documentation of licensing/approvals at provincial and district level at various distances from shore (coastal/ territorial), and at national level for EEZ/archipelagic waters. Combined with efforts to quantify FAD-associated catches (by volume, species, size composition and extent of dependence), this would eventually form the basis of a FAD control measure, or a FAD Management Plan, to be incorporated with the proposed National Tuna Management Plan (NTMP).

3.6.4 Baitfish management

Review all available information on tuna baitfish, for pole-and-line, longline and handline use, especially in Indonesia but also neighbouring countries (PNG, Solomon Islands).

With the involvement of stakeholders in each area, develop tuna baitfish management plans or harvest guidelines, which could be applied at district/provincial level.

3.6.5 Ecosystem modeling

Modeling the impact of fishery removals on the ecosystem needs to be undertaken, using existing models developed by RFMOs (e.g., SPC). This data-intensive modeling has already been applied in part to eastern Indonesia (Sunda/Sahul Shelf), but will require the collection of additional trophic data and biological samples to adequately assess Pacific ecosystems and considerably more work for Indian Ocean areas

Working Group	P4KSI, BPPL, SDI, industry, WWF/NGO, Universities, SPC
Priority	Intermediate
Status	Expanding from existing activities
Timeframe	1 year (development), implement (year 2) ongoing where high risk



MSC Performance Indicator(s)	<p><i>Intermediate:</i></p> <p>2.1.3 Retained species Information</p> <p>2.2.3 Baitfish information</p> <p>2.3.3 ETP species information</p> <p>2.4.3 Habitats information</p> <p>2.5.3 Ecosystem information</p>
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3.7 Improving ecosystem fisheries management

A risk-based assessment (RBA) framework needs to be completed for retained, ETP, and baitfish species as well as habitat impacts. This would draw on the information review as outlined above (3.3), and anticipating data deficiencies, would involve the application of SICA (Scale Intensity Consequence Analysis - qualitative analysis, requiring information from stakeholders) and PSA (Productivity-Susceptibility Analysis, involving semi-quantitative analysis).

The RBA would identify ecological risk from species/fishery interactions, recognizing that risk will vary across species and fisheries, and may result in national limits for ETP (and other interactions) being established and enforced (see 3.3 above for the role of observer programmes, which would characterize operational aspects of all tuna fisheries). It would utilize information obtained from the literature (see 3.3) and experience with similar or same species elsewhere in the WCPO and Indian Ocean.

Key requirements would be identification of the SICA¹¹ components:

- The main risk bearing activities, which would in this case be fishing;
- The spatial scale of the fishery, i.e., the percentage range of the stock that overlaps with the fishing activity;
- The Temporal Scale, the time spent on the fishing grounds where the interactions will occur;
- The level of fishing intensity, identifies the direct impacts as defined as Negligible, Minor, Moderate, Major, Severe and Catastrophic;
- Consequence of fishing activity on either population size or reproductive capacity.

Key requirements would be identification of PSA components:

- Average age of maturity
- Average size of maturity
- Average maximum age
- Average maximum size
- Fecundity

11 See pages 86-106 of the MSC FAM version 2.

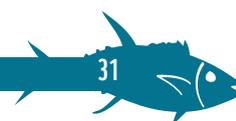


- Trophic level
- Reproductive capacity
- The overlap of the fishery with the species distribution (Availability)
- Species overlap with the type of gear (Encounterability)
- Gear Selectivity
- Post capture mortality fr bycatch and ETP species

Capacity building

Training in risk assessment methods and the application of EAFM to Indonesian tuna fisheries will be required for Indonesian scientists in key agencies, Universities and NGOs, and also requiring funding support and development of links with external research bodies, RFMOs and NGOs. The workshops should also be participatory, requiring industry input. It is noted that some risk assessment training has already been provided by CSIRO to BPPL scientists, and BPPL may be in a position to conduct the training sessions.

Working Group	P4KSI, BPPL, SDI, PSDKP, WWF/NGO, University, multi-stakeholder involvement, RFMOs, external research bodies
Priority	Intermediate
Status	Expanding from existing activities
Timeframe	1 year (development), implement (year 2) ongoing where high risk
MSC Performance Indicator(s)	<p><i>Intermediate:</i></p> <p>2.1.1 Retained species assessment</p> <p>2.1.2 Retained species management</p> <p>2.1.3 Retained species information</p> <p>2.2.1 Baitfish information</p> <p>2.2.2 Baitfish species management</p> <p>2.2.3 Baitfish species information</p> <p>2.3.1 ETP species information</p> <p>2.3.2 ETP species information</p> <p>2.3.2 ETP species management</p> <p>2.4.1 Habitats information</p> <p>2.4.2 Habitat management</p> <p>2.4.3 Habitat information</p> <p>2.5.1 Ecosystem information</p> <p>2.5.2 Ecosystem management</p> <p>2.5.3 Ecosystem information</p>



3.8 Setting/reconfirming national limits for ETP interactions set

Indonesia has adopted a series of measures to protect turtles, and most interactions with tuna gears appear to be relatively low. Similarly it has also implemented the National Plan of Action (NPOA) for reducing catches of seabirds in longline fisheries, and has recently completed an NPOA for the conservation and management of sharks. Sea mammal interactions are not perceived to be a problem. The results from the observer programme should be used to re-evaluate these NPOAs, against the perceived risks to these species groups, across the range of species.

Working Group	SDI, FKPPS, KTI
Priority	Intermediate
Status	Expanding from existing activities
Timeframe	1 year (development), implement (year 2) ongoing where high risk
MSC Performance Indicator(s)	<i>Intermediate:</i> 2.1.2 Retained species management 2.2.2 Baitfish species management 2.3.2 ETP species management 2.4.2 Habitat management 2.5.2 Ecosystem management

3.9 Bycatch management mitigation strategies designed and implemented through the management plan

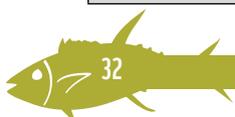
Where high risks have been identified, develop an overall management strategy for management and mitigation of ecosystem impact risks, involving all stakeholders in the development and implementation of the system.

The strategy will need to be monitored, and the success of any mitigation measures introduced regularly assessed. Management and mitigation must be incorporated into a strategy, which will be different for each fishery and will likely include, *inter alia*:

- Spatial and seasonal closures;
- Changes to gear configurations, to minimize interactions with juveniles and at-risk species e.g. hook types, minimum mesh sizes, maximum gear dimensions etc.;
- Controls on FAD deployment – minimum spacing, exclusion zones, fleet limits etc
- Non-target species catch limits;
- By-catch retention policy (where applicable).

These measures will be incorporated into the NTMP.

Working Group	SDI, FKPPS, KTI
Priority	Intermediate
Status	New
Timeframe	1 year (development), implement (year 2) ongoing where high risk



MSC Performance Indicator(s)	<i>Intermediate:</i> 2.1.2 Retained species management 2.2.2 Baitfish species management 2.3.2 ETP species management 2.4.2 Habitat management 2.5.2 Ecosystem management
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3.10 Research Plan including capacity building in stock assessment, EAFM and ecosystem modeling, and addressing information gaps

A Research Plan needs to be prepared which provides a coherent and strategic approach to research and information needs across all three sustainability principles, in a timely and reliable manner.

This integrated plan needs to take account of national and international requirements and obligations, and be backed by secure funding secured from industry, Government and donors.

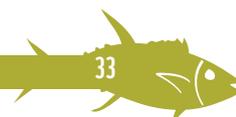
The plan should include the following components, in all cases backed by an increased commitment to data collection to fill the considerable existing gaps in knowledge:

- Information gathering, review and interpretation of available information to identify information gaps and guide research planning;
- Tactical focus on critical target and retained species, recognizing that there is currently insufficient focus on the regional/migratory nature of these stocks;
- Overall risk assessment, with a strong focus on retained/bycatch and ETP species;
- Application of ecosystem models;
- Capacity building to support all activities;
- Raising awareness of research needs, outcomes and application at district, provincial and national level
- Periodic review and assessment of the research plan (and subject to an external review process).

Working Group	P4KSI, BPPL, SDI, local fisheries schools, universities, RFMOs, external research bodies
Priority	Intermediate
Status	Expanding from existing activities
Timeframe	1 year
MSC Performance Indicator(s)	<i>Intermediate:</i> 3.2.5 Research Plan

4. COMPLIANCE STRENGTHENING

Enforcement systems in Indonesia have been upgraded through provision of training to PSDKP



officers, a strengthening of the penalty system and application of VMS to vessels > 100 GT. However, the compliance system for the tuna sector does not appear to have been tested, and there are reports of large scale deployment of non-licensed *rumpons* (FADs).

4.1 Risk analysis to identify the main areas of non-compliance and determine appropriate actions

PSDKP should **define the most likely types of infringement according to seriousness, and their capacity to control them**, along with partner organizations (the Navy, Marine Police, KKP, DKPP, DKPD and community groups) and plan to deal with them by **undertaking a risk analysis**. The principal risks (Appendix 3) would be divided into the following sections: Strategic Risk, Specific Risk, Likelihood, and Consequence, Risk Rating and MCS Adequacy, and Mechanisms for Improved Action.

Options for strengthening activity should centre around the enforcement tools in the management plan.

- The vessel licensing system, log books and catch certificates, and fishing permits;
- *Rumpon* measures – restrictions to the number of FADs licensed per vessel used and periods of prohibition on FAD fishing;
- Minimum mesh sizes and other gear configurations (restrict use of J hooks, as opposed to eco-friendly circle hooks);
- Spatial and seasonal closed areas;
- Bycatch retention and restrictions on shark finning, i.e., retention of the carcass and maximum % of fins relative to total landed shark weight;
- Baitfish management plans;
- Regular monitoring of seasonal closures;
- Active community participation in monitoring zones, closed areas and gear deployment;

Implementing the above may require an increase in the number of enforcement officers.

Working Group	PSDKP, Agency of MAF in province and district/POKMASWAS
Priority	High
Status	New
Timeframe	Operating within 12 months but ongoing on a continuous basis
MSC Performance Indicator(s)	<i>High Priority</i> 3.2.3. Compliance & enforcement

4.2 Review legislation and violation sanctions

Based on the management tools identified, it is important to extend National Decrees to each province and district. Legislation will require updating to list the series of restrictions and penalties including:

- Operating without a fishing license (as a mechanism to endorse the capping of new entrants);
- Fishing with gears in excess of the prescribed limits;

- Fishing in closed seasons or closed areas.

The range of potential violations as defined above would need to be accompanied by a schedule of penalties, which ultimately result in license removal (for repeat offences). Fishing without a license would have to result in confiscation of boat, gear and heavy penalty. Penalties should take account of the risk assessment (see below), such that regular/high risk offences should result in heavier penalties.

Working Group	PSDKP, DKP in province and district
Priority	High (with some lower priorities e.g. ecosystem related issues)
Status	New penalty schedules recently introduced, but may require specific review for EEZ, archipelagic and coastal, with a view to strengthening application at Provincial and District Level.
Timeframe	12 months
MSC Performance Indicator(s)	<p><i>High Priority:</i></p> <p>1.2.2. Harvest control rules and tools</p> <p>3.2.1. Fishery-specific objectives</p> <p>3.2.3. Compliance & enforcement</p> <p><i>Intermediate and Low priority:</i></p> <p>2.1.2. Retained species (Harvest strategy)</p> <p>2.2.2. Bycatch species (Harvest strategy)</p> <p>2.3.2. ETP species (Harvest strategy)</p> <p>3.1.1. Legal customary framework</p>

4.3 Developing education and outreach

Community fisher households should be educated in fisheries co-management and control measures. Fishing communities will have to be made aware of the ramifications of non compliance, most especially the consequences of effort control associated with the decline in CPUE, targeting juvenile species (through the use of certain gears), the justification for spatial and temporal closed areas and the consequences of negative ecosystem interactions. This work should include educational outreach undertaken by the fishery administrations in cooperation with DKP District, P4KSI and WWF, with visible support from the buyers and intermediaries, with supporting innovative publicity materials including posters and additional education outreach in local schools. This exercise is likely to require dedicated resourcing for a long period, i.e., the full 5 year period, and must be extended to the network of community and Community Surveillance Group (POKMAS) organizations.

The process of educational outreach should be further extended by regular community based meetings which can also be used to obtain feed-back on the success or problems encountered with the management measures.

Working Group	P4, WWF , MMAF and DKP Province and District, middlemen and processors
Priority	High
Status	New
Timeframe	Operating within 12 months but ongoing on a continuous basis

MSC Performance Indicator(s)	<i>High Priority:</i>
	1.1.1. Stock status
	1.2.2. Harvest control rules and tools
	3.1.4. Incentives for sustainable fishing
	3.2.1. Fishery-specific objectives
	3.2.2. Decision-making process
	3.2.3. Compliance & enforcement
	<i>Intermediate and Low Priority</i>
	3.1.1. Legal customary framework
	3.1.2. Consultation, roles & responsibilities
3.1.3. Long-term objectives	

4.4 Strengthen Community- based management systems for handline and other coastal fisheries

Under the Supervision of DKPD and PSDKP, fishers should agree to a set of standards, and **allocate responsibilities to a number of community control officers**. A system of circulating day-to-day monitoring responsibilities among fishers could be explored. A system adopted amongst fishers in Thailand and Indonesia is to devise a self-funded community compensation to fishers allocated to monitoring rather than fishing duties, but to circulate these activities to all willing participants. Fishers would need to be allocated some basic equipment such as binoculars, life jackets and VHF radios to strengthen their ability to support their compliance duties. **Community controllers need to be trained in monitoring fisheries regulations, communication skills, use of radios and other equipment.**

Working Group	POKMAS, PSDKP, DKP Province, DKP District
Priority	High
Status	Ongoing
Timeframe	Operating within 12 months to 3 years (because of the wide network of coastal communities) but ongoing on a continuous basis
MSC Performance Indicator(s)	<i>High Priority</i> 3.2.3. Compliance & enforcement

4.5 Reports prepared and publicly available identifying violations detected

Establish a system of reporting on violations and provide to the KTI and all stakeholders. High exposure of offences and penalties will to promote the deterrence effect.

Working Group	PSDKP. DKP Province/District
Priority	High
Status	New
Timeframe	Operating within 6 months but ongoing on a continuous basis

MSC Performance Indicator(s)	<i>High Priority</i> 3.2.3. Compliance & enforcement
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4.6 Train and improve the effectiveness of enforcement officers and add supporting hardware

Existing training applied to PSDKP staff should be upgraded to take account of the new regulatory systems. These should include knowledge of the regulations, as well as deployment procedures and strategies (as determined by the risk analysis (4.1)). Current capital assets will need to be evaluated in the light of amended regulatory requirements. An ideal solution would be to extend the Vessel Monitoring System (VMS) to all high-risk groups (below the current < 100 GT limit) and to recruit and train observers. It is noteworthy that PNA (Parties to the Nauru Agreement, which includes Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu) are currently experimenting with applying VMS to FADs.

Working Group	PSDKP
Priority	High
Status	Ongoing
Timeframe	Operating within 18 months but ongoing on a continuous basis
MSC Performance Indicator(s)	<i>High Priority</i> 3.2.3. Compliance & enforcement

5. OTHERS

5.1 Review of the impact on fuel subsidies on sustainability, 5-30GT and < 5 GT vessels

There is a large body of evidence¹² that suggest that input subsidies such as those for fuel are creating a negative distortion to capacity of the fleet by creating artificial profits and stimulating overfishing. However, the full extent of these distortions and relative impact on intermediate and smaller scale fishermen is unclear. It is important therefore, for **BBRSE to identify the impact of fuel subsidies to gauge the extent to which they are consistent with MSC Principles of sustainability and the ecosystem approach to Fisheries Management.**

5.2 Explore the prospect of changed emphasis from fuel subsidy to positive subsidies such as sustainable fishing incentives

BBRSE should also work, with KAPI to evaluate savings in costs that could be made (e.g. through identification of carbon emission inefficiencies) as a result of vessel inefficiencies and gear deficiencies.

Working Group	BBRSE/KAPI
Priority	High
Status	Expanding from existing activities
Timeframe	1 year
MSC Performance Indicator(s)	<i>Intermediate:</i> 3.1.4 Incentives for sustainable fishing

12 Dorsey, G., ADB/MMAF (2006), TNC (2008).

APPENDIX 1: Outline of proposed tasks for Indonesian Tuna FIP Action Plan

1 GOVERNANCE AND DEFINITION OF NATIONAL FISHERY MANAGEMENT OBJECTIVES											
	Priority Actions	Comments	PI	Institutional participation	Ongoing	NEW actions	2011	2012	2013	2014	2015
1.1	Refine objectives to ensure that priority is given to sustainable fisheries and the ecosystem approach to fisheries management at national and local level	Mechanism to potentially extend the current law to prioritise fisheries sustainability, against production and growth objectives, and accommodate EAFM principles	3.1.1	SDI, P4KSI, Dinas, PLN, KKJl, PSDKP		√					
1.2	Extension of the management system to local level	All fishery management principles, including precautionary approach should be extended to provincial and district levels;	3.1.1, 3.1.3, 3.2.1, 3.2.2	SDI, P4KSI, Dinas, PLN, KKJl, PSDKP		√	*	*			
1.3	Indonesia becomes a full Member of WCPFC and is instrumental in formulating strong precautionary policies at both RFMOs and implements decisions	To continue the process to become full member of WCPFC		KKP (SDI, P4KSI, PUSKITA), KTI, KEMLU, SetKab	√		*				
		Actively participated in adoption process of precautionary policies in fishery management in RFMOs	3.1.1	SDI, P4KSI		√	*				
		Continuing to be present at meetings		SDI, P4KSI	√		*				

1.4	Development of fisheries specific management plans	Definition of goals and objectives, Adherence to RFMO conventions, Implementing national tools and HCRs (See also 3.4 below), implementing precautionary management measures, developing bycatch mitigation strategies (3.5), Applying MCS, and reviewing strategies		SDI, P4KSI, PUP, PSDKP, KTI and stakeholder associations (ASTUIN, ATLI, Agency of MAF in province and district, dll) and WWF/SFP.	√	*	Ongoing	Ongoing	Ongoing	Ongoing
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2 STRENGTHENING THE INSTITUTIONAL FRAMEWORK

	Priority Actions	Comments	SG	Institutional participation	Ongoing	NEW actions	2011	2012	2013	2014	2015
2.1	Decision making and consultation processes consolidated through FKPPS and the KTI, which implements management strategies in territorial, archipelagic and EEZ waters	Legalize FKPPS and the KTI as a formal apex institution for Indonesian fishery management.	3.1.2			√	*				
		Strengthen the role of KTI (at national level) and to formally undertake the fisheries management role as defined	3.1.2	SDI, Agency of MAF in province and district, stakeholder,		√	*				
		Decisions implemented centrally, and not at decentralized level. Provinsi and District implement policy, but not responsible for formulating and making decisions which are at variance with national management requirements	3.1.2			√	*				



		Allow for active engagement from stakeholders in management decision making.	3.2.2	SDI, P4KSI, PUP, PSDKP, KTI dan stakeholder lainnya (ASTUJIN, ATLI, Agency of MAF in province and district, dll)		√	*	Ongoing	Ongoing	Ongoing	Ongoing
2.2	Identification of responsibility and capacity building across the range of implementing bodies	Allocation of tasks to specific stakeholders; Tuna Fisheries Saker, KKP, DKP Provinsi and District and Community groups	3.1.2	SDI, Agency of MAF in province and district, stakeholders as described above.		√	*	Ongoing	Ongoing		
2.3	Strengthening the role of Community fishing organizations	Establishing POKMASWAS in local headline and gill net coastal fisheries	3.1.2	SDI, Agency of KKP in province and district, Community, processors and middlemen and NGOs (WWF/ TNC).		√	*	Ongoing			

RESEARCH ACTIVITIES

3

	Priority Actions	Comments	SG	Institutional participation	Ongoing	NEW actions	2011	2012	2013	2014	2015
3.1	National scientific stock assessment capacity strengthened to support management taking onto account the major biological factors	Human capacity building in stock assessment and establishing region specific research stations at Benoa and Bitung	1.2.4, 3.2.4	P4KSI, BPPL, KOMNAS KAJISKAN, BPSDM.		√	*	*	*		
3.2	Information gaps removed	Stock abundance			√		*	*	*	Ongoing	Ongoing

3.5 Incorporated into 1.4 above	Fishery- specific management plans encompassing a set of well defined control rules limiting effort (by restricted entry licensing, especially at provincial level) and the impact of juvenile BET (restrictions on the use of FADs (across all levels of Government), raising the minimum mesh size, closed areas and others). The tools used should take into account uncertainties	Develop fisheries specific management plan (National Tuna Management Plan)	1.2.2/3.2.1	SDI, FKPPS, KTI		√	*	Ongoing	Ongoing	Ongoing
3.6	Bycatch data collection	Review of available information on stock status including bait fisheries, sharks, marlins and other 'main' pelagic species					*			
		Development of observer training module (from WWF/ SPC examples) and training of observers	2.1.3, 2.2.3, 2.3.3, 3.2.2	P4KSI, BPPL, SDI, industry, WWF/NGO, universities, SPC		√	*			
		Requires monitoring aggregate fish densities and size on FADs over periods to determine the likely impact on associated fish species	2.4.3, 3.2.2				*			
		Modelling of fishery removals to assess the impact on the ecosystem using existing SPC tools – ECOPATH etc	2.5.3, 3.2.2				*			

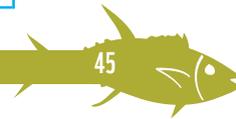
3.7	Completion of a risk based framework for retained and bycatch species (skipjack, small tunas, mahi mahi, kawakawa, sharks) and baitfish. Requires independent research to collect qualitative and quantitative information to perform a risk based approach covering SICA and PSA	Stakeholders receive training in risk assessment and participate in method specific workshops to determine risk to non target species.	2.1.1, 2.2.1, 2.3.1, 2.4.1, 2.5.1	P4KSI, BPPL, SDI, PSDKP, industry, WWF/NGO, University, multi-stakeholder involvement, RFMOs, external research bodies	√		*	*			
3.8	National limits for ETP interactions set and independent data collected on ETPs limits to ensure that bycatches are within national and international requirements. This may require observers to be present across a range of fisheries	Drawing from the information in 4.1 and undertake a risk assessment NPOAs finalised or amended to take account of WCPFC CMMs (sharks, turtles, cetaceans and birds)	2.3.2	SDI, FKPPS, KTI		√	*	*			
3.9	Management strategy and mitigation	Developing a management strategy for bycatch species and baitfish to be incorporated into a management plan (1.4)	2.1.2, 2.2.2, 2.3.2, 2.4.2, 2.5.2	SDI, FKPPS, KTI	√		*	*			

3.10	Indonesian Research Plan prepared to take account of national and international demands and obligations with appropriate budget funding secured from industry, government and donors.	Information gathering to determine data gaps, tactical focus on critical target stocks (and not confined to current FMA review process), cost effective risk assessment ingrained into analytical tools, application of ecosystem models, capacity building to support the above, awareness raising of activities undertaken and periodic review (including external scrutiny).	3.2.4	P4KSI, (BPPL, BBRSE, KAPI)	√	*				
		Seek cooperation with SPC/CSIRO with respect to ecosystem data collection		P4KSI, (BPPL, BBRSE, KAPI)	√	*				
		Incorporate raising awareness of the research plan to improve understanding among stakeholders in national, provincial and district level		P4KSI, (BPPL, BBRSE, KAPI)	√	*				
		Extend internal review process (e.g. research, management) incorporating inputs from provincial and district levels	3.2.5		√					
		Plan an external review process, as well as the monitoring of implementation of the plan			√					

COMPLIANCE STRENGTHENING

4

Priority Actions	Comments	SG	Institutional participation	Ongoing	NEW actions	2011	2012	2013	2014	2015
4.1	Compliance action to be implemented, based on risk analysis and determine enforcement priorities across the range of tuna fisheries	3.2.3	PSDKP, Agency of KKP in province and district / POKMAS		√	*	Ongoing	Ongoing	Ongoing	Ongoing
4.2	Strengthening the legislation on sanctions	3.2.3	PSDKP/KKP Legal Department	√		*				
4.3	Education process for fishers on management measures for target species, bycatch reduction and consequences of ecosystem interactions	3.2.3,	PSDKP, BPSDM KP, SDI, P4KSI, KAPI, Agency of MAF in province and district, Processors, middlemen and WWF.		√				Ongoing	Ongoing
4.4	Strengthen Community-based management systems for handline and other coastal fisheries.	3.2.3	PSDKP, Agency of MAF in province and district, all stakeholder	√		*	*	*	Ongoing	Ongoing
4.5	Reports prepared and publicly available identifying violations detected	3.2.3	PSDKP, Agency of MAF in province and district		√	*			Ongoing	Ongoing





4.6	Train and improve the effectiveness of enforcement officers and add supporting hardware	Upgrading of existing PSDKP training programme, but extended to Provincial and District participation.	3.2.4	√		*	*	Ongoing	Ongoing
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5 OTHER ISSUES									
5.1	Review of the impact on fuel subsidies on sustainability, 5-30GT and < 5 GT vessels	Conducting review on the effect of subsidy on fishery resources, to all fishery (environmentally friendly and non environmentally friendly) and different GT variation	3.1.4	√		*			
5.2	Explore the prospect of changed emphasis from fuel subsidy to positive subsidies such as sustainable fishing incentives.	Explore positive subsidies which benefit sustainable fishing practices e.g. pole & line		√		*			

APPENDIX 2. Concept Notes for a Scientific Observer Programme for Indonesia Tuna Fisheries

RATIONALE

Of the eight tuna fisheries to be covered by the FIP Action Plan i.e., handline, longline, pole-and-line, troll-and-line, purse seine > 30 GT, purse seine < 30GT, (drift) gillnet, and ringnet, experience suggests that higher ecological risk, as a result of high levels of bycatch and juvenile tunas, is likely to be associated with at least three of these fisheries – gillnet, longline and purse seine (both size categories). Nevertheless, observer programmes would ideally be established for all fisheries. In essence, these are likely to be one-off for lower risk fisheries (pole-and-line, troll-and-line, handline), and more regular for the high ecological risk methods. In practical terms, given the large number of vessels involved in the widespread Indonesian tuna fisheries, the level of coverage would need to be low initially. All observer schemes, whether one-off, or more regular, would have scientific rather than compliance objectives. Information on the other lower risk fisheries (pole-and-line, troll-and-line and handline) could also be collected by a combination of port/unloading sampling and fishermen interviews.

OBJECTIVES

The primary objective of a scientific observer programme would be characterization of all aspects of each fishery – catch (by fishing operation) by species (target species, bycatch and ETP) and size, gear and vessel configuration, selectivity of the gear, interaction with FADs and ETPs, location of catch relative to governance boundaries, and others. Biological sampling might also be undertaken.

PLANNING

In the *initial pilot phase* (possibly starting late 2100- early 2012), and following a review of information available from previous observer programmes in Indonesia, suitable training and preparation of forms/logs, low level coverage of three fisheries (longline, purse seine (2 vessel sizes) and gillnet) would be achieved. This could involve 2 trips per year per gear from each of up to 4 ports (e.g. Bitung, Sorong, Kendari, Ambon in the WCPO). At the same time, port sampling data, in conjunction with interviews, would be collected in the same ports (or a subset of them) from the remaining gear types.

An evaluation of the pilot phase activity, after 1-2 years, would identify problems to be resolved with the programme, the level of risk associated with the various gears, and would inform planning for the next phase. During this *consolidation phase*, possibly starting 2013, and following a feasibility study, the extent of coverage would be increased to, for example, 20% of large purse seiners, 10% for longliners and gillnetters, and 5% for other gears.

If, in the medium or longer term, compliance observer work would be required e.g., to observe FAD closures, area closures, full retention of catch etc, the programme could enter a *compliance phase*, with a higher level of coverage, and subject to obtaining support for such work.

SUPPORT

Initiating the programme will require guarantees of support (financial and human resources), a nominated responsible agency (BPPL or P4KSI), development of suitable databases, cooperation of international agencies with previous experience with observer programmes e.g., WCPFC/SPC, CSIRO, eventual certification of observers etc. Initially, during the pilot phase, selected Universities could be enlisted to support the programme.

APPENDIX 3: Example of Strategic Risk Analysis for Indonesian Tuna fisheries (Possible Draft Action)

Strategic Risk	Specific Risk	Likelihood	Consequence	Risk rating	MCS Adequacy	Mechanisms for improved action
Excess capacity/ unauthorized fishing undermines national and regional fisheries management goals	Overfishing by domestic vessels with pressure on specific target species	Almost certain	Serious	Severe	Weak: Reluctance to implement capacity controls.	Requires stronger resolve in licensing policy at national and provincial level, and a focus on PSDKP activity on domestic as well as IUU activities
		Possible	Intermediate	Moderate	Weak at Provincial level.	Targeted actions in areas of high fishing intensity
		Possible	Intermediate	Moderate	Weak at Provincial level.	Requires greater provision of industry intelligence
		Possible	Intermediate	Moderate	Weak at District level	Requires greater provision of industry intelligence
		Possible	Intermediate	Moderate	Weak at District level	Requires interaction between DKPD and POKMAS, and codes on restricted access to non localized areas
		Possible	Intermediate	Moderate	Weak at District level	Requires interaction between DKPD and POKMAS, and codes on restricted access to non localized areas
		Limited	Moderate	Low	Weak: Requires minimal monitoring	Landing site checks at high tuna dependency ports
		Limited	Moderate	Low	Weak: Requires minimal monitoring	Landing site checks at high tuna dependency ports

Non compliance of management tools undermines national harvest strategies	Unregulated fishing in closed areas/ closed seasons	Almost certain	Small purse seine	Serious	Severe	Weak: Reluctance by Provincial Government to implement controls and lack of financial resources to allow monitoring of activity	VMS and Sea surveillance, 100% observer coverage
		Likely	Large purse seine	High	High	Weak: Inadequate focus on domestic vessels, with foreign IUU detection, a stated national priority	VMS and Sea surveillance, 100% observer coverage
		Likely	Long line	Serious	High	Weak: Inadequate focus on domestic vessels, with foreign IUU detection, a stated national priority	VMS and Sea surveillance, 100% observer coverage
		Unlikely	Pole & line	Intermediate	Moderate		
		Unlikely	Troll & line	Intermediate	Moderate		
		Unlikely	Other methods	Intermediate	Moderate		

	Fishing with unauthorized fishing gear	Almost certain	Small Purse seine	Serious	Severe	Weak: Inability to monitor and control <i>Rumpon</i> deployment & use of small gears	<p>Promote the system of licensed FADs, across the administrations, gear markings, High levels of surveillance in regularly fishing location and possible Satellite tracking</p> <p>Gear inspections at sea and on land</p> <p>Intelligence from other fishers</p> <p>Education programmes</p>
		Likley	Large purse seine	High	High	Weak: Inability to monitor and control <i>Rumpon</i> deployment	<p>Promote the system of licensed FADs, across the administrations. s. gear markings, Satellite tracking and observer coverage</p> <p>Intelligence from fellow fishers</p> <p>Education programmes</p>

Undermine the sustainability of bait species			Likely	Pole & line	High	High	Requires limits set on site extraction	Check on sales and purchases and cooperation with bait POKMAS Education
			Likely	Long line	High	High	Requires limits set on site extraction	Check on sales and purchases and cooperation with bait POKMAS Education
			Possible	Hand-line	Intermediate	Moderate	Requires limits set on site extraction	Check on sales and purchases and cooperation with bait POKMAS Education

Undermines sustainability of bycatch species and wider ecosystem impacts	High ETP interactions	Likely	Long-line	High	High	Weak: No bycatch monitoring. Especially critical for ETP interactions	Observer coverage (20%) Education At sea surveillance and port inspections
		Possible	Gill net and ring net	Intermediate	Moderate	Weak: No local level control applied by DKPD	Education POKMAS
	Shark fining	Likely	Long line	High	High	Weak: No implementation of NPOA	Observer coverage (20%) Education At sea surveillance and port inspections
		Possible	Troll & line	Intermediate	Moderate	Weak: No reported interactions	Occasional observer monitoring
Bird entanglement							

