Asia-Pacific
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for Asia-Pacific Prosperity

Capacity-building Workshop on Implementation of Port State Measures under the APEC Roadmap on Combatting IUU Fishing

APEC Oceans and Fisheries Working Group

November 2021

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Economic Cooperation

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WORKSHOP REPORT

APEC Oceans and Fisheries Working Group

November 2021

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Table of Contents

LIST OF ACRONYMS, FIGURES AND TABLES

AI	artificial intelligence
AIS	Automatic Identification Systems
APEC	Asia Pacific Economic Cooperation
CMM	*Conservation and Management Measure on Minimum Standards for Port State Measures*
CSIRO	Australian Commonwealth Scientific and Industrial Research Organisation
EEZ	exclusive economic zone
FAO	Food and Agriculture Organization of the United Nations
HMTCs	harmonised minimum terms and conditions (for access by fishing vessels)
IMO	International Maritime Organization
IUU	Illegal, Unreported, and Unregulated fishing
MC	Master of Ceremonies
MCS	monitoring, control and surveillance
MMSI	Maritime Mobile Service Identity
MRAG	
MRAG AP	Asia Pacific
(NZ) MPI	New Zealand Ministry for Primary Industries
FIMS	Fisheries Industry Marine System
OFWG	Oceans and Fisheries Working Group
PSM	Port State Measures
PSMA	Port State Measures Agreement
RBM	Rights Based Management
RIMF	Regional Information Management Facility
VMS	Vessel Monitoring and Surveillance
WCPFC	Western and Central Pacific Fisheries Commission
WWF	World Wide Fund for Nature

Māori terms

kaitiakitanga	stewardship
mana	respect
manaakitanga	looking after people
rangatiratanga	leadership
tikanga	appropriate action
tohungatanga	expertise
wero (challenge	challenge
whakataukī	proverb
whanautaunga	family

Figures

Tables

EXECUTIVE SUMMARY

With the APEC region providing approximately 52 percent of global fisheries catch – an industry which represents a global value of approximately USD 144 billion every year – the sustainability and management of fisheries resources is a top priority for APEC Member economies. Considering this, the fact that 20 per cent of fish captured globally is lost to Illegal, Unreported, and Unregulated (**IUU**) fishing, which is untaxed and often excessive, is a major concern, and one which warrants concerted attention in the APEC forum.

The Workshop was segmented into five themes:

Theme One – Significance – Economic impacts
Theme Two – Compliance with Port State Measures
Theme Three – FAO View on Significance
Theme Four – Emerging Technologies
Theme Five – Pacific focus on Application

The Project identified best practice and innovative approaches which economies could employ to deliver Port State Measures (**PSM**) needed to combat IUU.

At the conclusion of the Workshop, a number of recommendations to improve capacity building, uptake and application of PSM in the APEC Region had been extracted over the course of the two days. These were:

1. Economies to **note** that the most effective PSM programmes are those that target limited resources based on risk and intelligence.
    - every PSM, however simple/small, contributes to combatting IUU. Some of biggest practical improvements come from just using monitoring, control and surveillance (**MCS**) to their fullest potential
2. Economies to **note** that some of biggest practical improvements come from using good dockside inspections. This allows for cross-referencing log-sheets vs catch offloaded
    - the most effective regimes are those that target limited resources based on risk and intelligence
3. Economies are **encouraged** to recognise that tackling IUU works best when it is treated as a shared problem. This requires cooperation on improving traceability of fish throughout the supply chain
    - sharing of technologies to combat IUU fishing where aid is offered

4. Economies to **note** that voluntary compliance achieved through education and incentives is cost effective in improving compliance.
    - The more that Member economies can encourage voluntary compliance (through education, incentives, straightforward regulation, including stakeholders in the regulatory process etc) the better
5. Economies are **encouraged** to use the Workshop virtual toolbox to enhance effectiveness, education and innovation in relation to Port State Measures
    - and to utilise the Workshop best practice examples to increase MCS of IUU.
6. Economies are **encouraged** to continue to build their technical capacity in PSM through training, information, and best practice exchange.
7. Economies are **encouraged** to increase investment in MCS and the front line inspectorate to monitor the activities of foreign vessels operating in APEC economy waters.
    - There is a need to monitor the activities of the new fleets which have started to operate in APEC economy waters (noting that financial returns from fishing have increased over recent years without a corresponding investment in MCS).
8. APEC OFWG to **consider** holding regular workshops on topics relevant to IUU including innovative technologies, coping with Covid in the future and MCS training and programmes.

A key outcome of the Workshop is the provision of a virtual toolkit that comprises resources for all member economies and is hosted by the New Zealand Ministry for Primary Industries. This is intended to be a ready reference for economies.

The Pre-Workshop evaluation recorded 154 participants and speakers registered for the Workshop (40% female, 58% male and 2% not specified) from 17 APEC economies and 17 other economies from around the world. The post-Workshop evaluation was completed by 18 participants. While this was disappointingly low, the assessment of the Workshop by participants who did respond were generally positive, with all respondents stating their overall understanding of issues impacting port state measures and IUU fishing had improved as a result of the Workshop sessions.

Participants were asked which Workshop themes they felt they had learnt the most about during the workshop sessions. These were ranked as follows:

Technology (Dr Chris Wilcox and Dr Jessica Ford CSIRO, Australia)
Practical application (Francisco Blaha, Pacific Economies)
Economic impact (Duncan Souter, MRAG)
FAO View on Significance (Dr Matthew Camilleri and DR Alicia Mosteiro, FAO)
Compliance (Dr Lara Manarangi-Trott, Western Central Pacific Fisheries Commission)
Pacific perspectives (Alois Kinol (PNG), Julian Tamehana (NZ), Francisco Blaha (Pacific Economies))
Technology (Bubba Cook, Western Central Pacific Tuna Programme)
Importance of PSM for indigenous communities (Craig Ellison, Ngai Tahu Seafoods)
Compliance (Andy Wright and Julian Tamehana NZ MPI)

When asked about ways that the project team could have improved the overall conduct of the workshop, respondents made a range of suggestions and comments. Overall, responses were very positive, with many stating that the workshop was well run. Others noted technical difficulties they had encountered, and some would have liked more participant involvement. Other ideas put forward were to invite more participants from all over the world as guests of APEC in any future program, have a broader representation of the wider APEC economies (it was felt that much of the findings and discussions were framed around the FFA and the Pacific), there was very little participation in Q&A from APEC member countries from Asia and perhaps they could submit papers and the organisers could create "discussion rooms" to exchange ideas and finally some presentations were more effective than others especially ones with more concrete examples and concrete information. were the most useful. "Workshop" I think often implies more active participation, so perhaps that can be considered in the future (e.g., imbedded polls, breakout groups, etc). That said, as a newer staff member, I learned a lot about PSMA, so it was still quite effective!

INTRODUCTION AND BACKGROUND

Introduction

With the APEC region providing approximately 52 per cent of global fisheries catch – an industry which represents a global value of approximately USD 144 billion every year – the sustainability and management of fisheries resources is a top priority for APEC Member economies.

Considering this, the fact that 20 per cent of fish captured globally is lost to Illegal, Unreported, and Unregulated (IUU) fishing, which is untaxed and often excessive, is a major concern, and one which warrants concerted attention in the APEC forum. The Oceans and Fisheries Working Group (OFWG) agenda demonstrated this concern by adopting the APEC *Roadmap on Combatting Illegal, Unreported and Unregulated (IUU) Fishing*. The Roadmap has sought to strengthen the prevention and combating of IUU fishing with consideration on capacity building.

The Roadmap objectives are two fold[1]:

- Build technical capacities
- Strengthen institutional capacities and compliance with domestic and international conservation and management measures to address IUU fishing within APEC through enhanced cooperation between member Economies.

The Roadmap has six action areas:

- Implementation of PSM
- Exchange of information regarding traceability and monitoring, control and surveillance of fishing activities
- Increase the coordination of APEC Economies
- Promote collaboration with relevant regional and international fisheries bodies to identify where APEC can contribute
- Strengthen Public-Private Engagement
- Capacity building.

According to D Souter (2021)[2], IUU fishing is estimated to account for 11-26 MT, ex-vessel value of US$10-23.5b but that “In practice, nature and scale of impacts are highly variable –

1 *APEC Roadmap on Combatting Illegal, Unreported and Unregulated (IUU) Fishing*. Third Senior Officials’ meeting, Puerto Varas, 29-30 August 2019. APEC Roadmap on Combatting Illegal, Unreported and Unregulated Fishing

2 Souter, D. IUU: economic costs and observations. Presentation, *APEC PSM Workshop*, 21 July 2021

differ region to region, country to country, fishery to fishery." Souter goes on to refer to several studies specifically related to the APEC region:

- **FAO/CSIRO (2021)** – 'illegal landings' in APFIC region
    - Sub-regions in APEC area: 4.5 MT; US$15.5b
- **Sumaila et al (2020)** – global 'illicit trade' study
    - APEC region: 4.1 - 7.1 MT; US$3.6 - $6.4b
- **MRAG AP (2016)** – South Pacific tuna fisheries
    - 300kT; US$616m ('first cut', high levels of uncertainty for some IUU risks)

PSM can also play a valuable contribution to supporting and lifting indigenous returns from fisheries thereby contributing to fisheries sustainability. This, however, is inhibited by IUU and regulatory barriers and compliance issues and the related challenges of combatting IUU whilst still capturing the revenue that processing on-shore delivers.

The APEC OFWG was tasked with leading action on this issue which led to the development of the OFWG PSM Workshop Project. This workshop will make an important contribution to progress under the Roadmap.

The PSM Project was aimed at capacity building and developing a shared understanding of the impact of the current IUU on those engaged in fisheries.

Identifying what the barriers and opportunities are for PSM involves a coordinated and collaborative response by economies. The focus is to address issues that lead to reducing IUU and improving the regional fishereies, as well as regional economic strengthening. This requires greater investment in MSI and research whilst noting that the simplest etc. This underpinned the value and importance of conducting the PSM Virtual Workshop, recording this in a report and providing a virtual tool box of the presentations and related videos.

The specific objectives of the Workshop were to:

- To identify barriers and opportunities being faced by APEC economies in implementing PSM.
- To examine how PSM are able to effectively combat Illegal, Unreported and Unregulated fishing in light of the economic pressures encountered as a result of the global pandemic of Covid-19.
- To develop resources and recommendations for policy settings and capacity building activities which could helpfully be built upon to enhance PSM.

Background

The PSM Workshop was conducted in a post-global Covid-19 pandemic environment but where variant strains were emerging world-wide. This environment was having a significant effect on PSM

APEC Ministers have repeatedly identified the fight against IUU fishing as a priority issue, highlighting the global and regional threat which this poses to sustainable fisheries, fishing communities, marine ecosystems, and societies. In recognition of this, in 2019 APEC Food Security Ministers welcomed the APEC Roadmap on Combatting IUU Fishing, identifying as Action 1 under the Roadmap the importance of robust and effective PSM as a critical component to combatting IUU. As part of this project, we will be designing a virtual repository which will house interviews and informational videos from experts and industry relating to key issues of interest identified by Economies. A workshop will then be virtually in June 2021, bringing together representatives from Member economies, industry, and international organizations to identify further issues and gaps in knowledge encountered in implementing PSM and, correspondingly, highlight opportunities for further research, capacity building and best practice examples to help overcome those impediments.

The PSM Workshop emerged from this strong interest in collaboration across the APEC economies on IUU and information sharing. The project was funded from the APEC general fund and supported by the economies of Australia; Canada; Chile; China; Indonesia; Korea; Malaysia; New Zealand; Philippines; Russia; Singapore; Chinese Taipei; Thailand; United States; and Viet Nam. The budget developed as part of the project proposal was designed to cover speakers, facilitator (**MC**), coordinator, scribe, and video production. The resultant Workshop Program is at Attachment A.

The intention throughout was to try to achieve a gender balance in terms of both speakers and participants. This, alongside the specialist expertise in IUU, allowed for a platform where a diversity of voices was able to speak to some of the key issues impacting the application of PSM across the APEC economies from each of their unique perspectives.

The Pre-Workshop evaluation recorded 154 participants and speakers registered for the Workshop (40% female, 58% male and 2% not specified) from 17 APEC economies and 17 other economies from around the world. The post-Workshop evaluation was completed by 18 participants. While this was disappointingly low, the assessment of the Workshop by participants who did respond was generally positive, with all respondents stating their overall

understanding of issues impacting port state measures and IUU fishing had improved as a result of the Workshop sessions.

Table 1: Attendee (Speakers/Participants Registered at 12 July) Summary Table

	Female	Male	TOTAL
Speakers and MC	4	10	14
Participants	61	89	150*
All Attendees	65 (44%)	99 (66%)	164 (100%)

Note * 4 participants did not indicate gender

Speakers and participants were drawn from 17 APEC economies and 2 other agencies, the FAO and WWF. The biographical notes of speakers, MC, project overseer and project coordinator are at Attachment B.

In seeking participants from member economies, care was taken to emphasise particularly the importance of gender balance in the Administrative Circular, to send a reminder to economies about registering to participate and extending the period of registration to encourage participation.

Once speakers were identified, they were provided with a formal letter confirming their participation, information about scope of presentation in the particular theme area and information about logistics and registration. They were also contacted by the MC individually for a short discussion on their topic to build familiarity with their scope by the MC and comfort for the speaker with the prospective Workshop conduct.

The core team liaised regularly in the lead up to the Workshop. The New Zealand Ministry of Foreign Affairs and Trade coordinating team was liaised with separately in relation to the virtual presentation and conduct.

WORKSHOP PROCEEDINGS

DAY ONE

Opening

Mr Patrick English, MC, welcomed everyone to the workshop. Forty economies were online. He acknowledged the impact of COVID-19 and how the world is managing it. PSM and Illegal, Unregulated and Unreported (**IUU**) Fishing had been directly impacted by COVID19 and participants would hear about the impacts and challenges. He encouraged participants to leave a legacy. In Māori culture, it is about tāngata tāngata tāngata (it is about people, people, people). IUU through PSM can be tackled with cooperation and participation with everyone.

The **Workshop Welcome to New Zealand** was provided by **Mr James Brown,** Manager, International Fisheries, New Zealand Ministry for Primary Industries (**MPI**). He said 2021 was important New Zealand and OFWG was honoured to welcome participants and speakers to the workshop.

He noted the New Zealand had been active in the PSM area and IUU and that he was pleased to bring a group of people together to share lessons and experiences, and strengthen positions on PSM.

The ambition for New Zealand in 2021 was to raise the awareness of PSM and encourage economies that had not yet signed up to the PSM Agreement to do so.

New Zealand's theme for their APEC host year is 'Haumi ē. Hui ē, Taiki ē. Join. Work. Grow. Together." Clear instructions for APEC New Zealand was that the focus should be on what we could do together as 21 economies with shared interests.

James thanked the economies who had co-sponsored the workshop, encouraged everyone to actively participate, join, work and grow together, wished everyone good luck and looked forward to the Workshop's progress.

Objectives for the Day

Mr Patrick English, MC, described the objectives for the first day:

1. To consider the economic impacts of IUU for Member economies including indigenous communities and ways of addressing these impacts.
2. To consider barriers to compliance and opportunities for APEC economies in implementing PSM.

OFWG WORKSHOP WELCOME - DR ALICIA G LAGNO, Chair, Ocean Fisheries Working Group

Dr Alicia G Lagno thanked New Zealand for organising the Workshop on PSM as an implementation activity of the APEC Roadmap on IUU. She noted that collaboration was a key principle and that we in APEC needed to combat IUU and strengthen capacity and cooperation between our economies.

She noted that six action areas of the Roadmap and the implementation goal of OFWG. She saw this Workshop as important in the support of economies to progress domestic action, exchange information and identify areas of common interest. It was also important to coordinate action with specific tools, be familiar with the development of technology in the area and appreciate the impact on indigenous livelihoods. Collaboration was vital. She encouraged everyone to share their experience and analysis in the Workshop and encouraged all to learn, grow together and serve.

THEME ONE: SIGNIFICANCE – ECONOMIC IMPACTS

KEYNOTE SPEECH: MR DUNCAN SOUTER, Chief Executive Officer, MRAG Asia Pacific, Australia on “IUU – Economic impacts”

Mr Duncan Souter outlined his presentation, that the first part of presentation would centre around costs in the APEC region and globally and the second part would focus on insights and observations regarding work undertaken on IUU and PSM.

Around 58% of the global wild catch fisheries production was undertaken in the APEC region These were some of the most ‘fisheries dependent’ countries in the world where fish was an essential source of protein. He said the bottom line was that APEC economies had a vital interest in maintaining the health and productivity of fisheries in the region.

IUU fishing was one of the key challenges facing fisheries globally. He said that IUU fishing accounted for and estimated 11-26 MT ex-vessel with a value of US$10-23.5 billion. He referred to a number of studies that attempted to estimate the impact of IUU in the region: FAO/CSIRO (2021) which estimated 4.5MT with a value of US$15.5 billion; Sumaila et al (2020) which estimated 4.1-7.1MT with a value of US$3.6-6.4 billion and MRAG Asia Pacific (2016) which estimated in the tuna fisheries alone, 300kT with a value of US$616m. He noted that in practice, the costs were complex and driven by local circumstances, that the metric of using the ex-vessel value was not always a good measure of 'loss' to costal economies. Other costs, in addition to direct catch costs, were that IUU fishing undermined fisheries data creating higher uncertainty and higher risk; it undermined coastal livelihoods and food security; it impacted marine ecosystems and it was linked to labour abuses and other transnational crime. Often, the hardest hit were those in developing economies.

He noted the variability of IUU, that it was not a homogenous activity. By understanding the local nature and extent of IUU, different monitoring, surveillance and compliance solutions could be developed and adopted. He stressed the importance and success of cooperation: the vessel register, harmonised minimum terms and conditions (**HMTCs**) for access by fishing vessels, vessel monitoring and surveillance (**VMS**), common log sheets, observer programs, the Regional Fisheries Surveillance Centre, the Niue Treaty (cooperation), regional operations, regional MCS strategy, Regional Information Management Facility (**RIMF**), etc. He noted that these maximised limited resources.

APEC economies were well placed to help disrupt and deter the flows of IUU product through the supply chain. There was a longstanding mandate to work cooperatively on IUU issues that had been refreshed in the 2019 Roadmap on Combatting IUU.

In his view, the most cost effective MCS system was the one where everyone complied voluntarily, that the more voluntary compliance could be encouraged, the further limited MCS resources would stretch. Some of most important 'tools in the toolbox' were those that encouraged voluntary compliance including education, involvement of stakeholders in regulatory process, incentives and straightforward and clear regulation. This included strong, up to date vessel registries, good logbook/data collection, good dockside inspections and strong coordination amongst economy agencies.

In addition, new technology did offer significant potential but only after encouraging voluntary compliance as noted above. This new technology included ckchain, drones, etc. However, some of the biggest improvements in efficiency and effectiveness could come from risk-

analysis and intelligence gathering/ sharinAutomatic Identification Systems (**AIS**), artificial intelligence (**AI**), machine learning, blog.

Duncan commented specifically on the impact of Covid, that Covid-19 had been a huge challenge particularly in the supply chain where fisheries had not functioned well. The Pacific Islands hade handled Covid-19 well and collectively. The PSM Agreement had put in a range of measures to minimise the impact of supply issues. Indicators showed that fisheries had come through well; that catch volume had been reasonably consistent.

In response to a question about the trend of IUU in APEC, Duncan noted that estimating IUU was difficult and that there would always be a level of uncertainty. MRAG South Pacific was in the process of updating the 2016 estimates and a study was expected to be released later in 2021. He would expect that those estimates to reduce in the Pacific region but any such reduction needed to be kept in context. Education had been about better information. In 2016 estimates of IUU showed uncertain information in illegal fishing. In the study, MRAG was working with data that would give better information on the scope of illegal trans-fishing. This allowed the risk to be narrowed down. Better information was being obtained through big data approaches and this was helping.

In terms of whether reporting should be more frequent, Duncan noted there was some suggestion that this be undertaken. He noted there was an initiative to establish a set of guidelines where IUU studies had been undertaken. In that process, there was a view that it was better to establish a set of technology guidelines that different economies could use to assess their own IUU issues. Tracking IUU at relevant regional scale was important. A set of indicators could be compiled that was then less expensive.

In terms of the recommendation for the roadmap he would make, Duncan pointed to information sharing and cooperation as being essential. One of the observations was that IUU was best dealt with as a shared problem. By making sure there were good risk and intelligence frameworks, a successful PSM strategy would result.

THEME TWO: COMPLIANCE WITH PORT STATE MEASURES

FISHERIES INSPECTION – MR ANDREW WRIGHT, Manager, Ministry for Primary Industries New Zealand

Mr Andrew (Andy) Wright advised that the video about to be presented covered:

- How New Zealand had implemented PSM in New Zealand ports and how compliance rules were used to support this
- The usefulness of risk assessment to guide inspection processes
- How New Zealand used tools such as observers in the unloading of goods and verifying species
- What happened after the inspection and if non-compliance was identified
- Under PSM, the flag economy or the economy port could be asked to undertake an investigation and
- Health and safety of inspectors including the challenges of COVID-19.

The New Zealand video on inspection and interview with Fisheries Officer was played. It covered Foreign vessel approval, Pre-inspection vessel checklist, Health and Safety – slip hazards and working machinery, Bridge inspection, Hold inspection, Monitored unload, Practical considerations, Post Inspection and Notifying the Port Economy The video would be available through the New Zealand MPI repository.

The Fisheries Officer in the Video Mr Julian Tamehana, and Andy Wright then answered a range of questions from the MC and participants.

FISHERIES INSPECTION – THE PRACTITIONERS – MR ANDREW WRIGHT and MR JULIAN TAMEHANA, Ministry for Primary Industries New Zealand

On training in the wider Pacific region, Julian noted that training was very important and that there needed to be an initial set of skills. New Zealand had a very good relationship with Pacific economies and assisted alongside some of the economies where training was required. This was better enabling these economies to do their jobs as fisheries officers and conduct inspections.

Julian noted the operational system had changed in recent years in the areas of vessel monitoring systems, visual aspects, and technology that kept advancing. Vessels could now be monitored through hand-held apps and other good technology tools were available.

In terms of health and safety considerations, Julian said an important first step was undertaking a risk analysis. If a vessel had previously visited New Zealand, it had a record and this record would be studied to see if there were any risks. Once that was completed, a visit to the port was undertaken. Tides needed to be right, along with an awareness of working machinery. A health

and safety induction needed to be taken on board and there was also a requirement to wear hard hats, masks, and high viz vests.

Concerning language and cultural challenges, Julian said they always had to be respectful when boarding vessels since these were people's homes and livelihoods. He said that being a New Zealander and Māori ensured cultural awareness. There was always an attempt to find out about the culture, to be respectful and learn the language as this was a big ice breaker. A list of questions was provided and these were used when vessels were boarded. This was also helpful to break the language barrier.

In relation to training on technology such as AIS and drones, and how beneficial would it be for the fisheries officers to access tools and whether this could be done online, Julian noted that some fisheries officers had already undertaken courses on drones. He said that mobile app training was undertaken internally.

For training courses, because of COVID-19, Zoom was now used and there had been an assemblage for one week for opportunities with a defence component e.g. handcuffing. The second phase of training was a commercial four-week Zoom course and the onus was on the officer to complete hands-on training with workbooks. MPI fisheries compliance worked alongside trainee and other inspectors to upskill them. Officer safety training was undertaken every six months. New Zealand trainers had also worked alongside fisheries officers in economies such as Fiji, Niue and Tonga on a vessel in the Pacific. Part of the requirement of people attending was that they had to compile a boarding list.

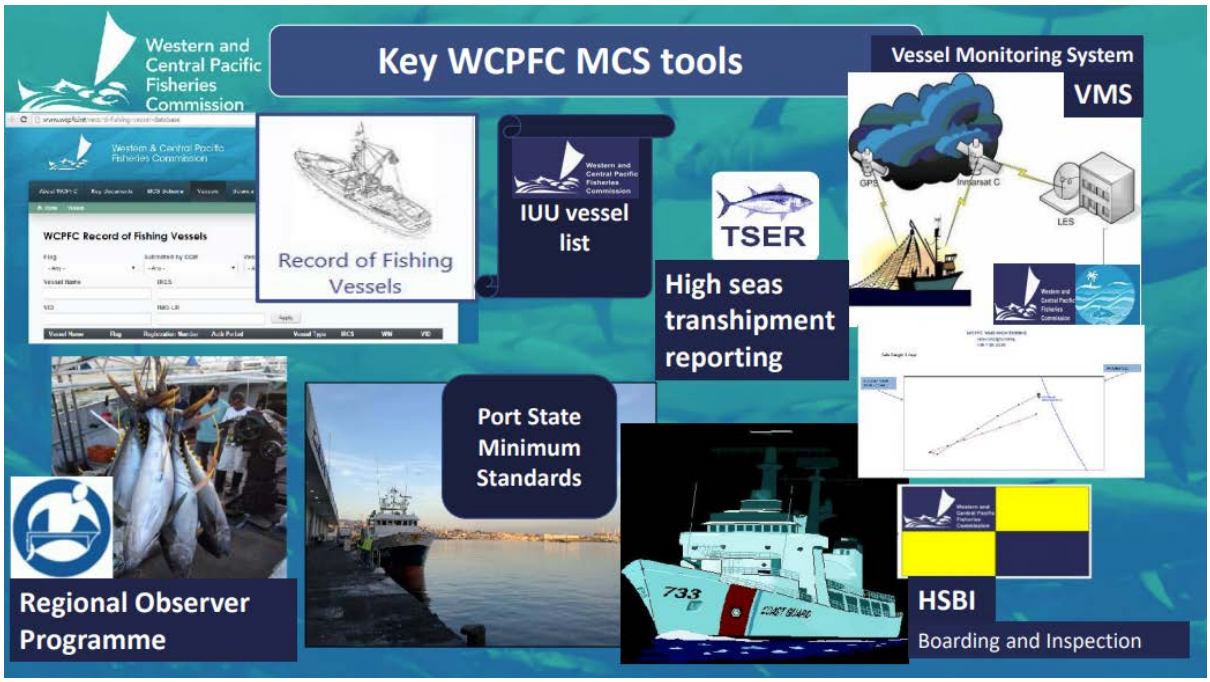
Julian was asked how often containers were encountered that contained the product of IUU fishing. He said that IUU came in different forms and outlined a situation regarding abalone that had resulted in prosecutions.

PORT STATE MEASURES – THE WESTERN AND CENTRAL PACIFIC FISHERIES COMMISSION MINIMUM STANDARDS APPROACH – DR LARA MANARANGI-TROTT, Compliance Manager, Secretariat, Western and Central Pacific Fisheries Commission

Dr Lara Manarangi-Trott started out with a backgrounder on the industry and the Western and Central Pacific Fisheries Commission (**WCPFC**). On the industry she noted tuna was a significant contributor to the regional economy. Fifty five percent of the world's tuna catch was in the region.

Tuna fisheries provided significant income to Pacific Island Fisheries, it was still in reasonably good shape. On the WCPFC, she said it had been 17 years in existence, there were 42 Commission Convention Members (**CCM**) seats at the table, there were 44 Conservation and Management measures and 6 resolutions had been agreed, the Secretariat comprised 9 international staff and 13 support staff as well as contactors. She then outlined key WCPFC MCS Tools and included high seas transhipment reporting, high seas boarding and inspection, a regional observer programme and a vessel monitoring system – See Figure 1

Figure 1 – Key WCPFC MCS Tools



The context for WCPFC's approach was outlined and Lara noted that not all CCMs were parties to the FAO Agreement on PSM. The WCPFC objective and roles were "to establish processes and procedures for CCMs to request that port inspections be undertaken on fishing vessels suspected of engaging in IUU fishing or fishing related activities in support to IUU fishing"[3]. She then outlined the processes and procedures applying to designated ports.

In the current environment, 7 CCMs had designated ports and/or notified contacts under the *Conservation and Management Measure on Minimum Standards for Port State Measures* (**CMM**) 2017-02 and a further 14 WCPFCC were PSM Agreement Parties. Specific assistance was available for CCMs notably the legal basis, international organisation participation, technical assistance, implementation assistance and a mechanism for dedicated funding to support inspections of foreign fishing vessels in Pacific Islands Ports was envisaged and provided for.

3 WCPFC. *Conservation and Management Measure on Minimum Standards for Port State Measures 2017-02*. Philippines, Dec 2017, para 1.

In conclusion, Lara noted that the WCPFC's Port State CMM established minimum standards that were intended to complement the FAO PSM Agreement and provided flexibility for WCPFC CCMs to be able to determine when CMM 2017-02 requirements would be applicable and to which ports. CMM 2017-02 included provisions to assist the developing CCMs but a dedicated funding mechanism had not yet been developed. A future review of the CMM 2017-02 may well consider additional elements such as: notification requirements, port entry, authorisation or denial, use of ports and additional inspection requirements.

In terms of the impact of Covid-19 on the WCPFC activities, Lara said that the observer programmes had been impacted, mainly around vessels and the need for observers to be safe. There had also been a need to adjust port inspections. In reports that were being received, some ports in the Pacific Island economies had resulted in vessels not coming directly into port to do their transhipping. This was being monitored closely and a paper would be presented to the WCPFC Technical and Compliance Committee in September 2021.

In relation to identifying ownership of countries and transhipment at your ports, Lara said that this depended on the country. WCPFC's role was to set up at a regional level. New Zealand for example, would have its own procedure but each country would have its own way of undertaking inspections. In responding to a question about consensus Lara said that WCPFC makes decisions primarily by consensus and that voting was used by exception if necessary. The minimum standard approach was one that all members had to be comfortable with. As time went on there would be the ability to raise the minimum standards and have more elaborate requirements if necessary.

Mr Andy Wright noted that only seven members had designated their ports and he asked how much was this a challenge to having the scheme work within the Pacific and what plans could be put in place to increase the designation. Lara said there would be a need to check which members had designated ports and what their reasons were if this had not already been advised. Some had indicated they would be adhering to the Agreement in any event. Lara noted that COVID-19 had interrupted progress.

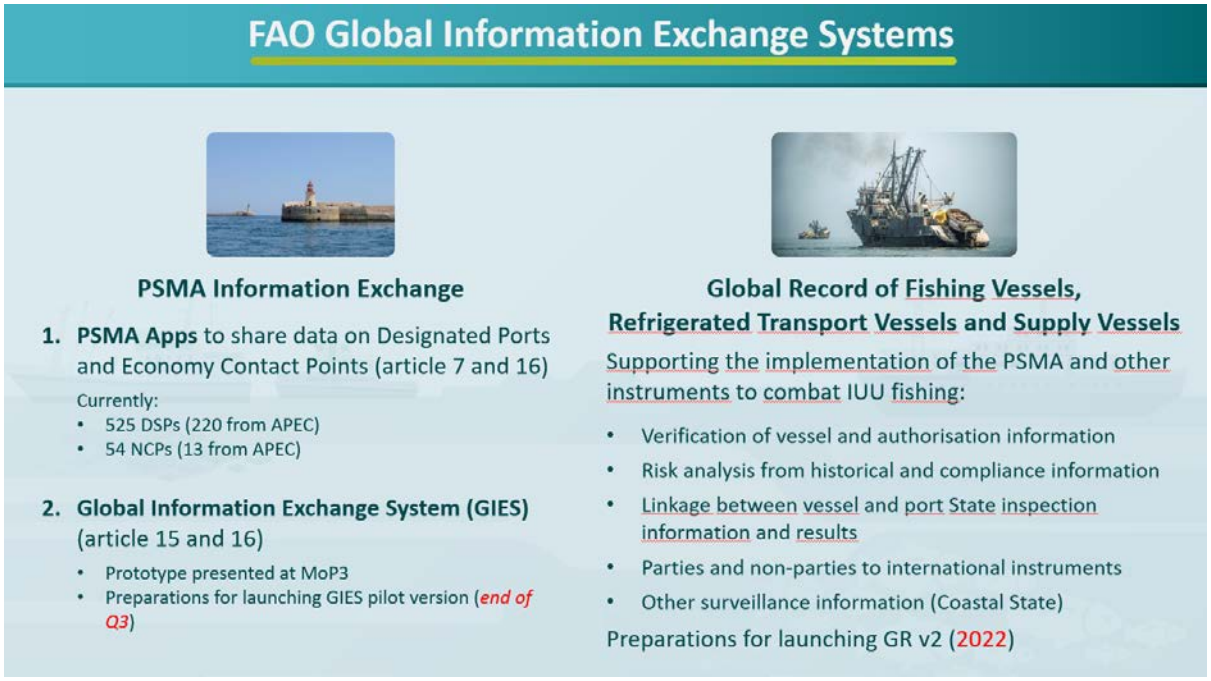
THEME THREE: FAO VIEW ON SIGNIFICANCE

DR MATTHEW CAMILLERI, Fisheries Liaison Officer, and DR ALICIA MOSTEIRO, Fisheries Officer FAO, Rome, Italy

Dr Matthew Camilleri summarised the status of the PSM Agreement, that there were 69 members globally, and 13 members from within APEC, with Papua New Guinea and the Marshall Islands looking to become a party soon. Meetings of the PSM Agreement members had been held in 2017, 2019 and most recently in May 2021 (virtually). FAO had assessed the level of implementation of the PSM Agreement across APEC: all APEC signatories had reviewed their legislation after signing but a third did not require changes; all APEC signatories had had measures in place to deny entry into port and 25% had used those measures; reasons for denying entry included no authorisation by flag economy (17%), clear evidence that fish on board was IUU (8%) and reasonable grounds to believe that the vessel was engaged in IUU or related activities (25%).

Dr Alicia Mosteiro then discussed FAO global information exchange systems. She noted that the importance of information sharing was that it was a fundamental element for eliminating IUU fishing – through compliance, cooperation and ratification. She described two key aspects, the PSM Agreement information exchange and the Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels (see Figure 2 below)

Figure 2 FAO Global Information Exchange Systems



Alicia then summarised the FAO Global Record tool that gathered and disseminated information through a unique access point. The information was certified, relevant and up-to-date on vessels used for fishing or in support of fishing activities, its application, operation and implementation.

She then commented on how the FAO work supported the APEC Roadmap:

- Under the PSM Agreement, promoting its benefits, supporting regional PSM Agreement implementation strategies, including through convening regional coordination meetings in preparation for meetings of the Parties to the PSM Agreement.
- In information exchange by further developing or strengthening information exchange mechanisms among economies in line with international requirements, conducting pilot testing to link existing economy or regional systems with the global exchange system and supporting economy authorities to upgrade their systems as required
- In capacity development by addressing challenges and supporting developing economies to strengthen their capacity to implement the PSM Agreement and complementary instruments.

She concluded by providing an insight into the FAO website:

Illegal, Unreported and Unregulated (IUU) fishing | Food and Agriculture Organization of the United Nations (fao.org)

Agreement on Port State Measures (PSMA) | Food and Agriculture Organization of the United Nations (fao.org)

Information System | Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels | Food and Agriculture Organization of the United Nations (fao.org)

THEME FOUR: SIGNIFICANCE FOR INDIGENOUS COMMUNITIES

IMPORTANCE OF PORT STATE MEASURES FOR INDIGENOUS COMMUNITIES – CRAIG ELLISON, Chair, Ngai Tahu Seafood, Director, Sealord and Director, Aotea Fisheries

Mr Craig Ellison opened with a traditional welcome in Māori in which he described his ancestry, his places of heritage and importance and his family, greater family and tribe, his relationship within that tribe, and to wish us all well. He explained that this reflected the importance of communications around relationships and location that Māori, the indigenous people of Aotearoa New Zealand, expected on meeting someone. This allowed the listener

to be able to ‘place’ them in the mosaic that was and is New Zealand and Pasifika culture. He also provided background on the Treaty of Waitangi, that Māori owned 35 percent of fisheries, were concerned with reputational, cultural, sustainability and threats to biodiversity and that a cultural perspective needed to be understood and adopted.

In speaking on the importance of PSM for Indigenous Communities, Craig took ‘a view through a different lens’ with no slides of fish, fishing vessels or fishers, but rather a focus on the taonga – the treasures that indigenous peoples hold dear (the mahika kai pou that guides us). The impact of IUU fishing on those treasures and the need to look beyond the commercial and the stock sustainability issues – crucially important as they are – were yet more reasons to raise the imperative that we must collectively stop the depredations of IUU fishing. Those reasons are simple: taonga transcend the simply economic, they reflect our relationship to the land and to the seas.

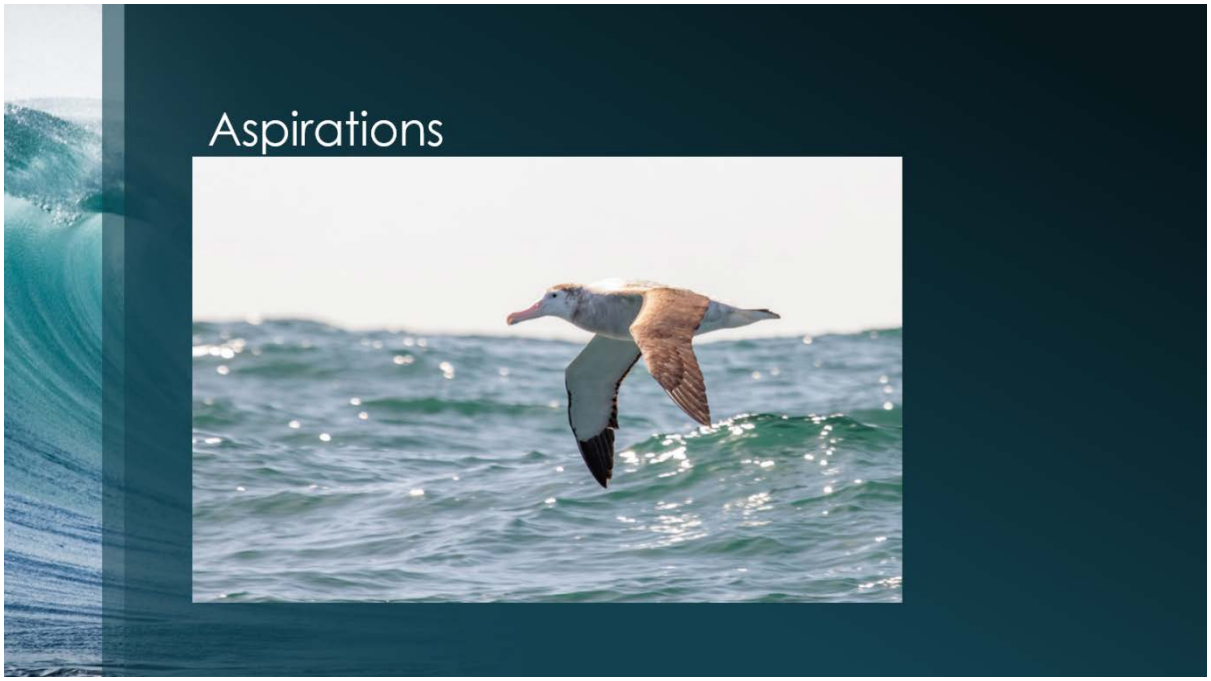
In terms of where we were at, he acknowledged the work that had preceded us. Māori look back to those who fought for rights and now the activities threatened by IUU Fishing, the PSM involvement and that sustainability was extremely important. For economic impacts, people depend on fish for their protein source therefore it has a high culture value.

Ngai Tahu values were central – whanautaunga (family), manaakitanga (looking after people, tohungatanga (expertise), kaitiakitanga (stewardship), tikanga (appropriate action), and rangatiratanga (leadership). All values reflected what we were trying to achieve in IUU Fishing. These values define us in the actions we were trying to achieve.

Using the analogy of seabirds, for vulnerabilities, he noted that titi (sooty shearwater or muttonbird) were heavily regulated and protected but that change was inevitable and not always good. For example, if an albatross died as a result of IUU fishing 5,000 km from the coastline of New Zealand, the loss is as emphatic as if it happened on our doorstep. The loss is the loss. This is the vulnerability in as simple a way as he could portray.

As those involved in IUU fishing disregard the conventions of modern society around sustainable fishing, they also flaunt best practice fishing measures that prevent bird interactions, that prevent sea mammal interactions and care little for incidental mortalities in any event. Yet for his greater family, this was a real and significant loss and irreplaceable. Collectively we are all affected by IUU fishing. Many work hard to protect endangered species. Intensive protection measures can be lost by a rogue operator.

For relationships, he pointed to Hector's dolphins which were protected in New Zealand. Measures had community support and the relationship identification depended on community support. The community was reassured that there were careful New Zealand fishers but compliance was needed with wider fishers so that it became the norm. In terms of shared behaviours, the best practice was to follow ethical behaviour but pockets of poor behaviour were hard to police. If you don't care how you fish, where you fish and what damage you do to the fishstocks and the environment, you may equally have a similar and significant disregard for crew and people wellbeing and health. In the Pasifika community, that behaviour is unacceptable and beyond tolerating. Pockets of poor behaviour in an economic sense can be (eventually) contained. In a Covid and IUU fishing environment, pockets of infection on the high seas carry a much higher level of risk and consequence.



In relation to aspirations (see above from presentation), Craig said that we needed: cooperation, transparency, and compliance. In addition there should be consideration of the impact on indigenous populations of depletion of taonga species which go beyond economic to cultural practice and intergenerational knowledge, – for Māori threatening to break the chain of mātauranga (traditional knowledge) being passed down from generation to generation. There were layers of dependence and vulnerability. Stewardship, support and expectation and a move to a position of obligation was important.

He concluded that this was a time critical issue and that we needed to demonstrate collective action beyond the rhetoric, beyond the catch phrase: it is no longer 'nice', it is 'necessary'. He concluded with a Whakataukī (proverb)

Toitu te marae o Tane
Toitu te marae o Tangaroa
Toitu te iwi
When the land is strong
When the oceans are strong
The people thrive.

Mr English stated that we had been handed a wero (challenge). Mr Ellison had provided a critical point of view with feeling and mana (respect), and a greater mandate for PSM. We needed to do a lot better. He asked Craig how all communities could be involved in compliance and its impact on people and how we could make a greater difference through people. Craig noted that good work was being done but he was looking for a consistent approach. Messages needed to be fresh and resonate with the listener. Community support within and outside of New Zealand was important. Distance, location, and messaging were all complex.

Close of Day One

Pat English thanked all speakers, organisers and participants. He noted that lots of information had been shared and advised that key messages would be extracted against the IUU Roadmap for submission to OFWG.

WORKSHOP PROCEEDINGS

DAY TWO

Objectives for the Day

Pat English (MC) welcomed all participants and speakers back to Day Two of the Workshop. He noted that it appeared 40 economies were represented throughout APEC and beyond. He recapped Day One and advised that the objectives for Day Two were:

- To consider current practices and new technologies for PSM
- To consider best practice application of PSM, the players involved in facilitating these e.g. government, industry, research etc
- To consider a set of summary recommendations to take forward to OFWG.

THEME FIVE: EMERGING TECHNOLOGIES

SEAFOOD AND FISHERIES EMERGING TECHNOLOGIES – BUBBA COOK, Western and Central Pacific Tuna Programme Manager, World Wide Fund for Nature (WWF), New Zealand

Mr Bubba Cook noted at the outset that data collection was key for PSM. He listed the emerging technologies and proceeded to discuss each one.

Catch Documentation and Traceability – he said that paper was no longer an option and that the key take home was that data catchment had to be through IT.

Unmanned Surveillance – Aerial drones and remote sensing could help with combatting IUU fishing and could assist in verifying data sources for PSM.

Electronic Monitoring – Technology was now more compact, robust and capable of achieving observation. He discussed the WIFI AI modules had been built into a camera in New Zealand.

Artificial Intelligence and Machine Learning – An example was an earpiece that could translate any language as a fisheries officer boarded a vessel.

Genetics, Biochemical Markers, and Spectrometry – Bubba envisaged that DNA barcoding and related genetic tools would become standard in the future. COVID-19 had been driving a low cost, hand-held tool for this purpose. Such a tool could positively identify a fish as packed. Biochemical tracking could play a valuable role in verifying and validating catch e.g. the origin

ocean of a certain tuna. Hyperspectral imaging could classify and identify fish. There was room for more exploration.

Integrated Satellite Imaging and Tracking – This offered more accurate estimations of tracking. Radar could also be used in a new way to fill in blanks by analysing radar data.

Blockchain – Blockchain markets would become more discerning as to where people would source their fish. Current technology development could lead to a level of accountability in fisheries that would be unprecedented.

Data Management Solutions – The volume, variety, velocity, veracity of data lent itself to a variety of solutions. Big data analytical tools would become critical in this area.

Bubba noted that people were our biggest asset. People needed to be trained to execute the technology. He concluded with a quote from Steve Jobs:

> "Technology is nothing. What's important is that you have faith in people, that they're basically good and smart, and if you give them tools, they'll do wonderful things with them."

Website/Contact details:
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info@seafoodandfisheriesemergingtechology.com

Pat English asked Bubba what the most effective and emerging technologies were and their accessibility and cost. Bubba said that funding would always be a big hurdle for people to overcome. The technology applications were becoming less expensive and more readily available. There was a need to move towards more digitised systems that start capturing data as opposed to using paper and transferring it into a digital platform. These needed to be funded in a sustainable way and donor funding was not a good way to do this. Reinvestment needed to happen from institutions in terms of cost recovery mechanisms.

Bubba noted that there was a huge volume of research in determining technologies and how these were being adopted. It was difficult for people to take these up unless there were demonstrable incentives in adoption such as showing how there was an Increase in efficiency or improvement in economic returns. There was a further need to show that purchased technology was achieving objectives.

Andy Wright noted that identifying fish species in a port inspection for fish processed at sea could be problematic eg where there were some trunks of fish with no other features. In relation to genetic testing devices, he asked Bubba whether an internet link to the device was needed or whether it could be worked offline and whether such devices worked in a fish hold at -60º. Bubba said the goal was for the unit to be self-contained and hand-held. It could operate independently. A reduced run time had improved the number of samples that could be run through the system. The next generation system would be available in October 2021. COVID-19 had driven these types of technologies in an increased manner and as a result there would be more advancement of the technology in the future. Technologies had been tested for a range of temperatures but he was unsure about -60º.

Andy Wright referred to unmanned surveillance and in terms of legal aspects, whether there had been any case studies on use of imagery collected and used in any type of prosecution. Bubba was unsure about prosecuting vessels. He referred to a case (possibly Chile) where a drone had been used that identified fish being dried on roofs. Fixed-wing, water-landing drones had been used to collect information to demonstrate to the government that there were incursions into protected areas. It had not matured to the level where enough information had been available for a particular prosecution.

FISHERIES STATISTICS AND RESEARCH FOR IUU – DR JESSICA FORD, Research Scientist, Oceans & Atmosphere, CSIRO, Australia

It was noted that Dr Jessica Ford's colleague, Dr Chris Wilcox, Senior Principal Research Scientist, had apologised for absence. Jessica opened with comments on the challenges in detection noting that, depending on tools applied, there could be a significant volume of data and an associated significant cost, especially in relation to security. CSIRO had an ongoing research program to extract information from existing data and develop low-cost surveillance data sources. The key was to apply a risk-based approach at the outset.
The CSIRO analytics team was focused on three areas:

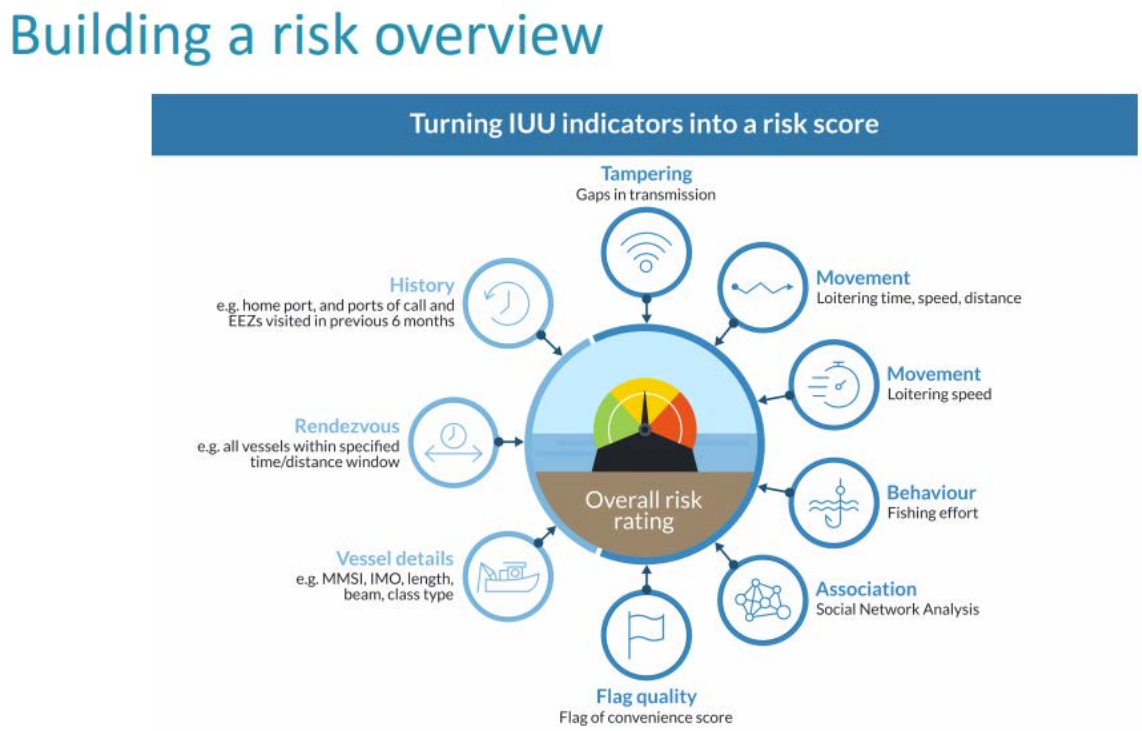
- identifying information, analysis and risk assessment
- baseline and strategic pictures on levels of IUU
- training and data and equipment handling.

Improving Information from AIS recognised that globally, tens of billions of signals were made every year. The problem was too much data. However, behaviour tells us about potential actions and intentions. Jessica discussed risk and anomalous behaviour as ways of identifying

persons, vessels and areas of interest. By focusing on suspicious and potentially illegal activity e.g. long gaps in a high transmission region, or too much or too little catch versus time at sea, or turning off the VMS when not permitted or fishing in a closed area, vessels/persons could be identified. Because automating was common on many vessels, they had a lot of data. To prioritise vessels to view you needed to focus on what was normal, what was expected, and what we saw. Irregular behaviour could also be identified using statistically robust methods and quantitative risk assessments to reach a 'risk matrix score'.

A risk overview could be built by turning IUU indicators (see Figure 3) into a risk score e.g. movement, behaviour, association, flag quality, vessel details, history, rendezvous. Gaps could occur for a variety of reasons which could depend on where a vessel was. It was important to understand the context as to how and where a vessel was moving.

Figure 3 Turning IUU indicators into a risk score



To build a risk overview, several criteria were applied:

- tampering – gaps in transmission
- movement – loitering time, speed, distance
- behaviour – fishing effort, AIS off for periods, moving in and out of high-risk area, loitering in areas for no obvious reason, uneconomical tracks
- association – understanding how flags, companies and fleets operated; who were the key players and conduits of trade; using social network analysis (tankers were interconnected across fleets, reefers operated with specific fleets, flag level partnerships of trade); understanding fleet dynamics, disentangling complex

interactions across fleets; measuring the degree of interactions, connectedness; and propagating known risk to ‘friends’.

- flag quality – flag of convenience score
- vessel details – Maritime Mobile Service Identity (**MMSI**), International Maritime Organization (**IMO**) measures, length, beam class type
- rendezvous – all vessels within a specified window
- history – home port and ports of call and exclusive economic zones (**EEZs**) visited in the previous 6 months.

All this information contributed to the risk assessment overview and an understanding of irregular behaviour.

Making this information available on request required the processing of large amounts of data. Priorities were high-risk vessels moving to a near real-time arrangement that looked for implementation partners. To reduce data costs, utilising existing ship data from radar satellites. Other tools included hydrophones for fisheries to collect surveillance data from ships of opportunity; automating long-range surveillance cameras; harvesting ship’s radar as low-cost surveillance data. All commercial vessels carried navigation radars with typical ranges of 90 to 180 km radius, Navigation radars automatically detected other vessels and integrating across vessels, a regional picture of vessel detections could be compiled. This allowed for the construction of tracks, the detection of activities and likely port visits.

Prototyping radar harvesting as a system had the goal of developing a system for capturing, transmitting and fusing vessel navigation radars as a surveillance and monitoring feed. Phase one was testing the feasibility of harvesting radar data; developing a prototype data logging system; implementing a prototype on a CSIRO vessel; statistically integrating data to get vessel sources, routes and locations.

Jessica described trials with an RV Investigator. Currently, CSIRO had three years in operation with an RV Investigator. The typical radar range was around 275 km radius. Target acquisitions and track construction had been completed. Developing a detection function for vessels and ocean conditions then working on estimating source ports, activity areas, and vessel densities were all required.

Rolling out radar harvesting was phase II of the program. This required extension of the application to cargo, fishing, and research vessels; real-time data transmission via phone/satellite modem/ship coms; statistical modelling to integrate multiple radar data feeds

in real time; and database and a secure webservice. The current implementation included: Indonesia: an economy research vessel and four patrol vessels; the Great Barrier Reef: 30 Great Barrier Reef Marine Park officers and eight Queensland Marine Police; the Indian Ocean: two vessels; the Pacific: one vessel from Costa Rica to Ecuador; and the Arafura Sea: a commercial fishing vessel.

In terms of the future, Jessica indicated the vision was for free fisheries surveillance data – delivered by radar loggers (the size of mobile phones) as a license condition. Just using tuna vessel positions from AIS presented near complete coverage of the Indonesian Ocean/Torres Strait and WCPFC.

On whether the data loggers could be installed on aerial platforms/surveillance aircraft, Jessica said yes, they could be installed if it had a radar. Andy Wright asked if she saw a time when VMS data would be available to the public as AIS data. Jessica said there had been an ongoing discussion but it was important to keep in mind that fishing activity was a business and care needed to be taken as to who had access to the data. However, it was important to have discussions around sharing data between economies. With the model, in terms of ease of injecting new sources of data and information into the model, Jessica said that a survey had been completed that looked at 50 indicators regarding priority and ranking. Additional sources could be added and this was a key aspect of the tool.

Pat English was interested in what happened to the data that was collected e.g. if fishing vessels were to have the system installed on a voluntary basis at this point whether the data would be available to the flag economy of the vessel. Jessica said that work was being undertaken towards data sharing and benefits were being noted along with its low cost. Francisco Blaha noted that many economies were voluntarily releasing VMS data to the public via IAS platforms like GFW. The Marshall Islands were currently going through the process.

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THEME SIX: PACIFIC FOCUS ON APPLICATION

PORT STATE MEASURES IMPLEMENTATION IN THE MARSHALL ISLANDS – FRANCISCO BLAHA, Fisheries Consultant, Pacific Economies

Francisco Blaha began by explaining where the Marshall Islands were and then the matrix of fishing related activity and the economy interest (see Table 2):

Table 2: Economy involvement in catch documentation[4]

	Harvesting	Trans-shipping	Landing	Transport	Processing	Importation
Coastal economy	Y	Y				
Flag economy	Y	Y	Y			
Port		Y	Y	Y		
Processing economy				Y	Y	
Market					Y	Y

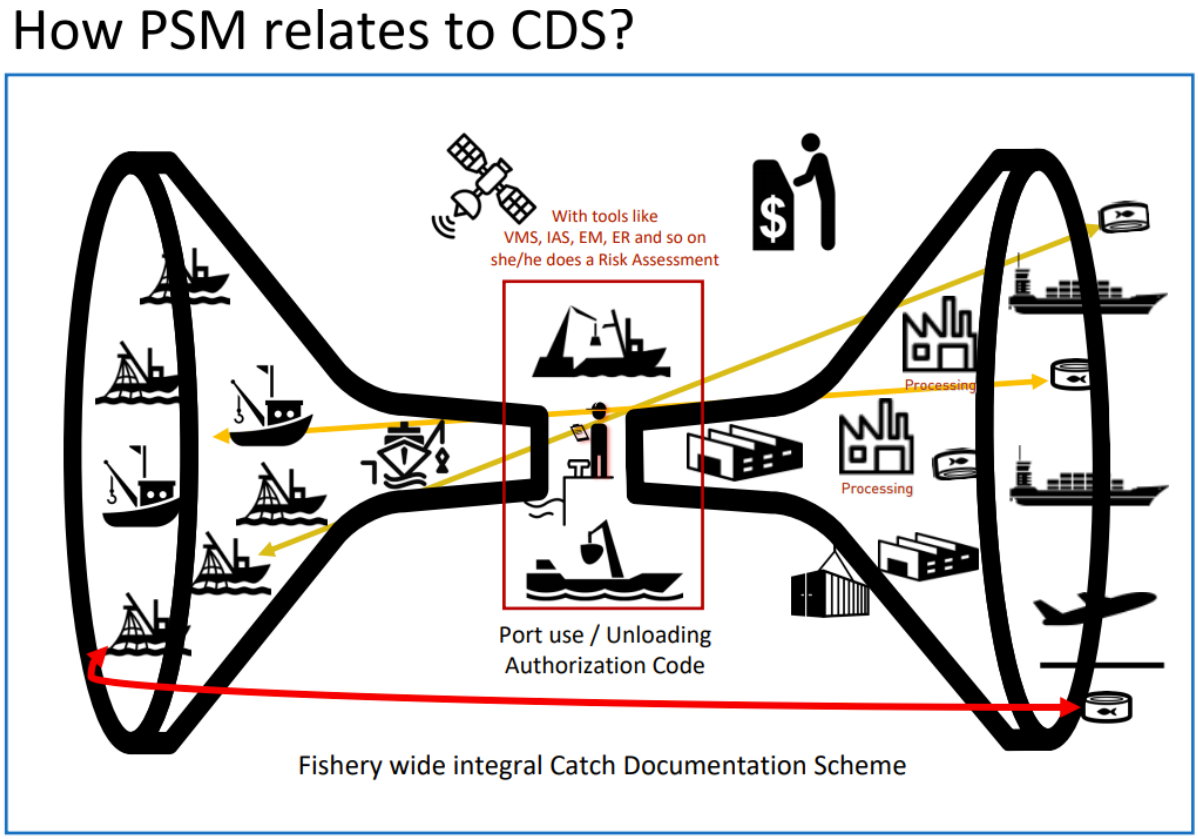
Francisco then described what was meant by operations covering: basic definitions, operational aspects of fishing gear in vessels, the basics of understanding catch legality, the rights and responsibilities as an officer, the basics of landing monitoring, and the need of fishing vessels departure clearance check. He presented this diagrammatically then in terms of documentation for the Marshall Islands. He illustrated a case study with a 'port in a whiteboard' as a low tech analytical tool compared to the 'bliss of good tools such as the FFA's Regional Office Centre.

Intelligence for now required manually checking and tracking data. He depicted arriving vessel intelligence reports, and described this graphically. He then showed that boarding and inspection was not just about the name and size of the boat but many other elements. The collaboration between the Marshall Islands and Thailand was also described. It was underpinned by a Memorandum of Understanding with Thailand that facilitated the exchange of PSM based clearance data for the verified weights per fishing vessel.

In terms of how PSM relates to the Catch documentation Scheme, Francisco presented a schematic (see Figure 4):

4 Hosch G, Blaha F. 2017. *Seafood traceability for fisheries compliance – Country level support for catch documentation schemes*. FAO Fisheries and Aquaculture Technical Paper No. 619. Rome, Italy

Figure 4: Relationship of PSM to Catch Documentation Scheme



Francisco was asked how interagency cooperation in implementing PSM was managed. He said it was all about people, people, people. The advantage of being in a small place was that everyone knew each other. It was also about leadership, having a great team and making change. There was a need to have trust and people needed to trust you. Moving information was about creating a human bridge. People needed to be looked after: the bigger the challenge, the bigger resources you had.

PACIFIC PERSPECTIVES ON PORT STATE MEASURES PANEL DISCUSSION

Moderator Patrick English

Alois Kinol (Papua New Guinea)

Julian Tamehana (New Zealand)

Francisco Blaha (Pacific Economies)

Pat English stated that there was a need to acknowledge that PSM in developing economies could be a burden to those economies. He invited opening comments from Alois Kinol, Papua New Guinea since Alois had not spoken during the Workshop.

Alois Kinol said that the focus of Papua New Guinea was on the implementation of what was currently being done. Overall, implementation comprised a common centre – central nervous system for the monitoring of vessels and determination of analysis and risks. Papua New Guinea had four operational ports where port entry was authorised, boarding and inspection took place, unloading/port use authorisation was undertaken and departure clearance issued.

In 2020 a total of 970 vessels entries occurred throughout the ports, an average of 77 vessels per month for which all data was shared. Due to COVID-19, each vessel's crew had to have a temperature reading. There was limited space for quarantining vessels and going to different ports to quarantine was a challenge.

Work in Progress comprised:

1) a review and development of PSM standard operating procedures for which drafting had been completed; and
2) an electronic PSM system (Fisheries Industry Marine System or FIMS) that had been scoped and development was in progress.

The challenges faced included capacities in operational ports (internet access; office facilities; manpower); interagency activity across the National Fisheries Authority, Customs, National Agriculture and Quarantine Inspection Authority, and Department of Health (lack of exchange of information and understanding of each function in relation to boarding, inspection of authorisation of fishing vessels) and the impact of COVID-19 on port operations.

Going forward, there needed to be: internal and external consultation with industry and line agencies; implementation of the draft standard operating procedures; training and capacity building; and import capacities in ports.

Julian Tamehana (New Zealand) said that it had been an interesting couple of days and that the presentations had been very informative. As a fishery officer at the tactical level, he said that sometimes they did not get exposed to the strategic level of work being undertaken. He was reassured by the amount of work going on around the world and the innovations in train. He was particularly impressed with the PMS schematics and with the discussion and had enjoyed participating in the workshop.

Francisco Blaha (Pacific Economies) said that a lot of the work went back to people, that the relationships with people in the region were very important. Communication was important and

would be improved if we trusted others. Information sharing was based on trust along with respect for each other's work. The human side was just as important as the technology side.

Malaysia commented that according to a 2020 study conducted by STATISTA, losses due to IUU fishing in the Western and Central Pacific which included the South China Sea was estimated to be US$3.4 billon. Malaysia was interested in any CSIRO plans to conduct IUU fishing risk analysis in the region in the near future Jessica Ford advised that FAO was providing a review of IUU fishing in the APFIC region and that she would be interested in extending this to others in the region. The same applied to other economy and regional risk assessment.

One participant was interested in the definition of fishing vessel in fisheries legislation. Jessica Ford said that Australian definitions included aircraft and drones. Alois Kinol advised that in Papua New Guinea law, it included drones, or anything supporting a fishing vessel.

Pat English asked how Pacific economies could better address capacity issues. Francisco said through co-operation, that the better you cooperated together, the better the linkages. He said we needed to share resources and problems. The more we worked together the more we benefitted.

A participant noted that given the onus was on flag economies to ensure their vessels complied, he was interested in how often noncompliance was due to a genuine lack of knowledge of updated conservation management measures or fishing legislation by fishers and whether this was something that needed to be improved Alois said it was a challenge and that responsibility, at least in part, was with the port economy. Julian said that sometimes it was hard to quantify due to language. Education provided a role. In New Zealand, the main role was to educate before we enforced and to try to get a message out particularly for those who did not have the internet or social media. He said they had to be visited personally to get the message across. Francisco said that if you came to fish in an economy's waters, you had the responsibility to comply with their regulations. As a skipper whatever happened on their boat was their responsibility. To claim you did not know was a problem.

WORKSHOP RECOMMENDATIONS

Pat English presented a summary of the overarching policy recommendations that had emerged over the two days of the Workshop. These were high level recommendations that had been drawn from more specific proposals made by the speakers.

1. Economies to **note** that the most effective PSM programmes are those that target limited resources based on risk and intelligence.
    - every PSM, however simple/small, contributes to combatting IUU. Some of biggest practical improvements come from just using MCS to their fullest potential
2. Economies to **note** that some of biggest practical improvements come from using good dockside inspections. This allows for cross-referencing log-sheets vs catch offloaded
    - the most effective regimes are those that target limited resources based on risk and intelligence
3. Economies are **encouraged** to recognise that tackling IUU works best when it is treated as a shared problem. This requires cooperation on improving traceability of fish throughout the supply chain
    - sharing of technologies to combat IUU fishing where aid is offered
4. Economies to **note** that voluntary compliance achieved through education and incentives is cost effective in improving compliance.
    - The more that Member economies can encourage voluntary compliance (through education, incentives, straightforward regulation, including stakeholders in the regulatory process etc) the better
5. Economies are **encouraged** to use the Workshop virtual toolbox to enhance effectiveness, education and innovation in relation to Port State Measures
    - and to utilise the Workshop best practice examples to increase MCS of IUU.
6. Economies are **encouraged** to continue to build their technical capacity in PSM through training, information, and best practice exchange.
7. Economies are **encouraged** to increase investment in MCS and the front line inspectorate to monitor the activities of foreign vessels operating in APEC economy waters.

- There is a need to monitor the activities of the new fleets which have started to operate in APEC economy waters (noting that financial returns from fishing have increased over recent years without a corresponding investment in MCS).

8. APEC OFWG to **consider** holding regular workshops on topics relevant to IUU including innovative technologies, coping with Covid in the future and MCS training and programmes.

These Workshop recommendation themes were linked back to the Workshop goals. They were not exhaustive and were part of an ongoing process.

CLOSING SESSION

Pat English thanked the workshop organisers, Mr Blackbeard (Project Workshop Overseer) and Ms Carole Inkster (Workshop Coordinator). He extended further thanks to the speakers and the APEC secretariat for their support, facilitation and administrative diligence. Attendees were thanked for their participation and questions and he hoped that more knowledge and experience had been gained from the workshops.

Pat finished with a whakautkī (proverb):

> What is the most important thing in the world: It is people, it is people, it is people.

Participants were encouraged to complete the evaluation forms, which would be distributed via e-mail.

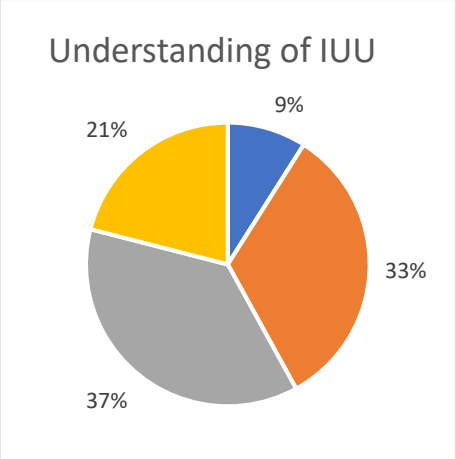
EVALUATION

Pre-Workshop Benchmark Evaluation

As people registered for the Workshop, they were invited to complete a survey to assess several aspects of understanding and knowledge. One hundred and fifty four (154) completed the survey by 12 July 2021. In addition to details such as name, economy, email and gender, they were asked:

- Their understanding of IUU
- The aspect of PSM they were most interested in
- What they would like to hear most about concerning PSM
- Attending in what capacity (e.g. Economy Official, Private Sector).

At the time of registration, the pre-evaluation form was completed by 154 persons.



Understanding of IUU – There was a split between:

- fair (33%)
- good (37%) and
- very good (21%).

Poor or very poor (9%) made up the balance.

Aspects relating to PSM to hear more about –

The areas were:

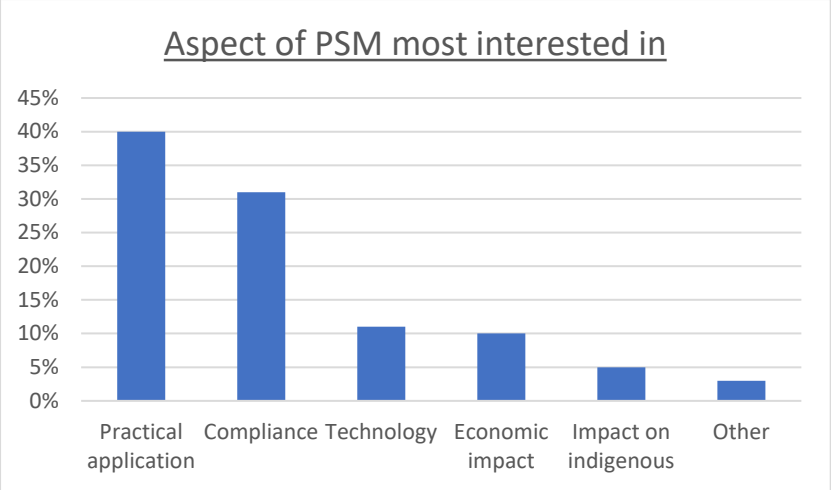
- barriers to implementation (33%)
- regulatory impediments (18%)
- sustainability impacts (18%)
- new technology (14%)
- other economies' experiences (10%)
- all others made up the balance (Off-the-shelf products, economics, financial implications etc) (7%).

One mentioned politics and legal, another idea testing and a third, capacity building.

Aspect of PSM would you be most interested in –

The areas those who completed the pre-evaluation form were most interested in comprised:

- Practical application (40%)
- Compliance (31%)
- Technology (11%)
- Economic impact (10%)
- Impact on indigenous peoples (5%) and
- Other (3%).



Capacity of participation – Those completing the pre-evaluation form did so as economy officials (64%), members of non-government organisations (14%), academics (10%), private sector (8%), and other including intergovernmental organisations (4%)

Gender of Registered Pre-Evaluation Registrants –

The gender split of those that completed the pre-evaluation form was:

- female (40%)
- male (58%) and
- not specified (2%).

Six others registered but did not complete the form.

Those who completed the pre-Workshop form were from 34 economies from around the world of which 17 were APEC economies:

Economies that completed pre Workshop Registration		
Australia	*Ghana	Peru
*Bangladesh	*India	Philippines
*Belgium	Indonesia	*Solomon Islands
*Benin	Japan	Chinese Taipei
Brunei Darussalam	*Kenya	Thailand
Canada	Korea	*Tuvalu
Chile	*Madagascar	*United Kingdom
China	Malaysia	United States
*Curacao	*Mauritania	*Vanuatu
*Czech Republic	New Zealand	Viet Nam
*Falkland Islands	*Nigeria	
*Gambia	Papua New Guinea	

Note: *Non-APEC

Post Workshop Attendance

The project team asked the New Zealand Ministry of Foreign Affairs and Trade for attendance information on each of the two days. This showed the following:

DAY 1 – Attendance recorded

Session attendees 86 (excluding speakers)

Gender

- Male 52%
- Female 48%

Delegate affiliation

- Economy official 67%
- Non-member participants 26%
- Other 4%
- APEC Secretariat 2%
- Technical focal point 1%

Economies represented:

Australia; Canada; Chile; Indonesia; Japan; Malaysia; New Zealand; The Philippines; Chinese Taipei; Thailand; United States; Viet Nam.

Other Organisations

APEC Secretariat

DAY 2 – Attendance recorded

Session attendees 80 (excluding speakers)

Gender

- Male 50%
- Female 50%

Delegate affiliation

- Economy official 65%
- Non-member participants 26%
- Other 4%
- APEC Secretariat 2.5%
- Technical focal point 2.5%

Economies represented:

Australia; Brunei Darussalam; Canada; Chile; Indonesia; Japan; Malaysia; New Zealand; Peru; The Philippines; Chinese Taipei; Thailand; United States; Viet Nam

Other Organisations

APEC Secretariat

Post-Workshop evaluation

The project team asked participants who had attended the workshop to complete a post-workshop evaluation form. Only 18 post Workshop evaluation forms were received from participants in 16 economies (10 male, 8 female).

In terms of how much participant understanding of PSM improved as a result of the workshop, 44% said significantly and 66% moderately.

In terms of which of the Workshop presentations that participants felt they learnt the most about from the sessions, the top five presentations were:

- Fisheries Statistics and Research for IUU (Dr Jessica Ford, CSIRO)
- PSM Implementation in the Marshall Islands (Francisco Blaha, Fisheries consultant)
- IUU – Economic Impacts (Duncan Souter, MRAG Asia Pacific)
- Global Information Exchange System and Global Record (Dr Matthew Camilleri and Dr Alicia Mosteiro)
- Compliance with PSM (Dr Lara Manarang-Trott, WCPFC):

All others recorded support including the Panel, Craig Ellison, Bubba Cook and Andrew Wright and Julian Tamehana.

In terms of the comments received in the Post Workshop Evaluation, several were complementary about the Workshop (eg “Everything was excellent”, “I think it was very well run. I liked the mix of strategic and tactical discussion”, “It was perfectly arranged” and “It was fine as it was, both in duration and depth of subjects covered, very well done”), some considered the login process and platform used was overly complex.

Other comments made included:

- More participants from all over the world could be invited as guests of APEC in the future program
- To have a broader representation of the wider APEC economies. It felt that much of the findings and discussions were framed around the FFA and the Pacific
- There is extremely low participation in Q&A/Chat from APEC member countries from Asia. Should encourage them to submit papers and create "discussion rooms" to exchange ideas.
- I would have liked to have more interactive sessions and discussion. I also think some presentations were more effective than others. Ones with more concrete examples and concrete information were the most useful. "Workshop" I think often implies more active participation, so perhaps that can be considered in the future (e.g., imbedded polls, breakout groups, etc). That said, as a newer staff member, I learned a lot about PSMA, so it was still quite effective!

Promoting the Virtual toolkit would be an important post-Workshop activity for the Project Overseer.

CONCLUSIONS

Workshop participants enthusiastically embraced the two day workshop, sharing ideas and views that resulted in a range of policy recommendations to be taken forward within APEC. PSM are a vital underpinning to support compliance and protect resources of APEC member economies. The Workshop strove to develop a shared understanding of the impact of the current PSM environment on those engaged in fisheries. The value of sharing information from within economies and taking an “all-of-government” approach were noted as important aspects of individual economies.

Substantial gains could be made by sharing experience about what works well in an operation setting and how different tools can be applied.

The global pandemic Covid-19 was shown to have had a significant effect on economy ports and personnel, challenging systems and regulations as well as other challenges to those involved.

Barriers and areas that needed addressing were identified in order to build greater capability into the regional system. Consideration of these issues have formed part of this report and the recommendations to OFWG.

The Workshop objectives of identifying barriers and opportunities being faced by APEC economies in implementing PSM, examining how PSM are able to effectively combat IUU fishing and developing resources and recommendations for policy settings and capacity building activities which could helpfully be built upon to enhance PSM were clearly met or will be when the virtual toolkit goes live.

Areas where PSM related activities could be improved were identified and reflected in the recommendations.

ATTACHMENT A

APEC WORKSHOP AGENDA
DAY 1
Wednesday 21 July 2021

13:30 – 14:00 **Preliminaries**	**Test time, Connection confirmation** **Familiarisation with 'Chat' function**
14:00 – 14:10 **Administration**	**Delegates and Guests joined** **MC Patrick English – Introduction** Procedures for day and Rules of Engagement
14:10 – 14:25 **Opening Session**	(1) Welcome from New Zealand – **James Brown**, Manager, International Fisheries, New Zealand (2) Welcome Remarks APEC / New Zealand – **Alicia G Lagno**, OFWG Chair (3) MC – Objective for Day
THEME	**SIGNIFICANCE – ECONOMIC IMPACTS**
14:25 – 14:30	Speaker Intro **Patrick English**
14:30 – 14:50 **Keynote**	**IUU – Economic impacts** **Duncan Souter**, Chief Executive Officer MRAG Asia Pacific, Australia
14:50 – 15:00	Q&A**, Patrick English**
THEME	**COMPLIANCE WITH PORT STATE MEASURES**
15:00 – 15:05	Video intro **Andrew Wright**, International Fisheries Compliance Officer Ministry for Primary Industries, New Zealand
15:05 – 15:15	**Video – Inspection and interview with Fisheries Officer**
15:15 – 15:25	Q&A**, Patrick English** **Andrew Wright** and **Julian Tamehana**, Fishery Officer Ministry for Primary Industries, New Zealand
15:25 – 15:30	Speaker Intro **Patrick English**
15:30 – 15:50 **Speaker**	**Dr Lara Manarangi-Trott**, Compliance Manager Western Central Pacific Fisheries Commission
15:50 – 16:00	Q&A, **Patrick English**
16:00 – 16:10	**Rest Break**

WORKSHOP ON IMPLEMENTATION OF PORT STATE MEASURES
UNDER THE APEC ROADMAP ON COMBATTING IUU FISHING

WORKSHOP AGENDA
DAY 1 (continued)
Wednesday 21 July 2021

THEME	FAO VIEW ON SIGNIFICANCE
16:10 – 16:15	Speaker Intro **Patrick English**
16:15 – 16:35 **Speaker**	**Global Information Exchange System and Global Record – Funding the System** **Dr Matthew Camilleri**, Fisheries Liaison Officer, FAO, Rome, Italy **Dr Alicia Mosteiro**, Fisheries Officer, FAO, Rome, Italy
16:35 – 16:45	Q&A, **Patrick English**
THEME	**SIGNIFICANCE FOR INDIGENOUS COMMUNITIES**
16:45 – 16:50	Speaker Intro **Patrick English**
16:50 – 17:10 **Speaker**	**Importance of Port State Measures for Indigenous communities** **Craig Ellison,** Chair, Ngai Tahu Seafood and Director, Sealord and Director, Aotea Fisheries
17:10 – 17:20	Q&A, **Patrick English**
17:20 – 17:25 **Close Day 1**	**Closing Session** **Patrick English –** What is planned for Day 2
17:30	**CLOSE DAY 1**

WORKSHOP ON IMPLEMENTATION OF PORT STATE MEASURES
UNDER THE APEC ROADMAP ON COMBATTING IUU FISHING

WORKSHOP AGENDA
DAY 2

Thursday 22 July 2021

Day 2 – Thursday 22 July 2021	
13:30 – 14:00 **Preliminaries**	**Test time, Connection confirmation** **Familiarisation with 'Chat' function**
14:00 – 14:05	**MC – Recap, Objectives for Day and Rules of Engagement**
THEME	**EMERGING TECHNOLOGIES**
14:05 – 14:10	Speaker Intro **Patrick English**
14:10 – 14:30 **Speaker**	**WWF's Smart Fishing Initiative** **Bubba Cook**, Western and Central Pacific Tuna Programme Manager WorldWide Fund for Nature (WWF), New Zealand
14:30 – 14:40	Q&A, **Patrick English**
14:40 – 14:45	Speaker Intro **Patrick English**
14:45 – 15:10 **Speaker**	**Fisheries Statistics and Research for IUU** **Dr Chris Wilcox**, Senior Principal Research Scientist, **Dr Jessica Ford**, Research Scientist Oceans & Atmosphere, CSIRO, Australia
15:10 – 15:20	Q&A, **Patrick English**
THEME	**PACIFIC FOCUS ON APPLICATION**
15:20 – 15:25	Speaker Intro **Patrick English**
15:25 – 15:45 **Speaker**	**Port State Measures Implementation in the Marshall Islands** **Francisco Blaha**, Fisheries Consultant, Pacific Economies
15.45 – 15.55	Q&A, **Patrick English**
15:55 – 16:05	**Rest Break**

WORKSHOP ON IMPLEMENTATION OF PORT STATE MEASURES
UNDER THE APEC ROADMAP ON COMBATTING IUU FISHING

WORKSHOP AGENDA
DAY 2 (continued)

Thursday 22 July 2021

THEME	PACIFIC FOCUS ON APPLICATION (cont)
16:05 – 16:10	Speaker Intro **Patrick English**
16:10 – 16:30 **PANEL**	**Pacific Perspectives on Port State Measures** **Moderator Patrick English** **Alois Kinol** (Papua New Guinea) **Julian Tamehana** (New Zealand) **Francisco Blaha** (Pacific Economies)
16:30 – 16:40	Q&A, **Patrick English**
NEXT STEPS	**RECOMMENDATIONS**
16:40 – 16:50	**Summary themes for recommendations** from Workshop **Andrew Wright and Patrick English**
16:50 – 17:00	**Closing Session – Patrick English** **Post Workshop Evaluation** Closing Remarks (Andrew Wright, New Zealand) MC to note other workshops coming up in the APEC 2021 programme
17:00	**CLOSE WORKSHOP**

ATTACHMENT B

PRESENTER BIOGRAPHICAL NOTES

(In order of speaking in the Programme)

Patrick English, Chair/Moderator

Patrick English has been involved in international trade and in particular China, since 1989. He has degrees in Chinese studies, International Relations and International Management/Trade. Patrick is an experienced Trade Commissioner and diplomat having served in Malaysia and China, most recently in Guangzhou/Southern China as Consul General. Patrick also represented NZTE on the New Zealand China FTA negotiations team and led the market implementation programme for the FTA agreement.

Patrick returned to New Zealand in 2013 to become the first Executive Director for the New Zealand China Council. Patrick is on the Board of Auckland Confucius Institute, is a media, conference and seminar speaker on the New Zealand China trade and economic relationship, as well as contributor to programmes with a number of New Zealand universities. In 2015, Patrick was appointed as the founding Chair of the Ministry for Primary Industry's New Zealand Growth Partnership Executive Board, and was recently appointed as a chair/moderator for a number of MPI related working group sessions for APEC 21.

Dr Alicia Gallardo Lagno

Dr Gallardo is Undersecretary of Fisheries and Aquaculture, SERNAPESCA, Chile which follows 20 years experience in public service most as Chile Economy Director of the National Fisheries and Aquaculture Service, SERNAPESCA, Chile.

She leads the control of illegal fishing in Chile, one of the priorities of the government program. In this area, the implementation of reinforced inspection in the pelagic fishery (sardine - anchovy) in the southern zone of Chile has had successful results in recent campaigns. She has also overseen the development of surveillance programs based on technology (implementation of on-board cameras, remote monitoring, use of satellite images, among others) and the implementation of the landing certification.

She has extensive experience in aquatic animal health, biosecurity in aquaculture production, disease prevention, control and eradication, risk analysis, import regulations and food safety of animal products, including fishing, as well as in microbiology and food science. She has participated in numerous forums and panels of experts at the economy and international level in these areas. Since 2012 she has been a member of the OIE Aquatic Animals Commission and chair of the OIE ad-hoc group for the evaluation of the performance of veterinary services in aquatic animals, PVS. During 2020 she was appointed Lead Shepherd of the APEC Oceans and Fisheries Working Group (OFWG) for the period 2021-2022. Dr Gallardo is a Veterinarian from the University of Chile, with doctoral studies (PhD) in Veterinary Sciences from the same University.

Duncan Souter

Duncan Souter is Chief Executive Officer of MRAG Asia Pacific and a fisheries policy and sustainable development specialist with broad fishing industry, policy and management experience. Since joining MRAG, Mr Souter has developed and led a wide range of projects for governments, intergovernmental agencies, the private sector and NGOs aiming to support the sustainable development of fisheries in the Asia Pacific region.

Of particular relevance, Duncan led the first attempt to quantify the volume and value of Illegal, Unreported and Unregulated (IUU) fishing in tuna fisheries in the Pacific Islands region in 2016, as well as undertaking reviews of PSM and transhipment practices in the Pacific Islands region.

Prior to joining MRAG Asia Pacific, Duncan was the Fisheries Adviser to two previous Australian Government Ministers for Fisheries and prior to that the CEO of the Queensland Seafood Industry Association, the peak representative body for the $300m Queensland seafood industry. He is a past Director of the Cooperative Research Centre for the Great Barrier Reef and has served on numerous fisheries policy and science related advisory committees. He holds a BSc (Hons – 1st Class) in marine science from the University of Queensland.

Andrew Wright

Andy Wright is currently managing a team within the New Zealand Ministry for Primary Industries that focuses on international fisheries compliance. A large part of Andy and his team's role is to maintain situational awareness of the South West Pacific in order to detect IUU fishing. This is by way of using a range of MCS tools such as PSM, High Seas Boarding and Inspection, VMS and fisheries data analysis and also observer deployment to name but a few.

Andy's team also focusses on partnering with Pacific Island countries and providing capacity building assistance particularly in the area of PSM. Andy is the current Vice-Chair (for the SW Pacific) for the FAO PSM Agreement and also Chair of the Compliance and Technical Committee for the South Pacific Regional Fisheries Management Organisation.

Julian Tamehana

Julian Tamehana is a Fishery Officer based in Tauranga, New Zealand. He has been a Fishery Officer for approximately 14 years.

During this time, he has had a varied career and participated in a number of Operations targeting groups that have offended against the New Zealand Fisheries Act. He has been involved in a number of prosecutions and has also had an active role in training Fishery Officers in Officer Safety Defensive Tactics.

He has been deployed on a number of Maritime Patrols in New Zealand's EEZ, on the High Seas and within the waters of other Pacific Island economies, boarding and inspecting Foreign Fishing vessels.

Prior to joining Fisheries, Julian was in the New Zealand Army for 22 years. He is a keen tramper (mountain walker), runner, biker and fisher.

Dr Lara Manarangi-Trott

Lara Manarangi-Trott is the Compliance Manager for the Western Central Pacific Fisheries Commission (WCPFC), an international fisheries management organisation that was established in 2004, to conserve, manage and ensure the sustainable use of tuna and billfish in the western central Pacific Ocean. The Western Central Pacific region produces over 50% of global tuna fisheries production, and has 26 Members and 9 cooperating non-members.

Since 2012, Lara has overseen the monitoring and compliance programmes established by the WCPFC, and has supported the Commission's consideration of how emerging technologies could complement and enhance existing fisheries management tools and approaches.

Lara is a Cook Islander with a background in marine science, environmental management, and holds a PhD in International Law and Policy (University of Wollongong, Australia).

Dr Matthew Camilleri

Matthew Camilleri is a Senior Fisheries Officer and Leader of the Food and Agriculture Organization of the United Nations (FAO) Fisheries Global and Regional Processes Team and Secretary of the Agreement on PSM. He leads FAO's capacity-development programme on the implementation of the 2009 FAO Agreement on PSM.

Matthew joined the FAO in 2007 and his responsibilities have included the promotion and monitoring of the implementation of the FAO Code of Conduct for Responsible Fisheries and other international fisheries instruments, particularly those aiming to combat illegal, unreported and unregulated fishing.

Matthew Camilleri served as a fisheries management consultant to the Maltese government and as head of the Malta Centre for Fisheries Sciences between 1998 and 2007. He holds a PhD in fisheries science and ocean science and BSc (Hons) in in fisheries management (University of Plymouth, UK) and is a chartered biologist and a member of the Royal Society of Biology (UK).

Alicia Mosteiro

Alicia is an FAO Fisheries Officer and currently focuses her work in the international fight against illegal, unreported and unregulated (IUU) fishing. She is the Programme Coordinator for the Global Record of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels. Alicia joined FAO in 2010 and prior to working with FAO, she worked at the EU Commission DG Mare; Marine Lab Aberdeen; Malta Fisheries Ministry; and the Spanish Fisheries Ministry among others.

Alicia holds an MRes on Fisheries Management from Aberdeen University, UK, an MSc in Marine Biology from University of Calais, France and a BSc Marine Sciences from University of Vigo, Spain.

Craig Ellison

Craig is the Chief Operating Officer of Ngai Tahu Holdings Corporation, Chair of Wellington Zoo, and the Chair of Seafood New Zealand.

Past roles show a long involvement in the Fisheries and Seafood sector including being the past Chair of the NZ Seafood Standards Council, as well as serving on the boards of Sealord, Aotearoa Fisheries, Moana Pacific, Prepared Foods and the New Zealand Fishing Industry Board. He has been an industry advisor at two WTO Trade Ministerial Summits.

Craig was Co-chair of the Pacific Economic Cooperation Council Fisheries Development and Cooperation Task Force. He maintains a strong interest in operational excellence, governance, and Maori collaboration, and has previously served as Commissioner (and Deputy Chair) on the Treaty of Waitangi Fisheries Commission (Te Ohu Kai Moana).

Craig graduated from Otago University with a Masters in Zoology, and is a proud alumni of the Te Hono group (class of 2015)

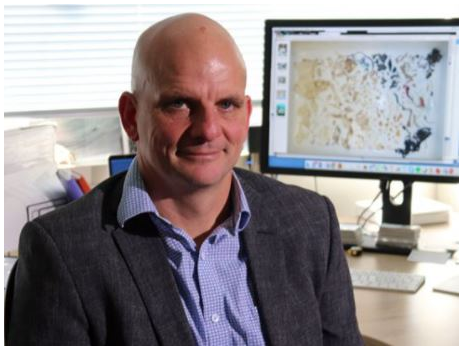
Bubba Cook

Bubba Cook is an experienced and motivated fisheries professional with an extensive background in fisheries conservation and management spanning across 19 years, 2 hemispheres, and a myriad of fish and invertebrate species. He has a solid background in Rights Based Management (RBM) of fisheries, particularly through the use of Individual Fishing Quotas (IFQ), as well as indigenous fisheries rights.

Bubba now works as the Western and Central Pacific Tuna Programme Manager for the World Wide Fund for Nature (WWF). This is focused on improving tuna fisheries management at an economy and regional level in the Western and Central Pacific Ocean. Most recently, he has been engaged in the introduction and expansion of technology for use in fisheries management as well as monitoring, control, and surveillance.

Bubba grew up in a fishing family on the Texas coast of the Gulf of Mexico. He spent 6 years with the US Navy before pursuing an education in fisheries science. Bubba holds a BSc in Fisheries (Texas A&M University) and a law degree in Natural Resource Policy and Environmental Law (Northwestern School of Law, Portland, Oregon).

Dr Chris Wilcox



Chris Wilcox is a research scientist with the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO) Marine and Atmospheric Research, stationed in Hobart, Tasmania. His research covers a wide range of topics in population management including control of invasive species, conservation of threatened biodiversity, and management of commercial and recreational harvesting. His work integrates field data, statistical analysis and predictive models to synthesize information to support decision-making.

He has worked with NGOs, government and private enterprise over a 25-year career as a professional biologist to develop cost effective solutions to natural resource management problems. Chris has been in Australia for 15 years, joining CSIRO in 2005. His research has included biodiversity offsets, population estimation, analysis of satellite tracking data, optimization of invasive species eradication, management of fisheries, reserve design and management, and most recently understanding the impacts of marine debris. Currently, his research is focused in two primary areas: a) evaluation of sources, impacts and solutions for plastic pollution in the ocean; and b) development of improved analytical tools for addressing illegal, unregulated and unreported (IUU) fishing.

Originally from the USA, he has PhD and MSC in ecology and conservation biology (University of California, USA) and A BSC and BGS (General Studies (University of Kansas, USA).

Dr Jessica Ford

Jess is a senior research scientist with CSIRO Data 61, based in Hobart, Tasmania. Jess's research focuses on developing analytical tools to support key challenges faced by fisheries agencies in trying to tackle illegal fishing. Her current research focuses on developing economy relevant risk assessments and prioritisation of vessel inspections at sea and in-port, the issue of flag economy liability in IUU, the role of bunker vessels in the fishing fleet, and profiling and link analysis for vessels, companies and persons of interest. Prior to joining CSIRO she worked at Novatis, Switzerland, as a statistician and with the University of Queensland as a research assistant.

Jess holds a PhD and Grad Cert (Marine Sciences) from the University of Tasmania and an MSc (Medical Statistics) and BSc (Neuroscience and Mathematics) from the University of Queensland.

Francisco Blaha

Francisco Blaha is widely experienced in an extensive range of fisheries and all its component parts having started out as fishing crew, then fisheries observer, fisheries researcher, advisor, fisheries officer, trainer and teacher and fisheries consultant. He has worked around the globe in over 55 economies (he is fluent in four languages) and for a wide range of organisations including the European Commission, FAO, South Pacific Commission, Pacific Islands Fisheries Forum, UN Development Program, NZAID, AusAID, USAID, South African Development Community, German Agency for Technical Cooperation and the Asian Development Bank. He has also worked for several commercial companies both in fishing and in technology and equipment.

Francisco has direct experience in institutional strengthening and capacity building and is a strong proponent of the Agreement on PSM. He has a keen interest in cleaner technologies, efficient resource management and the value of data. He won the 2019 Seafood Champion Awards from the Seaweb Summit for his advocacy work.

Francisco holds two MSc degrees, one in Food Science (University of Auckland, New Zealand) and one in Fisheries Science (Universidad Nacional de Mar del Plata, Argentina) and a 2nd Mate (Fishing Vessel) qualification (National Fisheries School, Mar del Plata, Argentina). He lives on Waiheke Island in New Zealand.

Alois Kinol

Alois Kandu is currently the Manager, Catch Documentation and Certification Unit (CDCU), PNG, a position he has held since 2013. This requires him to undertake the administration of the EU Catch Documentation System in Combating IUU and includes the operational implementation of UN FAO PSM Agreement for Authorization of all Fishing Vessels coming in and out of the main fishing ports in Papua New Guinea including Port Moresby, Madang and Wewak as well as a number of offshore islands.

Caleb Blackbeard

Caleb is a Policy Analyst for New Zealand's Ministry of Primary Industries and is the head of the New Zealand's OFWG Delegation. He has a background in Strategic Studies and is passionate about international cooperation to combat IUU fishing. Caleb is excited for participants to attend this workshop and learn about the experiences of PSM implementation from the perspectives of different economies.

Carole Inkster

Carole Inkster is the OFWG Workshop on PSM Coordinator and a Consultant, with MCM Consulting, New Zealand. She has been consulting to the food and agriculture industry and governments since 2011 and since that time has been Regulatory & Policy Director with the New Zealand Food & Grocery Council (NZFGC) and, since 2012, Principal Regulatory Adviser with the Infant Nutrition Council Australia and New Zealand (INC). This followed over 25 years' experience in government policy, strategy and legal areas in both Australia (in the primary industries/fisheries/agriculture portfolios) and New Zealand (in the agriculture, health and food portfolios). In the period 2002-2010, Carole was a senior executive in the New Zealand Food Safety Authority.

Carole has extensive experience in all aspects of regulatory policy, legislative development, standards development and systems design, industry impacts, whole of government requirements and international policy as it affects and interfaces with the agriculture and food industries. She has coordinated workshops for APEC in Papua New Guinea (2018) and Chile (2019).