



TE HUAPAE MATAORA MO TANGAROA THE FUTURE OF OUR FISHERIES



VOLUME III: INTEGRATED ELECTRONIC MONITORING AND REPORTING SYSTEM

CONSULTATION DOCUMENT 2016

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Purpose

This document provides information on proposed amendments to fisheries regulations to support the introduction of an Integrated Electronic Monitoring and Reporting System (IEMRS) in New Zealand commercial fisheries.

These proposed amendments are part of the Ministry for Primary Industries' (MPI's) Te Huapae Mataora Mo Tangaroa: The Future of our Fisheries programme.

An overview of the programme is available in Volume I. Additional details about specific aspects of the programme are available in the following supporting documents:

- Volume II: The Fisheries Management System Review
- Volume IV: Enabling Innovative Trawling Technologies

MPI invites comment from interested parties on proposed amendments to fisheries regulations to support the introduction of IEMRS in New Zealand commercial fisheries (and other aspects of the Future of our Fisheries programme, as described in other volumes of this consultation paper).

The introduction of an integrated monitoring and reporting system would:

- enable a substantial improvement in the monitoring of catch-effort reporting, to support the integrity of the Quota Management System (QMS) and management of protected species;
- provide more accurate information for decision-making by the commercial sector and government;
- provide improved information to support sustainability certification and traceability for market development.

Submissions

MPI welcomes written submissions on the proposal contained in this document. All submissions must be received by MPI no later than **5.00pm on Friday 23 December 2016**.

Submissions should be sent directly to: fisheries.review@mpi.govt.nz

You can also submit online through our website: www.mpi.govt.nz/Futureofourfisheries2016

Or, should you wish to forward hard copy submissions, please send them to the following address to arrive by close of business on **5.00pm on Friday 23 December 2016**:

Future of our Fisheries
Ministry for Primary Industries
P O Box 2526
Wellington 6140
New Zealand

We will consider all relevant material made in submissions, so you are welcome to provide information supporting your comments. Please make sure you include the following information in your submission:

- the title of the consultation document;
- your name and title;
- your organisation's name (if you are submitting on behalf of an organisation, and whether your submission represents the whole organisation or a section of it);
- your contact details (such as phone number, address, and e-mail).

Submissions are public information

Please note that your submission is public information. Submissions may be the subject of requests for information under the Official Information Act 1982. The Official Information Act specifies that information is to be made available to requesters unless there are sufficient grounds for withholding it, as set out in the Official Information Act. Submitters may wish to indicate grounds for withholding specific information contained in their submission, such as if the information is commercially sensitive or if they wish personal information to be withheld. MPI will take such indications into account when determining whether or not to release the information.

Executive summary

MPI proposes to amend existing fisheries regulations and introduce new fisheries regulations to support the introduction of an Integrated Electronic Monitoring and Reporting System (IEMRS) across the commercial fishing fleet. The purpose of IEMRS is to provide accurate, integrated and timely reporting and monitoring data on commercial fishing activity to inform decisions of fisheries managers in government and the commercial sector.

Under IEMRS, MPI proposes that all permit holders¹ will be required to:

- complete event-based electronic catch reporting in near-real time (electronic reporting – ER);
- provide automated geospatial position reporting (GPR) of the locations of fishing events (this will include some land-based operations, for example, eel fishing);
- operate automated cameras (electronic monitoring – EM) on commercial fishing vessels.

MPI needs comprehensive and accurate information on fishing activity to provide for the use of fisheries resources while ensuring sustainability. More specifically, we need information on the total removals of target and non-target species from fisheries, and associated catch rates.

MPI currently gathers this information from a variety of sources, including commercial fishers' catch-effort reporting, government observers on fishing vessels, and geospatial vessel position reporting on those vessels carrying Vessel Monitoring Systems.

The catch-effort reporting system is paper-based, which can cause delays of up to 13 weeks until data is available to end-users.

MPI has accumulated a substantial body of fisheries information over time. However, MPI's confidence in the fisheries information it uses would be strengthened significantly by:

- increased monitoring capacity;
- near-real time catch-effort reporting;
- automated GPR;
- information from other sources, such as shed sampling, surveys by research vessels or tagging studies.

The value of building the information base supporting management of inshore fisheries is particularly pronounced.

There are also international drivers for change. International experience, for example in Australia, indicates that feedback to fishers comparing their ER and EM data has resulted in significant improvements in fisher reporting, such as a reduction in discrepancies between ER and EM datasets over time.

The following summarises the key objectives of the IEMRS proposal and some indicators of success:

Key objectives

Indicators of success

| | |
|--|---|
| Build social licence ² and the support of the public, international markets, and all users of commercial fisheries. | Criticisms of the regime are reconsidered, revised and do not resurface. Consumers support market access. |
| Ensure that MPI is able to collect high-quality verifiable and independent information on fishing activity. | High-quality information is available and useful to managers in short time frames. |
| The commercial sector is able to monitor and manage catches in near-real time. | Catch-planning and ACE management are more responsive. Industry can build social licence with more and higher-quality information. |
| Fisheries resources are more efficiently used and sustainability is ensured. | Greater confidence that TACCs are appropriate. Wastage (by discarding) is reduced significantly and quantified more effectively. |
| Improve compliance with the requirements of the fisheries management regime. | Monitoring effectively captures close to 100 percent of fishing activity. A subset of this is then reviewed in accordance with MPI priorities and objectives. |
| Create opportunities to add value across the sector by improving access to existing markets and enabling access to new market opportunities. | TACCs are more efficiently used. New markets are identified for stocks that are currently commercially low value. Data generated that supports sustainability assessments and product traceability. |
| Future-proof the fisheries monitoring and reporting system to ensure that it is consistent with trends internationally and domestically. | Technology adopted is international best practice. |

¹ Including high seas permit holders. ² A social licence to operate indicates the level of approval from the community that the industry has to operate.

This discussion paper analyses three options. Table 1 summarises the potential costs and benefits of each of the options.

Table 1. Summary of benefits and costs of each option, to the general public, to the commercial sector and government

| Option | Cost to | Benefit to | Analysis of the extent to which this option achieves the objectives |
|--|--|--|--|
| Option 1: Maintain current state | General public No new financial cost to the general public from the current state. However, there will be a lost opportunity to enhance public confidence in the sustainability of the fisheries resource. | General public No discernible benefit to the public. | This option will not meet the objectives set out in this paper. This option would do nothing to address the information shortfall in the current system, such as, the collection of timely, verifiable, and independent information on fishing activity. The current patchwork situation would continue, with some of the commercial sector using ER, geospatial and/or EM technologies to differing standards and specifications, with attendant uncertainty about government requirements – this could lead some companies to adopt technology that does not meet government standards. Public confidence in fisheries will not be enhanced. |
| | Commercial sector A minority of vessels already carry EM on a voluntary basis, and geospatial position reporting technologies on a mandatory or voluntary basis. These costs would continue. Economies of scale would not be realised. Access to some markets is, or will become, compromised. | Commercial sector For the majority of permit holders who have not adopted EM, ER or GPR technologies, there would be no benefit. | |
| Option 2: Electronic reporting and automated geospatial position reporting by all commercial fishing permit holders ³ from 1 October 2017 | General public No new financial cost to the general public. | General public Greater confidence that catch-effort and fishing location information being reported is timely and accurate. | This option addresses the problem of an inefficient and outdated catch-effort reporting system. It will also allow MPI to analyse catch-effort and GPR information and take timely action where required. This option does not fully address our inability to verify catch and effort information, due to cost and logistical limitations on Observer coverage. This is particularly true in the inshore fishery where there are already low levels of Observer coverage. |
| | Government No additional financial cost to government. | Government No benefit to government. | |

³ Including high seas permit holders.

Option

Cost to

Commercial sector

Costs of catch-effort reporting limited to data transmission if fishers have a laptop, smart phone or tablet and download a free app. Otherwise investment by fishers, for example, \$1,000 to \$1,200 for a smart phone or tablet.

Cost of GPR is estimated at an initial \$1,000 to 2,000 for hardware and installation on a vessel and \$800 to \$1,000 per vessel per year for ongoing operating costs where Vessel Monitoring Systems are used.

The hardware costs for hand-held GPR equipment for fishers not operating from a vessel are estimated at approximately \$800.

Cost will be less where GPR can be accomplished using an ER tool.

Depending on the costs of ER, there may be a reduction in the profitability of some companies while longer term benefits accrue.

Government

There will be costs to government of the database to support ER (and to disestablish and retire the old database), and an additional cost for scoping the requirements of options for the new system. These costs will be supported outside of the cost recovery process. Once created, the operation of the new database may be cost recovered.

Benefit to

Commercial sector

Delivery of electronic catch reports with fewer errors than paper forms will reduce data entry and data management costs. Estimated annual savings approximate \$420,000.

Dashboards summarising catch information.

Better ability to monitor catch through time.

Industry logistics.

Tighter Licensed Fish Receiver reporting.

Better information.

More precision in TAC and TACC settings.

Market access better supported than for current state.

Currently, permit holders receive a deemed value bill for species caught without ACE, then source ACE to cover that catch. With ER providing near-real time information, the permit holder will be able to source ACE before balancing rather than retrospectively.

Government

Reduction in data management and entry costs over time as IEMRS transitions to business as usual.

Analysis of the extent to which this option achieves the objectives

| Option | Cost to | Benefit to |
|--|---|--|
| Option 3: Electronic reporting and geospatial position reporting for all permit holders ⁴ from 1 October 2017 and introduction of electronic monitoring on vessels in stages from 1 October 2018 (MPI's preferred option) | General public No direct cost to public. | General public This option would provide the greatest confidence to the public that information being reported is timely, verifiable and accurate. Public confidence in fisheries restored. |
| | Commercial sector See Option 2 for costs of geospatial position reporting and ER. EM is estimated at \$5,000 to \$18,000 per vessel for installation, equipment, set-up, travel, labour and training. Costs vary with the number of cameras required and the type of cameras that operators might choose. Service costs are estimated at \$1,000 to 2,000 per year, depending on service requirements. Depending on the costs of EM, there may be a reduction in the profitability of some companies while the longer-term benefits of IEMRS accrue. The redistribution of ACE as monitoring increases and the costs of IEMRS technologies may mean quota holders contract fewer ACE fishers. Review and analysis of EM information is estimated at between 0.5 and 0.25 hours of review time per hour of imagery collected. The total number of FTEs required to monitor EM imagery on shore will depend upon the hours of fishing time to be reviewed. Cost recovery is the focus of a broader MPI work programme, and the recovery of operating costs in relation to IEMRS will be considered in that context. (No additional cost recovery is expected in relation to IEMRS in the 2017/18 fishing year). | Commercial sector Individual accountability is promoted. Good performance can be clearly identified. One-off events by operators, for example, not meeting their legal requirements, need not create impacts across fleets. The true extent of such issues is better understood. If better information supplied by IEMRS supports fishery certification by the Marine Stewardship Council, the associated 20–30% price premium on another 5% of New Zealand's exported seafood could generate an additional NZ\$8 to \$12 million from exports markets annually. Market access is also expected to increase. If better information supports an increase in TACCs or better utilisation of existing TACCs to achieve a 5% increase in finfish exports at existing prices, the potential increase in export earnings could be NZ\$43.2 million annually. Improved export opportunities if fishery sustainability can be proven. Annex II sets out examples of benefits predicted or accrued in other jurisdictions in which electronic fisheries reporting and monitoring have been implemented or examined. |

⁴ Including high seas permit holders.

Analysis of the extent to which this option achieves the objectives

| Option | Cost to | Benefit to |
|---|---|------------|
| <p>Government</p> <p>See Option 2 for costs of ER and geospatial position reporting.</p> <p>There will be costs of the infrastructure for EM:</p> <ul style="list-style-type: none"> (a) workstation and software including licences; (b) database capacity for imagery storage (as part of broader consideration of the new catch effort database in Option 2). | <p>Government</p> <p>Deterrence to discarding.</p> <p>Encourage fishers and Licensed Fish Receivers to carry or obtain ACE packages better aligned with catch mix. Implementation of the QMS is better aligned with intent.</p> <p>More accurate estimates of catch limits.</p> <p>More accurate estimates of protected species bycatch.</p> <p>Improved export opportunities if we can demonstrate fish are sustainably caught.</p> | |

MPI welcomes feedback from stakeholders on the options outlined in this paper. We have set out questions at the end of each section of this paper to prompt that feedback.

Scope

The following table sets out what is in and out of the scope of IEMRS consultation:

| In scope | Out of scope |
|---|---|
| Amendments to fisheries regulations to support the new reporting and monitoring requirements, and development of new regulations. | IEMRS technologies will be supported by a detailed set of service standards and specifications. MPI will consult on these in due course. |
| Transitional arrangements between the current system and IEMRS. | Review of deemed value structures and processes ⁵ , or other components of the QMS |
| Cost recovery (however, rules and levy rate to be dealt with in separate processes). | Discarding – refer to section on “Addressing the discarding of fish” in Volume II. |
| | A broader review of fisheries operations: IEMRS links to the Future of Our Fisheries consultation, as well as the observer and cost recovery reviews, but will retain its own focus on the delivery of reporting and monitoring services. |
| Requirement for new infringements relating to new reporting and monitoring requirements. | Customary and recreational (including Amateur Charter Vessels (ACVs)) fisheries reporting. |
| | Penalty regime for other specific offences. |



Current state

Government and the commercial sector need information to provide for the use of fisheries resources while ensuring sustainability.⁵ More specifically, government and the commercial sector need information on the total removals of target and non-target species from fisheries, catch composition to include bycatch and associated catch rates. This information is also important for stakeholders and the public more broadly, as part of building transparency and confidence in commercial operations.

This information is currently gathered from the following sources:

Commercial fishers

A key component of the QMS is the extensive recording and reporting requirements that apply to commercial fisheries. The QMS, and the fisheries management regime more broadly, is dependent upon comprehensive and accurate information on fishing activity to (amongst other things):

- document catch and provide a measure of catch rates to input into stock assessment;
- monitor environmental performance (including impacts of commercial fishing on protected species);
- support operational functions (such as fulfilling international reporting obligations).

In most fisheries, the only requirement before fishing is that a fisher hold a valid fishing permit. A permit holder's catch is summarised on Monthly Harvest Returns (MHRs). Permit holders must ensure that all vessels complete the relevant catch effort and landing returns detailing "how" and "where" fish is caught, together with species and quantities taken, and where and what is landed. Permit holders are also required to report non-fish and protected species captures.

Permit holders are required to obtain ACE to cover their catch of any QMS stocks, or pay the appropriate deemed value⁶ (a price paid per kilogram of catch for which the permit-holder holds insufficient ACE).

In turn, all licensed fish receivers must complete monthly returns (LFRRs – Licensed Fish Receiver Returns) detailing species and quantities of fish received from each permit holder during that month.

⁵ In the Fisheries Act 1996, "Ensuring sustainability" means maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations; and avoiding, remedying or mitigating any adverse effects of fishing on the aquatic environment. "Utilisation" means conserving, using, enhancing and developing fisheries resources to enable people to provide for their social, economic, and cultural well-being.

The reporting regime creates a documentation trail that documents fish movements and ownership at harvest and landing. This reduces the opportunities for potential offending but does not eliminate such opportunities altogether.

MHRs and amendments can be completed online or using paper return forms. Permit holders can report catch, effort, and landing data in a paper form. However, fishers can elect to furnish these returns electronically or on paper forms. All forms and returns are reported to MPI's service provider, Commercial Fisheries Services Ltd (FishServe).⁷

The option of reporting electronically, which reduces error rates, has been adopted on a voluntary basis by 118 vessels (approximately 10 percent of the fleet) as at July 2016. Most are deepwater vessels, however; there are also an increasing number of inshore vessels doing so. For instance, 88 percent of Trawl Catch Effort and Processing Returns (TCEPRs) are submitted electronically, while 68 percent of MHRs are submitted electronically. Overall, 27 percent of fisher catch effort returns are submitted electronically.

Of the 206 Licensed Fish Receivers, 98 percent are already filing their LFRRs electronically.

Government Observers

MPI independently verifies catch at a vessel-specific level via the MPI Observer Programme. This provides assurance to decision-makers (and by extension the wider public) that what is reported by fishers as being taken from the resource is accurate. This information is also used to monitor the environmental impacts of fishing.

Fisheries Observers have been a crucial part of the commercial sector for the last 30 years. Amongst other things, Observers:

- record information on the species, quantity, size, age, and condition of fish, aquatic life (including protected species), or seaweed taken;
- record accurate and reliable data relating to vessel catch and processing;
- record how many undersized or unwanted fish are being returned to the sea⁸;

⁶ Deemed values are set for each fish stock in the QMS. They are set at a level to discourage fishers from targeting fish in excess of ACE and at the same time encourage them to land and report unintended fish bycatch. When the amount of a fisher's reported catch is more than the amount of ACE owned, the fisher is issued with a deemed value invoice.

⁷ FishServe provides administrative services to the New Zealand commercial fishing industry to support the Fisheries Act 1996.

⁸ Dumping of fish is prohibited under section 72 of the Fisheries Act 1996 (except where specifically provided for, for example, in accordance with Schedule 6 of that Act), however it is a defence if the fish are taken and discarded under the supervision of an MPI Observer.

- monitor the environmental impacts of fishing activity, including protected species captures;
- collect information on health and safety practices;
- obtain, analyse or verify information for other matters, for example, relating to statutory remits involving vessels and maritime rules.

There are well-documented studies that identify the difference between catch reported by vessels with and without Observers, such as, that unobserved vessel catches are significantly different to observed vessel catches. This is not unique to New Zealand fisheries – internationally it is referred to as the “Observer effect”.

These differences in reporting distort catch statistics and threaten the integrity of the QMS. Further unreported catch, including misreporting of bycatch, can introduce significant uncertainties into total catch estimation that can have serious implications for fishery sustainability and management of broader environmental impacts of fishing.

Crucially, however, the Observer Programme only provides coverage on selected vessels, not fleet-wide. There are also difficulties inherent in extending Observer coverage beyond current levels, which are addressed later in the section on the problem definition.

Geospatial position reporting

A small proportion of the commercial fishing fleet (7 percent), mainly larger vessels over 28 metres in overall length, are required by the Fisheries (Satellite Vessel Monitoring) Regulations 1993 to carry an Automatic Location Communicator (ALC), which reports vessel positions to MPI. These can be linked to catch-effort information and to analyse fishing patterns and anomalies.

Other sources of information

Information for fisheries management is also gathered from a number of other sources:

- researchers sampling fish in processing sheds to gather information about the length and age of fish caught;
- the commercial sector’s own research programmes;
- surveys by research or other vessels or tagging studies.

Amongst these, research surveys are the only source of fishery-independent information.

Current regulatory settings

Specifications surrounding catch-effort reporting, vessel monitoring and geospatial position reporting are set out

in regulations and circulars issued under the Fisheries Act 1996.

The Fisheries (Reporting) Regulations 2001 stipulate the types of returns that are to be provided by permit holders active in New Zealand fisheries waters. The permit holder is responsible for the provision of fully completed Catch and Effort and Landing Returns as well as Monthly Harvest Returns and Non-fish/Protected Species Catch Returns.

In general, Catch and Effort and Landing Returns are due with FishServe the 15th day of the next month following fishing. Filing dates for other returns vary depending on return type and/or fishing method. Therefore, there is little transparency around when the return is actually completed – it could be the day of posting, long after the fishing event occurred. Regulations also provide the format and content of each Catch and Effort and Landing Return. At present there is some catch information that is not requested (such as, sub-minimum legal size fish discarded).

The Fisheries (Satellite Vessel Monitoring) Regulations 1993 establish requirements for satellite vessel monitoring use on some commercial vessels (for example, vessels exceeding 28 metres in overall length) and in some areas (for example, Benthic Protected Areas).

Circulars issued under the Fisheries (Reporting) Regulations 2001 allow for voluntary electronic reporting of catch-effort by permit holders.

Reporting requirements for High Seas Permit holders are stipulated as a condition of permit.

Part 12 of the Fisheries Act 1996 establishes the Observer Programme, and sets out Observer duties (for example, collecting information on fisheries resources, fishing (including catch and effort information), the effect of fishing on the aquatic environment, and the transportation of fish, aquatic life or seaweed).

Relevant decisions that have already been taken

The Minister for Primary Industries, Hon Nathan Guy, announced in May 2016 that the Government had directed MPI to fast-track the work to install electronic monitoring and cameras on all commercial fishing vessels.⁹

Overseas trends

The use of electronic fisheries catch and effort reporting and electronic monitoring with on-vessel automated cameras is growing internationally. At the same time,

⁹ Media release <https://www.beehive.govt.nz/release/faster-rollout-fisheries-monitoring> and article in Seafood New Zealand magazine (August 2016), p.17 http://www.seafoodnewzealand.org.nz/fileadmin/documents/SNZ_Magazine/Seafood_Magazine_August_2016_A5.pdf

the information requirements of international seafood markets and consumers are increasing.

International examples of where catch-related information must be reported electronically include the following:

- the European Union (EU) system of fishing controls includes an electronic recording and reporting system (ERS) used to record, report, process, store and send fisheries data (catch, landing, sales and transshipment);¹⁰
- Norwegian fishing vessels (depending on length) are required to carry a mixture of position reporting (VMS) and catch and activity reporting (ERS) technology.¹¹

International examples of the use of electronic monitoring using automated on-vessel cameras include:

- the Australian Fisheries Management Authority (AFMA) operates an electronic monitoring (emonitoring) system of video cameras and sensors capable of monitoring and recording fishing activities, which can be reviewed later to verify what fishers reported in their fishing logbooks. These systems are now compulsory for most commercial fishing boats in the Eastern Tuna and Billfish Fishery, the Western Tuna and Billfish Fishery and the Gillnet, Hook and Trap fishery;
- The EM Observer System (including video cameras) is used in all of British Columbia's commercial hook-and-line/trap groundfish fisheries.¹²

Better fisheries information is recognised as one component of solutions to issues as diverse as food safety, Illegal, Unreported and Unregulated (IUU) fishing, and management of environmental impacts. Establishing seafood traceability through supply chains (boat-to-plate) is a key component of some initiatives in these areas.

The incidence of IUU fishing, globally, is of significant concern to New Zealand and other members of the international community. IUU fishing can occur in all wild-capture fisheries, both in national jurisdictions and on the high seas. IUU fishing results in widespread environmental, social and economic consequences. It adversely affects target species, as well as associated and dependent species and the wider ecosystem. It can seriously impair efforts to achieve sustainable fisheries and can ultimately lead to the collapse of a fishery. By distorting competition, IUU fishing jeopardises the economic survival of those who fish legitimately. Because of their lower operating costs, IUU fishers gain an unjust

economic advantage over legitimate fishers. The impacts of IUU fishing undermine international, regional, and national efforts to effectively conserve and manage fish stocks and the impacts of fishing.

The value of electronic monitoring in strengthening monitoring, control and surveillance capabilities, thereby demonstrably increasing the integrity of fisheries management, is also recognised internationally.¹³

The US Presidential Taskforce on combatting IUU fishing has a strong focus on seafood traceability as a tool to exclude seafood products sourced from IUU activities from the marketplace.¹⁴ Work is ongoing to define the types of information to be collected regarding seafood sold in the United States and the operational standards to be applied to the collection, retention, and transmission of such information, such as electronic information collection wherever possible.

Also relevant to the US market, the development of seafood import provisions under the US Marine Mammal Protection Act¹⁵ will be supported in part with fisheries information, including monitoring and reporting requirements comparable in effectiveness to those operating in the US. Where requirements are not met, imports will not be accepted.

This year, the Pacific Island Forum Fisheries Committee has issued a directive for its membership, which includes New Zealand, to increase their use of electronic reporting and monitoring to increase the integrity and efficacy of fisheries management.¹⁶

The Food and Agriculture Organisation of the United Nations (FAO) is developing voluntary guidelines for fishery catch documentation schemes. The FAO has convened two technical consultations to finalise these guidelines. The development of these guidelines is still in progress. However, consideration of catch documentation by the FAO emphasises the growing importance of demonstrable product provenance and traceability amongst the seafood industry.

Domestic trends

The accelerating international trend towards electronic reporting, geospatial position reporting, and electronic monitoring systems has been mirrored in New Zealand.

In regard to ER technology, some groups within the commercial sector have already developed and are using ER technology for their own uses (for example, reporting

10 <http://ec.europa.eu/fisheries/cfp/control/technologies/ers/>

11 <http://www.fiskeridir.no/English/Fisheries/Electronic-Reporting-Systems>

12 <http://newatlas.com/em-observe-fishing-monitoring-system/21496/>

13 MRAG (Asia Pacific). 2016. Towards the Quantification of Illegal, Unreported and Unregulated (IUU) Fishing in the Pacific Islands Region. Available at: <http://www.ffa.int/files/FFA%20Quantifying%20IUU%20Report%20-%20Final.pdf>

14 <http://www.nmfs.noaa.gov/ia/iuu/taskforce.html>

15 http://www.fisheries.noaa.gov/ia/slider_stories/2016/08/mmpa_import_factsheet.pdf

16 http://www.ffa.int/system/files/Roadmap_web_0.pdf

to company owners). Some of these reporting systems reflect MPI's data requirements.

Similarly, some operators are already using geospatial position reporting tools (for example, Vessel Monitoring Systems). As for ER, some of these systems reflect MPI's requirements.

Trials and deployment of EM technology in New Zealand have been taking place for well over a decade. Examples of domestic EM trials include:

- in 2008, the then-Ministry of Fisheries contracted Archipelago Marine Research Ltd to undertake a pilot study to evaluate the feasibility of EM for assessing protected species interactions in the demersal and pelagic longline fisheries;
- the Department of Conservation (DOC) contracted Archipelago Marine Research to undertake two trials since the early 2000s of EM systems: the first in 2003/04 was a pilot study to test the effectiveness of EM in inshore trawl and set net fisheries off the Canterbury coast to examine interactions between protected species and fishing gear. The second in 2008 trialled EM systems on two inshore vessels fishing off the north-east coast of the North Island to monitor protected species interactions;
- MPI contracted Trident Systems to place video cameras on all 15 snapper trawlers operating in the snapper one fishery (SNA1) off the east coast of the North Island. These vessels have cameras installed to estimate the amount of undersize snapper caught and discarded. Subsequently, imagery has been reviewed to explore compliance with fish dumping regulations.

The overall conclusion of these trials is that EM has application to meet some but not all fisheries monitoring objectives.

Preliminary discussions

MPI has had preliminary discussions about electronic reporting and monitoring and geospatial position reporting technologies with fishing company representatives, FishServe, providers of electronic monitoring and reporting technologies (both in New Zealand and internationally), government agencies, the Office of the Privacy Commissioner, the Australian Fisheries Management Authority (AFMA), the Pacific Islands Forum Fisheries Agency (FFA), and the US National Oceanic and Atmospheric Administration (NOAA).

Consultation Questions:

- Do you agree with how we have defined the current state in relation to monitoring and reporting?
- Would you like to comment? For instance, how would you describe the current system? What other factors should be considered?

Problem definition

While a significant body of fisheries information has been collected over time, MPI's confidence in the fisheries information it uses would be strengthened significantly by:

- increased monitoring capacity;
- near-real time catch-effort reporting;
- automated geospatial position reporting.

These issues are particularly prevalent in inshore fisheries.

In the absence of Observers, there is no sure way of monitoring or verifying catch-effort reporting by vessels, particularly given the incentives to maximise economic returns by discarding small or damaged fish. Similarly, protected species reporting most often cannot be verified.

The low levels of real-time or near-real time reporting limit the speed at which MPI can analyse information and take timely action where required.

Information needs are also hindered by an inefficient and outdated catch-effort system.¹⁷

These problems result in:

- critical risks to the integrity of the QMS, for example, uncertainty surrounding discarding and other sources of mortality mean that management settings (the TACC and relevant allowances) may not be set at optimum levels;
- constrained progress in resolving key management issues, such as discarding and protected species bycatch;
- undermined confidence amongst the public, some international consumers and users of wild fisheries that commercial fishers are operating with minimal or acceptable impacts on the environment and protected species;
- limited opportunities to create and add value to wild fish harvest. Low monitoring levels, particularly amongst inshore fisheries, restrict MPI's ability to verify reported catch information and the current catch reporting is not always able to support traceability through supply chains. Many fish stocks cannot meet the requirements of third-party sustainability assessments that support access to premium markets and where boat-to-plate chain-of-custody tracking is required;¹⁸
- long turn-around times with inaccurate paper-based

reporting limits the commercial sector and MPI from leveraging off accurate near-real time reporting.

Levels of Observer coverage

The challenges with implementing Observer coverage, particularly in inshore fisheries, are well documented in New Zealand and internationally. While coverage varies fishery to fishery, approximately 8.4 percent of the commercial fishing activity is monitored annually by Observers in New Zealand. It is impractical to extend Observer coverage significantly beyond current levels for cost and logistical reasons.

Around 60 percent of Observer days are allocated to monitoring offshore (deepwater) fisheries in the 2016/17 coverage plan, to achieve coverage rates of 8 to 100 percent of fishing effort depending on the fishery. In contrast, Observer coverage in inshore fisheries in 2016/17 amounts to about 20 percent of Observer sea days, monitoring < 5 percent of fishing effort. (The remaining 20 percent of observer coverage is allocated to highly migratory species observation, compliance purposes and other activities).

The daily rates for inshore and deepwater coverage is significant at approximately \$950/day and \$450/day respectively (these rates fluctuate over time, including in accordance with vessel operations). There are approximately 100 000 commercial fishing days annually. The cost of 10 000 Observer sea days for inshore would be approximately \$9.5 million and for deepwater fisheries would be approximately \$4.5 million (depending on daily rates).

Large-scale coverage is most practical on deepwater fishing vessels. These vessels typically fish at sea for weeks at a time, and have room to accommodate one to two Observers. Observer coverage of the 1000 or so smaller inshore vessels that head out for one to several days from a myriad of small ports around the coast is more problematic, for the following reasons:

- knowing where these vessels are operating is challenging – when MPI notifies the vessel operator that an Observer will be placed on their vessel, the vessel operator is required to indicate the areas in which the vessel plans to fish. Sometimes, this indication from the operator bears little relation to where fishing actually occurs;

¹⁷ The "catch-effort system" refers both to a technological system (databases, front ends, hardware and software) and to the regulations, form types, data fields etc.

¹⁸ MPI notes that species or fishery specific traceability systems exist for some fisheries in which New Zealand is active, for example, southern bluefin tuna (operating under the Commission for the Conservation of Southern Bluefin Tuna) and Antarctic fisheries for toothfish (operating under CCAMLR).

- MPI is precluded from placing Observers on some inshore vessels due to vessel size and Maritime New Zealand requirements, which specifies a maximum number of people that a vessel can safely carry;
- the placement of an Observer on some vessels can be precluded by the vessel's living conditions;
- the nature of inshore trips is quite different to the deepwater – most are one to several days in length. Observers typically spend time onshore in between trips to sea. Time ashore can be substantial as inshore fishing activity is heavily dependent upon weather conditions or other factors. Often trips don't take place at the dates and times notified. The Observer Programme pays accommodation costs for Observers while they are onshore between trips to sea, meaning costs can increase substantially compared to the deepwater fleet.

The efficiency of the current reporting system requires improvement

Currently, the catch-effort system is still largely paper-based. Errors occur on 17 percent of the paper forms submitted by permit holders.¹⁹ Common errors include the wrong year, vessel name, client number and invalid fish stocks.

In contrast, the error rate detected amongst (voluntary) electronic reporting is approximately 4 percent. This is primarily because with electronic reporting there is upfront validation of such fields as name and client number, meaning there is less room for basic errors. Where errors have occurred, correction is simple and quick. The current catch-effort database is able to accept data electronically and in real time (such as fishers submit daily), but electronic reporting is not currently mandatory.

The process for correcting paper forms is slow and cumbersome. FishServe mails back the forms to permit holders for correction within 14 days. For some forms, more than one mail-back is required. This is increasingly impractical with reduced postal services. It also results in substantial postage costs to FishServe – costs which are ultimately recovered from the commercial sector through the cost recovery levy process.

Given time frames for reporting and required error-checking, catch-effort information reported on paper forms may be unavailable to end-users (such as scientists, managers, the commercial sector) for three months or more after it was collected.

FishServe estimates that the cost of electronic reporting is about 50 percent less than paper-based reporting. Since the introduction of voluntary reporting, FishServe has advocated for electronic reporting to the commercial sector. Some fishers have been reluctant to adopt electronic reporting over time due to (amongst other reasons) the initial requirement for an encrypted USB drive (subsequently superseded by the use of password protection) and because it is not possible to use tablets. (These requirements may not apply to technology introduced under IEMRS.)

In addition to ongoing issues with paper-based reporting, the catch effort database first developed in the 1990s and used to store this information needs to be updated to remain fit for purpose. This database would require updating with or without the introduction of IEMRS. However, the opportunity to complete the update prior to the introduction of IEMRS will promote cost efficiencies in both projects.

Regional fisheries management organisations specify some of the reporting requirements that high seas permit holders must meet. This information sometimes sits outside the rest of the current catch effort system, creating inefficiencies.

Consultation Questions:

- Do you agree with how we have defined the problem?
- Would you like to comment? For instance, what evidence should we examine to inform further analysis of the problem?

¹⁹ In 2014/15, the number of forms submitted by permit holders was 122,290. The number of forms sent back for correction was 20,519, or 16.78%.

Objectives

The proposed high-level objectives of IEMRS are to:

- support sustainable use of the fisheries resource, consistent with the purpose of the Fisheries Act 1996;
- ensure that MPI is able to collect verifiable and independent information on fishing activity and the environmental impacts of this activity;
- restore social licence²⁰ and the support of consumers, other fishers and the wider community in the management of New Zealand's commercial fisheries;
- create opportunities to add value across the sector by improving access to existing markets and enabling access to new market opportunities;
- future-proof the fisheries monitoring and reporting systems to ensure consistency with monitoring developments domestically and internationally;
- increase compliance with fisheries legislation, including that relating to the discarding of fish.

Consultation Question:

- Do you agree with the objectives of IEMRS?

²⁰ A social licence to operate indicates the level of approval from the community that the commercial sector has to conduct its activities.



Options and impact analysis

Non-regulatory options

MPI considers the option of voluntary measures (for example, code of practice) is not feasible because it would not satisfy the policy objectives outlined above.

One hundred percent uptake of electronic reporting must occur for it to be most effective. It is unlikely that all members of the commercial sector would commit to, or rigorously follow, a voluntary code on ER, geospatial position reporting and EM if developed by that sector with the support of MPI. Also, standards and specifications may differ amongst the sector, and in particular be less stringent, than those developed by government. A further reason for consistent government standards is to meet international reporting requirements.

Voluntary electronic reporting has been in effect since at least 2009. In the years since then, electronic reporting has been adopted by about 10 percent (27 percent of returns) of vessels, mainly in deepwater fisheries. The main driver for permit holders to adopt electronic reporting up until now has been that some are required to report catch both to MPI and their company owners, and electronic reporting removes the need for duplication. It is unlikely that there will be significantly greater uptake in the absence of regulation.

MPI would have difficulty in asserting ownership of the data and imagery generated by voluntary electronic reporting and monitoring in the absence of regulation. Given past experience, this would be expected to result in issues with public confidence in the transparency and credibility of the information if it is still owned by the commercial sector as opposed to government.

MPI has also considered the option of increasing Observer coverage, particularly in the inshore fishery. However, there are serious constraints on coverage of the inshore fleet for the reasons outlined in the problem definition in this section of this paper.

The cost of further increasing coverage substantially in inshore fisheries would likely be prohibitive. There are currently 96 Fisheries Observers (numbers have been as high as 105 in recent years) – this number would have to increase dramatically to substantially lift current rates of coverage, particularly in the inshore fisheries.

Options for consultation

MPI has identified three options to consult on:

- the current state;
- electronic reporting and geospatial position reporting for all permit holders²¹ from 1 October 2017;
- electronic reporting and geospatial position reporting

for all permit holders²² from 1 October 2017, and phased introduction of electronic monitoring on commercial fishing vessels from 1 October 2018 (MPI's preferred option).

Electronic monitoring capabilities such as automated on-board cameras and associated analytical software are now affordable and effective enough to consider these as a solution to the information gap described in the problem definition.

To make the most of the investment in electronic monitoring technologies, a modern record-keeping system that captures all fishing effort electronically and transmits in near-real time is also required.

Following is a brief summary of what MPI means by the terms electronic reporting, geospatial position reporting, electronic monitoring, and an integrated electronic monitoring and reporting system (IEMRS).

Electronic reporting

Electronic catch reporting requirements are broadly expected to be a continuation of information currently captured by paper forms (for example, tuna longlining catch effort return, trawl, catch, effort and processing return, non-fish and protected species catch return).

Changes that are proposed to reporting using ER are described below. MPI's objective is to, as much as possible, standardise data collection, irrespective of fishing method. The main changes proposed are:

- **Event-based reporting** – Reporting will be event-based rather than time-based. At present, for some types of returns, permit holders are required to record the time of the start and end date of a shot or set (or other related event). This may encompass a number of other fishing events during a 24-hour period. MPI is proposing that in future the time of each "event" will be recorded. MPI proposes that an event will be defined as set out in Annex 1. Reporting will be initiated at the start of each event, with reports completed and submitted on the day that the event occurs. Completed e-reports then would be queued for electronic transmission over mobile data or satellite networks. The purpose of event-based reporting is for fisheries managers to have more robust catch, effort and landing information than is available at present. This includes supporting more efficient and effective monitoring.
- **All fish taken to be reported** – Permit holders will be required to report all fish caught, including non-quota species and fish below minimum legal sizes.

21 Including high seas permit holders.

22 Including high seas permit holders.

At present, depending on the return, fishers report only the top five to eight species due to space limitations on forms. Recording all species taken allows for a more comprehensive understanding of total catch.

- **Director-General approval of forms and data fields**
– As part of the move to electronic reporting, the Director-General of MPI will in future approve forms and data fields required. This will allow for a more agile and responsive system than the Cabinet approval process required to make changes at present.

Licensed fish receivers will also be required to submit LFRRs electronically, although the vast majority do so voluntarily at present. (This is currently a service devolved to FishServe).

Geospatial position reporting

Electronic reporting as above includes a geospatial information requirement such that the locations of fishing events are logged.

Geospatial positions of fishing activity will also be documented via electronic monitoring (described further below).

In addition, automated geospatial position reporting will be required through an automatic location communicator or comparable tool.

Electronic monitoring

Automated cameras placed on fishing vessels capture imagery of fishing activity that is reviewed to generate data that describes the activity being observed. These data can then be used to verify permit holders' statutory reporting. The amount of imagery captured that is reviewed by onshore analysts would vary with information needs and monitoring objectives, including the risk profile of the fishery. It is important to note that "EM Data" is the information documented from the imagery, and not the imagery itself.

The number of cameras required per vessel is determined by both data collection requirements and the capabilities of the cameras. Simplifying processes around catch handling reduces the number of cameras needed. Transmission of EM data to MPI will be by a required method that is to be determined. Depending on the supplier, wireless transmission or hard-drive capture may be employed.

EM technologies are commercially available, through providers based both in New Zealand and internationally.

In the first instance, MPI's intent is that mandatory camera monitoring is applied on all commercial fishing vessels. However, MPI acknowledges that there may be particular constraints on camera deployment in some cases.

Integrated electronic monitoring and reporting system

The data collected from the above three system components (ER, GPR, EM) will be integrated in an information base that facilitates the cross-checking and verification of reported information across data sources. This will occur onshore, supported by appropriate data management tools and infrastructure.

The preliminary expectation is that the integration of the three information streams will be undertaken within MPI through linking processes similar to typical database structures (for example, using a primary key, GUID (or UUID),²³ and content of specific linking fields).

With integrated data streams available for review, verification can proceed. Verification involves extracting data from EM imagery and position reporting and then comparing those data with fishers' electronic reports. Content to be verified will be described in fishery-specific monitoring plans to be developed by MPI.

Fishery-specific monitoring plans would be developed based on monitoring objectives and priorities. Currently, monitoring objectives and priorities are reflected annually in the development of services requirements for Observer monitoring (such as the specification of Fisheries and Conservation Services). It is envisaged that the planning processes culminating in these service specifications would continue. Where annual planning and consultation focuses solely on Observer services currently, under IEMRS these processes would encompass Observer- and camera-based monitoring services.

Fishery-specific monitoring plans would specify, for example:

- monitoring objectives for the fishery;
- which of those objectives EM is being used to meet, and which objectives will be met by other monitoring approaches (for example, Observers);
- statutory reporting requirements documented by ER that EM is intended to explore and verify;
- approach to sampling EM imagery (for example, random or systematic);
- amount of imagery to be monitored (for example, a percentage of sets, hauls or tows);
- procedures for identifying discrepancies between ER, GPR and EM findings, beyond which follow-up would occur;
- processes to follow when discrepancies are outside pre-identified thresholds and therefore require further investigation;
- processes to follow when other events of interest are detected (for example, potential compliance issues).

23 GUID = Globally Unique Identifier (or Universally Unique Identifier).

As part of analysis and review procedures, pragmatic thresholds for following up on identified discrepancies would be set at different levels for different fisheries, species, and reporting requirements, and will vary with fisheries management objectives and risks. MPI expects that the thresholds will vary depending on fisheries management objectives and risks. Further, particular vessels may be identified as higher risk or of particular interest, triggering higher levels of imagery review on a case-by-case basis.

The verification function of EM is similar to what some elements of Observer information provide, that is, supporting an understanding of the accuracy of the fisherreported data. International experience (for example, in Australia) indicates that feedback to fishers comparing their ER and EM data has resulted in significant improvements in fisher reporting (such as a reduction in discrepancies between the ER and EM datasets over time). Fisher-reported catch-effort information would remain the primary record used for MHRs.

To provide for effective management of the information streams collected by IEMRS technologies, MPI requires access to updated infrastructure. Central to this is the refresh of the catch effort database. A rebuild of this database was approved in 2014 and subsequently suspended in anticipation of IEMRS. The refresh will now continue, with database infrastructure created to support IEMRS information streams, and the delivery of the new database aligning with the roll-out of mandatory ER.

Figure 1 sets out a schematic of one provider's approach to on-vessel hardware for electronic monitoring.

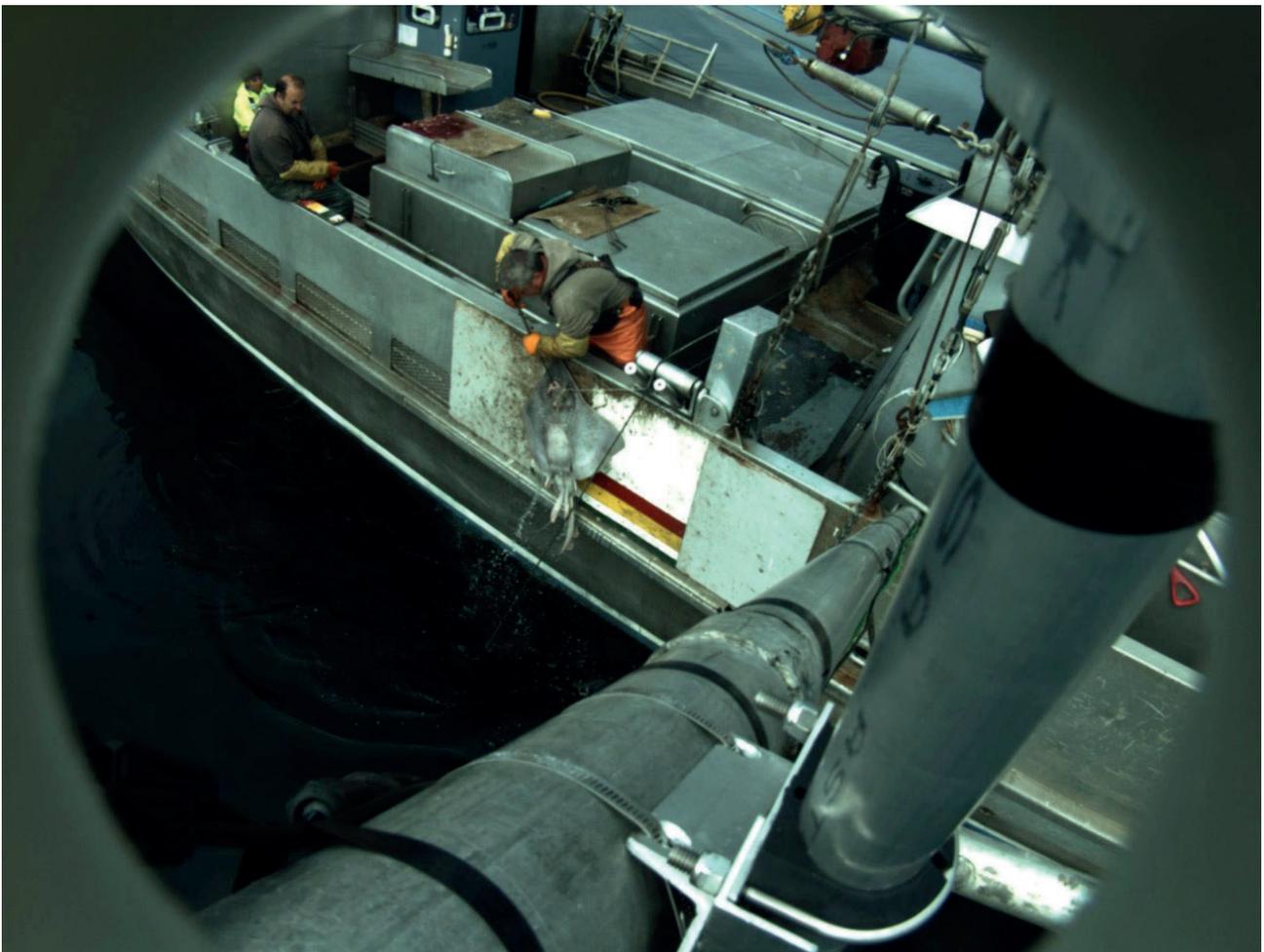
Figure 2 sets out IEMRS data and image flows.

Photos of EM systems in an Alaskan longline fishery are shown on the following page (Figures 3a, 3b).

Figure 3(a). The electronic monitoring system on this fishing vessel in Alaska includes cameras attached to the vessel's stabilizers. The cameras collect high resolution video of everything that comes up on the longline. Credit: NOAA.



Figure 3(b). A fisherman hauling a skate over the rail, as seen by the camera of an electronic monitoring system. Skates are bycatch species in the halibut fishery in Alaska. Credit: NOAA.



Options analysis

Table 1 summarises the options identified by MPI and their costs, benefits and whether they are likely to achieve the policy objectives. MPI seeks feedback on all available options, including combinations of options and options not presented in this consultation document.

Option 1: Current state

Under this option, the Government would not make any changes to fisheries regulations and the current state would continue, such as, most catch-effort reporting being paper-based, some mandatory GPR, voluntary ER and voluntary EM from a minority of the fleet, Observer coverage on a small portion of the overall fleet.

Under this scenario, MPI believes the following would apply:

- The current patchwork situation would continue, with some members of the commercial sector utilising ER, Geospatial and/or EM technologies to differing standards and specifications, with attendant uncertainty about government requirements – this could lead some companies to adopt technology that does not meet government standards and a potential cost to the commercial sector in lost time, effort and money.
- Continuation of the current paper-based reporting system for catch-effort carries high transaction costs for the commercial sector.
- The significant uncertainty associated with current catch and effort information may result in TACCs that are not set at optimum levels.
- Progress would continue to be constrained in resolving key management issues in some fisheries, such as discarding and protected species bycatch.
- Confidence will continue to be undermined amongst the public, international markets and users of wild fisheries that commercial fishing entities are catching their allocations with minimal or acceptable impacts on the environment and protected species. This is especially likely for fisheries with low levels of monitoring information.

- There would continue to be limited opportunities to create and add value to wild fish harvest. Low monitoring levels restrict MPI's ability to verify reported catch information and the catch documentation system is not able to support fine-scale traceability through supply chains.²⁴ Many fish stocks cannot meet the requirements of sustainability assessments that support access to premium markets and where boat-to-plate chain-of-custody tracking is required.

Consultation Question:

- Do you agree with this option?

²⁴ Exceptions exist in some cases, for example, the Catch Documentation Scheme for southern Bluefin tuna that operates under the Commission for the Conservation of Southern Bluefin Tuna, or where traceability systems have been implemented by an industry operator.

Option 2:

Electronic reporting and geospatial position reporting for all permit holders from 1 October 2017

The main features of Option 2 are:

- Electronic reporting and geospatial position reporting would be required from all permit holders.
- The standards and specifications for ER and GPR will be set in a circular (for example, under revised fisheries reporting regulations). These will be determined in a separate consultation process.
- There would be a three-month transition period from the promulgation of the regulatory requirements in July 2017 through to their coming into effect on 1 October 2017 (although MPI will be working with the commercial sector well before July on implementation requirements).
- In the event that the ER technology malfunctions, either when catch-effort information is sent by the vessel or received by MPI, the permit holder will be required to provide a back-up electronic report at the earliest practicable time.
- ER and GPR will be required of all permit holders – including high seas permit holders, and permit holders who don't fish from a vessel (for example, eel fishers, who will be required to use hand-held technology).
- The MPI Director-General will approve new data requirements.

Costs

Estimated costs are as follows:

- Estimated costs to Government are focused on data management infrastructure. The database that currently holds fisher-reported catch and effort information was created in the mid-1990s and is no longer fit-for-purpose. A new database is necessary to meet the requirements of IEMRS. These costs will not be cost recovered. (Operating costs of the new database may be considered for cost recovery).
- For ER, costs are limited to transmission costs provided fishers have a laptop, smartphone or tablet (or similar) and can download a free application.

There are no new financial costs to the public under this option.

Benefits

The benefits to the commercial sector are:

- **More accurate estimates of catch limits** – Due to the uncertainty surrounding catch reporting, MPI in most cases builds an estimate of “other sources of mortality” into the total allowable catch limits for fish stocks, based on an accumulation of information from MPI's Compliance teams and other sources. More accurate information from ER will provide greater confidence in the datasets that inform catch limits, in turn building greater confidence amongst the commercial sector and other stakeholders that those limits are sustainable.
- **Ease of reporting** – Reporting will be completed via a touch screen or mouse-click based interface, removing the need for handwritten entry of information into many small boxes.
- **Reduction in costs** – Delivery of electronic catch reports with fewer errors than paper forms will reduce data entry and data management costs. With an electronic system validation rules are built in at the front end of the process, hence greatly reducing the opportunities for error. Further, error correction is streamlined electronically. Estimated annual savings approximate \$420,000.
- **“Dashboards” summarising catch information** – Permit holders (and others by approval) will have access to the new catch-effort database by a log-in and structured permissions, allowing them to see information as they are lodging their reports.
- **Industry logistics** – At present, inshore fishers in particular are often unable to communicate their catches readily with licensed fish receivers. Under ER, catch information will be available to licensed fish receivers and owners/companies on a near-real time basis, allowing for quicker and more precise placement of products in the market.
- **Event-based reporting** – ER will be event-based reporting, rather than time-based – thus the time and cost to the commercial sector in reporting will be significantly reduced. Reporting will be more efficient.
- **Savings in time and postage costs** – The process for correcting paper forms is slow and cumbersome. FishServe mails back the forms to permit holders for correction within 14 days. Some corrections and clarifications require more than one mail-back. This is increasingly impractical with reduced postal services. It also results in substantial postage costs to FishServe – costs which are ultimately recovered from the commercial sector through the cost recovery levy process. FishServe estimates that the cost of electronic reporting is about 50 percent cheaper than paper-based reporting.

The benefits to government are:

- Near-real time ER and GPR on all vessels would represent a major improvement in vessel-based reporting. The current low levels of catch-effort reporting and GPR limit the speed at which MPI can analyse information and take timely action where required.
- The lack of any EM component to IEMRS, however, would fail to address a number of urgent fisheries management issues. Most notably, verification of fisher reports would remain constrained and public confidence in fisheries would not be restored. Significantly, however, this option would provide some improvement on the current state.

Consultation Question:

- Do you agree with this option?

Option 3:

Electronic reporting and geospatial position reporting for all permit holders from 1 October 2017, and a staged introduction of electronic monitoring on commercial fishing vessels from 1 October 2018 (MPI's preferred option)

The main features of Option 3 are as in Option 2, as well as:

- EM will be rolled out on a phased basis from 1 October 2018 to allow the supply market time to establish itself to service all of the commercial fleet (at present, the supply market is not large enough to do so). EM will be phased in amongst willing adopters and other fisheries based on an evaluation of risks to the management regime (for example, fish stock and protected species sustainability, compliance).

Important points to note about EM are that:

- The Fisheries Act 1996 provides legislative authority to make regulations to require the installation of equipment to "observe fishing or transportation".
- The Search and Surveillance Act 2012 allows for the placement of cameras on fishing vessels for the purposes of constant (24/7) monitoring, verification and compliance, as long as regulations are made under section 297(1)(ca) of the Fisheries Act 1996 for the purposes of section 227A, to require the installation of cameras on fishing vessels (compulsory installation). Vessel operators would be required to install cameras and collect imagery, and then provide the imagery to MPI.
- While cameras can provide services analogous to many of the monitoring and verification functions an Observer carries out, there are some key differences in these capabilities. For example, cameras cannot conduct biological sampling.
- Therefore, in some cases, Observers will still be placed on vessels that are required to carry EM. For example, observers may conduct research data collection (for example, sampling of length frequencies, otoliths and so on). In addition, Observers may be placed where there may be compliance concerns, including with EM requirements.
- Vessels carrying EM technology will be required to submit to MPI individual vessel monitoring plans (IVMP). The plans will set out the information on fishing activities that cameras will monitor (such as what cameras need to "see") and how on-board practices will ensure the capture of this information (for example, crew obligations regarding catch handling). Plans will be reviewed and approved by MPI Compliance. These plans will vary from vessel to vessel and with fishing method. To take an

example, a typical IVMP for a longliner would include requirements to capture imagery showing setting and hauling, catch handling and discarding.

- MPI is consulting on IEMRS technology only. However, in the future MPI would like to engage with the commercial sector on a possible trade-off between monitoring activities with camera technology and other technologies, such as catch verification supported by information collected using flow-scales. This could facilitate the use of fewer cameras on large vessels conducting complex processing, where greenweight weighing may be an alternative.

Costs

Costs of ER and geospatial position reporting specifically are set out in Option 2. Indicative costs of EM alone are set out below:

- To government: Workstations and software including licences. There are opportunities for cost efficiencies if purchased in bulk.
- To the commercial sector: Estimated \$5,000 to \$18,000 per vessel for installation, equipment, set-up, travel, labour and training. This cost range reflects the number of cameras required (one or more), and the type of camera that commercial sector operators may choose. Service costs are estimated at \$1,000 to 2,000 per year.
- FTEs required to monitor EM imagery on shore will depend upon the hours of fishing time to be reviewed. MPI is considering two options for delivery of this function – either in-house or contracted out. Regardless of the option chosen, MPI will manage the reviewing function and ensure there are no conflicts of interest between the providers of EM hardware and the MPI-managed monitoring function. Cost recovery is the focus of a broader MPI work programme, and the recovery of operating costs in relation to IEMRS will be considered in that context. (No additional cost recovery is expected in relation to IEMRS in 2017).
- This option presents no direct new financial costs to the public.

MPI acknowledges that, depending on the costs of EM, there may be a reduction in the profitability of some companies while the longer-term benefits of IEMRS accrue. However, MPI also notes that by far the majority of permit holders are linked to a single vessel, reflecting a spread of costs across vessel operators.

Benefits

The benefits of IEMRS are set out below:

- **Deterrence of discarding** – Fishers, particularly inshore fishers, may operate to the specific instructions of licensed fish receivers as to what the licensed fish receivers are prepared to purchase. This has the effect, whether intended or unintended, of species a licensed fish receiver does not want in many cases being discarded because there is no market (or perceived market) for those “unwanted” species or fish of certain sizes. EM will deter this practice and encourage both fishers and licensed fish receivers to consider how to make use of those species. It will also encourage operators to carry or obtain an ACE package that is better aligned with the expected catch mix.
- **More accurate estimates of catch limits** – Due to the uncertainty surrounding catch because of discarding fish and other illegal fishing, MPI in most cases builds an estimate of other sources of mortality into the total allowable catch limits for fish stocks, based on an accumulation of information from MPI Compliance teams and other sources. With more accurate information from EM in particular, but also ER and GPR, the levels of uncertainty will be reduced amongst the datasets informing catch limits for all stocks.
- **More responsive TACCs** – In one scenario, if better information supports an increase in TACC or better utilisation of existing TACCs to achieve a 5 percent increase in finfish exports at existing prices, the potential increase in export earnings could be \$43.2 million annually.
- **More accurate estimates of protected species bycatch** – In inshore fisheries in particular, estimates of protected species bycatch (for example, seabirds) are poor. The comprehensive monitoring approach that IEMRS provides will increase the quality of these estimates, supporting better management of protected species interactions with commercial fishing operations. Rare events can be detected more effectively.
- **Fishery certification** – Inadequate information precludes fisheries being certified for sustainability. If better information supplied by IEMRS supports third-party fishery certification of more New Zealand fisheries, for example by the Marine Stewardship Council, the associated 20 to 30 percent price premium on another 5 percent of New Zealand’s exported seafood could generate an additional \$8 to 12 million from exports markets annually. Certification has also been shown to facilitate market placement.
- **Observers** – IEMRS technology will in future focus on verification by electronic monitoring. In some cases, Observers will still be placed on vessels that are required to carry EM. For example, observers

may conduct research data collection (for example, sampling of length frequencies, and otoliths). In addition, observers may be placed where there may be compliance concerns, including with EM requirements. MPI expects that under the IEMRS regime, Observer at-sea deployments will be significantly reduced over time, as MPI's information needs will be met by a more holistic monitoring approach taking account of integrated electronic monitoring, catch-effort reporting and vessel position reporting.

- **Operator accountability enabled** – With comprehensive monitoring, good practice can be better recognised. When issues arise with one operator, the extent of those issues across fleets can be examined and managed appropriately. For example, in the past, particular protected species bycatch events have led to the development of new regulations. Under IEMRS, the extent of risk-exacerbating behaviours will be better understood.
- **Social licence** – Robust and more comprehensive information together with significant improvements in transparency provided by monitoring will support the development of social licence for the commercial fleet. Further, stakeholder confidence in the level of commercial sector compliance with regulatory frameworks will increase.

Consultation Question:

- Do you agree with this option?

Further Consultation Questions:

General questions

- Are there other options, not described in this section, which should be considered? If so, what are the potential disadvantages and benefits of those options?
- Do you have any suggestions on how IEMRS and its components (EM, ER, GPR) could deliver benefits to the commercial sector generally and to you particularly?
- Given that the introduction of IEMRS technologies would occur in stages across the commercial fishing fleet, do you have any suggestions on how that phase-in period should be rolled out?
- What do you consider are particular difficulties that vessel operators may encounter in implementing EM?
- If you do not consider EM practical on some vessels, how else would you propose MPI verifies catch-effort reporting?

Permit holders

- What EM, ER or GPR technology/ies (if any) do you currently use in your operations?
- Do you operate this technology on your own behalf, or as an input into someone else's operations?
- If so, is it linked to the electronic systems of a Commercial Stakeholder Organisation (the representative body for commercial fishers of a particular stock or group of stocks (such as the Paua Industry Council), or other similar management group?
- What issues do you currently have with ER?
- What sort of feedback do you want from ER? What sort of data from ER would be helpful to you?
- If you do not currently utilise ER, EM and/or GPR technology, do you have any interest in being an "early adopter"?

Commercial stakeholder organisation (CSO)

- If you represent a CSO, would you be prepared to share your information standards for data collection on fishing activity with MPI on a confidential basis?
- How might your existing systems used by you and your stakeholders deliver on IEMRS objectives?
- Would you be prepared to identify vessels that use types of GPR and ER amongst those represented by your organisation?

Licensed fish receivers

- What problems do you experience with landing data?

Implementation plan

There are international and domestic precedents for EM and ER. However, the IEMRS initiative is the broadest in scale. MPI recognises that this is an ambitious undertaking, and will work closely with the commercial sector and other stakeholders throughout the roll-out.

An implementation cycle for the IEMRS project, with accountabilities for each stage, is set out in Figure 4 below.

MPI will take the following steps to give effect to the regulations to support IEMRS:

- the Minister for Primary Industries will make a media statement announcing the Government's decisions;
- MPI will communicate the decisions to all those who made submissions on this discussion paper;
- MPI will post the new regulatory information on its website, along with guidance;
- in order to facilitate implementation, MPI will hold workshops for the commercial sector and service providers;
- monitor the delivery and the data and imagery gathered;
- MPI will provide ongoing information to the commercial sector about IEMRS via the MPI webpage;
- engage with the commercial sector to work through technology requirements, compatibility and installation. Training on the new reporting requirements and on the technology (including its maintenance) will be important for achieving consistency in data provision. MPI also proposes that the roll-out of IEMRS is facilitated by a new forum or working group, established with a specific focus on the development, implementation, monitoring and review of the new system.

Regulation

MPI will need to amend at least the following regulations to implement electronic reporting and monitoring:

- Fisheries (Reporting) Regulations 2001;
- Fisheries (Satellite Vessel Monitoring) Regulations 1993;
- Fisheries (Infringement Offences) Regulations 2001;
- Fisheries (Cost Recovery) Rules 2001 and associated Cost Recovery Orders.

MPI will need to create new regulations at least in the following areas:

- to enable mandatory installation and maintenance of electronic monitoring systems;
- on the use and transmission of electronic monitoring data.

Circulars

The requirements for ER software (as outlined in this discussion paper) will be given effect by a circular issued by the Director-General of the Ministry for Primary Industries under regulation 41M of the Fisheries (Reporting) Regulations 2001.

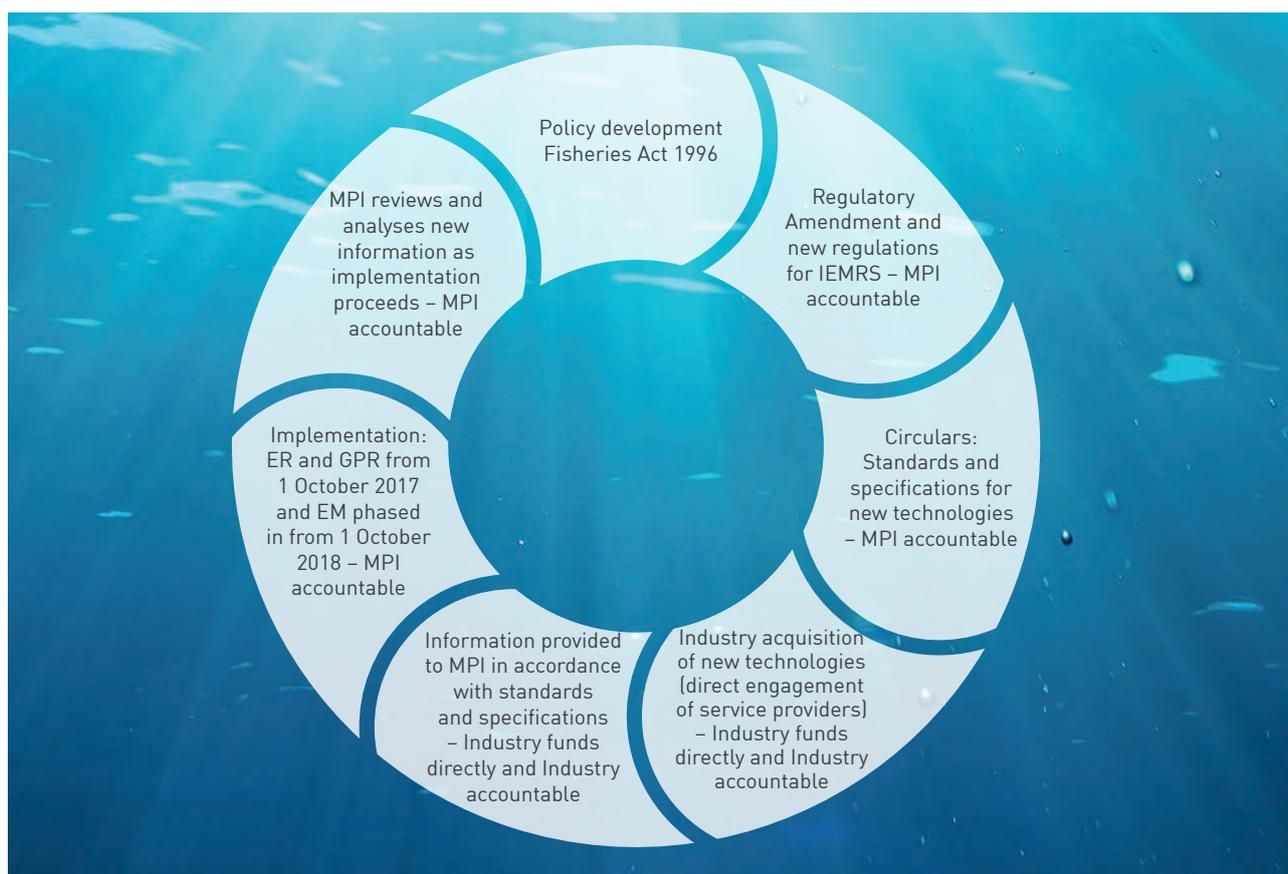
The major new requirements in the circular will be reporting latitude/longitude (new for some permit holders) and reporting all fish taken (new for all permit holders).

The circular will be published at the same time as the regulations, such as the end of June 2017, to allow for a three-month transition period prior to the 1 October 2017 start of the fishing year for most fish stocks. MPI recognises, however, that this period is short and will therefore be consulting with the commercial sector well before that date on the likely content of the circulars.

MPI also expects to articulate the requirements for EM systems via circular.

As described elsewhere in this consultation document, MPI proposes that industry will direct purchase the reporting tools required for ER and GPR and the monitoring equipment required for EM.

Figure 4. The IEMRS implementation cycle



Transitional arrangements

The transition period for ER will run through to October 2017. For EM technology, this will run from July 2017 to October 2018 (with phased introduction from then on).

When IEMRS is introduced, it may change MPI’s understanding of the true levels of fish catch in New Zealand’s commercial fisheries. Therefore, the transition to IEMRS will require careful management to ensure the best use is made of information collected under the current regime and using the new reporting and monitoring tools.

With the transition to IEMRS, it is expected that for fish stocks that are assessed, ensuring appropriate TACs and TACCs will require the implementation of analytical and management approaches which are robust to uncertainty in historical catch and effort data.

For assessed stocks, fishery-independent information (for example, trawl surveys) provides a mechanism to continue assessments, incorporating information collected in the past. When fishery independent information is unavailable, novel methods may be required to support the determination of TACs and TACCs while IEMRS information streams are established and bed in (for example, for a period of five years).

For fish stocks that are not currently assessed, the way their catch limits are set would not be affected by the introduction of IEMRS in the short term. However, IEMRS will provide information to support assessments of stock status over time.

As reflected in the Future of our Fisheries work programme, discarding policies and practices may change in the future. IEMRS technologies may be required to capture reporting and monitoring needs invoked by these policies.

IEMRS technologies will support more efficient and effective compliance interventions. Under IEMRS, MPI will continue to conduct compliance interventions in accordance with the VADE (Voluntary, Assisted, Directed, Enforced) model.

Risks

Based on experience in other countries like Australia and Canada, there are a number of risks around implementation. In the following Table 2, MPI has identified the following risks to ER, GPR and EM; whether those risks are high, medium or low; and what MPI proposes to do to mitigate those risks.

Table 2. Risks – Electronic Reporting, Geospatial Position Reporting and Electronic Monitoring

| Risk | High, Medium, Low | Mitigation |
|--|-------------------|--|
| Electronic Reporting and Geospatial Position Reporting | | |
| Levels of knowledge of the new reporting framework vary amongst the commercial sector. | High | MPI liaison staff to work with fishers. Technology service providers to work with fishers on service requirements. MPI has planned communications funding for resources supporting introduction of new requirements, for example, FAQs, information sheets. Administrative service provider will liaise with fishers. Build on lessons learned from the existing voluntary ER system. MPI will emphasise advantages for sectors – they will want to collect and use data using the new tools. |
| Levels of tolerance of the new reporting framework vary amongst the commercial sector | High | See above. |
| MPI infrastructure (technologies, people, processes) not in place, for example, catch-effort database and contract for administrative services. | Low | Robust project management tools in place. |
| Electronic Monitoring | | |
| Levels of knowledge of the new monitoring framework vary amongst the commercial sector. | High | See table above. |
| Levels of tolerance of the new monitoring framework vary amongst the commercial sector, for example, fisher interference with cameras or camera views. | High | See table above. Permit holders (and others by approval) will also have the ability to view footage from their vessels on request. |
| Capacity demands created by the need to address compliance issues at an unprecedented scale, particularly early on in the roll-out. | Medium | To be eased by staged implementation from 1 October 2018. |
| Capacity of service/hardware providers of EM technology. | Medium | To be eased by staged implementation from 1 October 2018. |
| MPI infrastructure – ensure continuity of data management as new systems are introduced. | Medium to Low | Smooth, documented transition processes and contingencies identified before problems arise. |
| Functionality issues with cameras while new systems bed in. | Medium | To be worked through with service providers. |
| Optimising monitoring ability – a need for fine tuning of camera angles and catch-handling operations to maximise the efficacy of camera views. | Medium to Low | To be worked through with service providers. |
| Electronic Monitoring | | |
| MPI provides consistent external advice on monitoring requirements. | Low | Eased by individual vessel monitoring plan (IVMP). MPI liaison staff to work with fishers. Observers may be placed on vessels to work out issues. |
| Expertise of reviewers – expertise and judgement expected of those people reviewing and analysing EM information. | Medium to Low | Ongoing audit of reviewers. Robust training. Clear documentation on review processes. |

Cost recovery

MPI will incur certain costs in set-up and administration of the IEMRS regimes, most significantly the monitoring and review of the EM imagery and the cost of establishing new data management infrastructure (and retiring the old catch-effort database). Capital costs of data management infrastructure will be covered outside cost recovery processes.

No additional cost recovery is anticipated in 2017. This is because systems introduced will be funded outside cost recovery processes. However, there are likely to be cost recovery implications in 2018 and beyond as IEMRS incorporates EM and operating costs are clarified. These will be considered in the context of wider work MPI is undertaking on cost recovery.

The phased introduction of EM will require careful consideration of costs in accordance with cost recovery principles and processes in operation at that time to ensure costs are recovered appropriately (in relation to service provision).

Privacy and Official Information Act

MPI acknowledges that the commercial sector and other stakeholders are interested in the ownership, as well as the security, privacy and confidentiality of the information

collected from electronic monitoring. Important things to note in this regard are:

- MPI is the owner of ER and GPR data and EM imagery as soon as it is received. MPI will also own data taken from EM imagery.
- MPI will collect, store, use and release information consistent with the Official Information Act 1982 and the Privacy Act 1993. The imagery collected will be encrypted and stored to Government Protective Security Requirements standards. MPI will protect the data with a security classification from the time it is received.

When fully implemented, the EM component of IEMRS will generate an enormous amount of imagery that will be impractical and not cost effective to retain long term. An indicative amount of imagery based on the implementation of EM in Australia is one terabyte per vessel per month. Therefore, MPI must develop an information management strategy consistent with its own obligations and the requirements of Archives New Zealand. This strategy must also be pragmatic, given the unprecedented volume of imagery MPI will be receiving and needing to house. MPI's proposed approach to the retention of imagery is summarised in the following table.

Type of imagery

Retention period

| | |
|--|----------------------------|
| Imagery excluding any events of particular interest | Not less than three months |
| Imagery including events of particular interest that have no actual or potential legal implications (for example, bycatch events where all relevant legal requirements were met) | Not less than seven years |
| Imagery including potential compliance issues | Not less than seven years |
| Imagery including identified compliance issues (excluding taskforce operations ²⁵) | Not less than seven years |

MPI will only keep the imagery necessary to meet MPI's monitoring, verification, and legal requirements. The rest will be deleted. This is necessary because the size of the imagery and the cost of storing it is prohibitive.

MPI will make the imagery collected and retained easily available for inspection by permit holders, crew, and others by approval. For example, MPI will make the imagery available at the office nearest to the permit holder, at which viewing facilities exist.

Information sharing with other agencies will comply with relevant legislation, including the Privacy Act 1993, and applicable Memoranda of Understanding.

The imagery and data derived from the imagery will be subject to OIA requirements.

The disposal of the data and imagery will be conducted in accordance with the requirements of Archives New Zealand.

²⁵ Taskforce operations already have disposal coverage under sub-class 5.7.4 "Task Force Operations" of Disposal Authority 613 with a minimum retention period by MPI of 10 years before transfer to Archives New Zealand.

Compliance

MPI's VADE compliance model steps through Voluntary Compliance, Assisted Compliance, Directed Compliance and Enforced Compliance, with the focus on information and assistance where this is a better intervention but strong enforcement where needed. The VADE model will continue to apply under IEMRS. For more information on VADE, refer to Annex III.

Consultation Questions:

- Do you agree with the proposed implementation arrangements?
- Do you see value in a MPI, commercial sector and service provider working group to work on implementation issues?
- What other issues does MPI need to consider to facilitate the commercial fleet's transition to IEMRS?

Monitoring, evaluation and review

The following Table 3 sets out the expected benefits and outcomes from IEMRS, the indicators of success against the baseline/current state, and the time frames for those benefits and outcomes to be realised.

Table 3. IEMRS benefits and how they will be measured

| The benefits or outcomes | Indicators of success | Baseline/Current state | Time frames |
|---|---|--|---|
| Consumer, stakeholder and public confidence in the commercial fisheries management regime is secured. | <p>Mainstream media profiles the NZ commercial sector fairly.</p> <p>NZ's fisheries management regime is again seen as world-leading.</p> <p>Existing criticisms of the regime are reconsidered, revised and do not resurface.</p> <p>Consumers support market access for NZ products.</p> | <p>Pervasive scrutiny and criticism of the fisheries management regime by some stakeholders, nationally and internationally.</p> <p>Media highlighting stakeholder views that MPI's approach to managing commercial fisheries is not fit-for-purpose.</p> <p>Stakeholder-initiated challenges to market access for New Zealand fish products.</p> | Benefits accrue from when implementation commences and grow over time. |
| Fisheries management delivers cost-effective and high-quality outcomes. | <p>High quality information is available and useful to managers in short timeframes.</p> <p>Management options are of higher quality and more quickly identified.</p> <p>The availability of extensive verified information supports better focused research and commensurately finely-tuned allocation of research funding.</p> <p>Data entry and management efficiency increase and costs per datum decrease.</p> | <p>Currently, there can be delays of up to 13 weeks from when fishing events occur to when catch-effort information is available to users.</p> <p>Management decision-making is often constrained by poor quality or lack of information (for example, low-information stocks, protected species).</p> <p>Research services are often designed to address information gaps created by a lack of monitoring.</p> <p>Data management is fragmented and labour intensive.</p> | Benefits accrue from when implementation commences and grow over time. |
| Market access is improved and new market opportunities become available. | <p>Data generated that supports sustainability assessments and product traceability.</p> <p>New markets develop for currently lower value stocks as these are landed due to improved compliance.</p> | Traceability and sustainability assessments may be constrained by lack of data (especially for inshore stocks). | Latent benefit accrues as information base improves; benefits realised from when new markets develop and/or certification is sought and gained. |

| The benefits or outcomes | Indicators of success | Baseline/Current state | Time frames |
|--|--|--|---|
| The commercial sector is able to monitor and manage catches in near-real time | <p>Catch-planning and ACE management are more responsive.</p> <p>Product placement in the market is more efficient.</p> <p>The commercial sector can build social licence with more and higher-quality information.</p> <p>The commercial sector and government access the same dataset describing catch patterns (within structured permissions around data access).</p> | <p>The commercial sector dependent on permit holder reporting to track and tally catch, and inform market placement.</p> <p>Government access to catch information is constrained by mandated reporting time frames.</p> <p>Sustainability of fish stock harvest cannot be claimed where information is lacking.</p> | <p>Benefits accrue from when ER or EM are live.</p> <p>Benefits increase following implementation of both technologies.</p> |
| Fisheries resources are more efficiently utilised and sustainability is ensured. | <p>Greater confidence in TACCs.</p> <p>Wastage (by discarding) is reduced significantly and quantified more effectively.</p> <p>Protected species interactions are managed better.</p> <p>Status of an increasing number of fish stocks is known.</p> | <p>Some TACCs are set using significant precaution due to information constraints.</p> <p>Discarding is an ongoing issue, with scale varying amongst vessels and fisheries.</p> <p>Management of some protected species interactions is constrained by lack of information.</p> <p>Status of around 50% of QMS fish stocks is unknown.</p> | Benefits accrue from the start of implementation. |
| Compliance activities can more efficiently and effectively support the integrity of the management regime. | <p>Monitoring effectively captures close to 100% of fishing activity. A subset of this is then reviewed in accordance with MPI priorities and objectives.</p> <p>Compliance activities are supported with robust information that allows rapid and appropriate responses.</p> <p>Understanding of compliance issues and risks increases significantly and enables more effective prioritisation of compliance responses.</p> | <p>~8.5% of fishing activity is monitored.</p> <p>Compliance interventions are often frustrated by poor quality and/or incomplete information that becomes available slowly.</p> <p>Compliance risk assessments are based on patchy information especially in inshore fisheries.</p> | Benefits accrue from the start of implementation. |
| Opportunities to add value are created across the sector. | <p>TACCs are more efficiently used, including in-season increases.</p> <p>New markets are identified for stocks that are currently considered of low commercial value.</p> <p>Management and use of low information stocks is improved.</p> | <p>Inconsistent process for identifying stocks for in-season increases.</p> <p>Dumping and underreporting of commercially low-value stocks is incentivised.</p> <p>Effective and responsive management of low-information stocks is not achieved.</p> | Benefits accrue from the start of implementation. |

Monitoring

In the short term, MPI will produce an end of project report – a final assessment of the project’s achievements, lessons learned and how/when benefits will be measured. This will be provided initially to the project’s governance group, then shared more widely with the commercial sector and other stakeholders.

MPI will on an ongoing basis:

- generate an automatic message to the permit holder/ company owner in the event that ER or GPR technology ceases to transmit;
- evaluate fishing patterns of vessels to ensure they are consistent and that there are no anomalies;
- work with service providers and fishers to quickly resolve any technical issues with the operation of ER and GPR technology;
- authorise any requests for dispensations to shut the technologies down temporarily in the event of technical issues or accidents;
- monitor the number of infringements of the new regulations issued to vessels;
- monitor any displacement of effort in the commercial fishing fleet, for example, vessel registrations and fishing permits cancelled, as this may indicate that some portion of the fleet has been unable to comply with the new reporting requirements;
- ensure that the indicators of success in Table 3 are being met as expected;
- keep records of complaints and investigations, follow media-related articles and liaise with representative commercial sector bodies;
- keep track of early adopters of IEMRS technologies and ensure that their learnings are publicised to the commercial sector more widely;
- keep track of how many vessels MPI is monitoring at any given time and assess comparative rates of accuracy;
- maintain ongoing contact with overseas jurisdictions on implementation of IEMRS here and similar systems overseas, to ensure learnings are integrated.

Evaluation

MPI will evaluate the information available to it from the above sources. We will assess:

- whether the ongoing impacts are as intended;
- whether there are any unintended consequences;
- what have been the commercial sector’s main concerns;
- the costs of implementation to the commercial sector are they as expected? More? Less?
- what have been the positive impacts?
- what have been the negative impacts?

Review

The introduction of IEMRS technologies will be phased, with reviews undertaken at the end of each phase.

Similar to existing data collection and monitoring programmes, it is expected that information collected using IEMRS reporting and monitoring will be reviewed as it is incorporated into MPI’s work programmes. For example, reviewing fishery specific monitoring plans is expected to occur annually, with IEMRS information and collection tools being central to these plans.

Indicators of the success of the new regime will be as set out in Table 3 above.

MPI will report to the Minister for Primary Industries on a regular basis on the implementation and outcomes of IEMRS.

Consultation Questions:

- Do you agree with the proposed monitoring, evaluation and review arrangements?
- What do you think should be monitored? To whom should the results be reported?

Next steps

Following the receipt of submissions, officials will advise the Minister for Primary Industries and Cabinet on final policy options.

MPI will provide advice to Cabinet Economic Growth and Infrastructure Committee (EGI) in March 2017.

The following Table 4 sets out significant milestones for the IEMRS project:

Table 4: Proposed milestones for IEMRS project, significant products and timeframes

| Stage/Milestone | Significant products | Timeframe |
|--|---|-----------------------|
| Budget new initiative bid completed | Resourcing fit-for-purpose to support IEMRS | February 2017 |
| Regulatory framework finalised post consultation | Cabinet paper + RIS | February 2017 |
| ER and EM implementation plans developed | Implementation Plan | April 2017 |
| Standards and specifications for ER, VMS and EM documented | Standards and specifications documents | May 2017 |
| EM monitoring plan developed | Monitoring Plan | May 2017 |
| New regulations developed | Regulations and accompanying circulars drafted | May – July 2017 |
| IEMRS system architecture confirmed | Architecture documented | August 2017 |
| Capacity and capability in place to support the introduction of mandatory ER and GPR | Alignment of staffing to deliver necessary capacity and capability | August 2017 |
| Briefings for the commercial sector on ER | Communications products (such as presentations, video) | August 2017 |
| Catch-effort data management infrastructure updated | Upgraded catch-effort data management systems and infrastructure that are fit-for-purpose for information generated through IEMRS | October 2017 |
| ER operational and mandatory | ER interface in place | October 2017 |
| GPR operational and mandatory | Data management infrastructure in place | October 2017 |
| Implementation plan for EM confirmed | Implementation plan (updated) | March 2018 |
| Briefings for the commercial sector on EM | Communications products (for example, presentations, video) | August 2018 |
| Capacity and capability in place to support the introduction of mandatory EM | Alignment of staffing to deliver necessary capacity and capability | August 2018 |
| Phase in commences: EM operational and mandatory | EM systems and management structures in place | October 2018 |
| IEMRS integration into Business as Usual | Systems, processes and ongoing quality assurance processes in place | January 2019 (onward) |

Annex I

The concept of an event

Central to the Catch Effort system is the concept of an event.²⁶ An event is a specific temporal occurrence for a vessel or fisher. As such an event will always have an associated vessel and/or fisher identifier, a start time, and will frequently have an end time and a location.

MPI proposes that an event will be defined as follows:

- Fishing events (operational event type = "F"). Are associated with estimated catch and effort data. For example, one set or tow and all its effort data constitutes a fishing event.
- Production events (operational event type = "P"). Are associated with processing and actual landings.
- Disposal events ("L") = actual disposals of catch.
- Environmental events (operational event type = "E"). Are associated with environmental and vessel activity data. Environmental records are made on a daily basis.

²⁶ Ministry of Fisheries WAREHOU Database Documentation Catch Effort Base Views and Fields (Adapted from CATCHEFF database documentation Part 2 – Base views and fields) Version 9 http://www.fish.govt.nz/NR/rdonlyres/53499660-15B3-42A2-92BE-71379A6DE63A/0/Warehou_Database_Documentation_V9.pdf

Annex II

Examples of benefits predicted or accrued in other jurisdictions in which electronic fisheries reporting and monitoring systems have been implemented or examined.

| Jurisdiction | Summary of benefit | Reference |
|-----------------------------------|--|--|
| Western and Central Pacific Ocean | <ul style="list-style-type: none"> • USD\$63.5m – 120m benefit across fisheries comprising approximately 2000 vessels,²⁷ including: • ~50% fewer on-land EM reviewers as at-sea observers • Savings of USD\$1.1m on human observer costs if 10% of EM imagery reviewed • Savings of \$2.2m on human observer costs if 20% of EM imagery reviewed • Improved compliance with conservation measures • Potential price premium of 20% on product certified as sustainable by Marine Stewardship Council | Banks et al. 2016 ²⁸ |
| Australia | <ul style="list-style-type: none"> • AUD\$11m benefit over observers at 100% monitoring of catch for a 10-year period for fisheries comprising 220 vessels and 32 000 days fished per year • ~27% cost savings delivered by EM, on 10% observer coverage • Eastern Tuna and Billfish Fishery: 10 month trial, AUD\$1.6m cost-recovered from industry for management, cost savings generated by EM expected at ~\$0.27m, other benefits include improved logbook recording, better compliance, less “observer effect” • EM allows access to a gillnet fishery that would otherwise be closed due to protected species interactions (Australian sea lions) | Lara-Lopez et al. 2012 29GSGilason & Assoc Ltd 2007 ³⁰ M. Gerner, AFMA, pers. comm. |
| USA | <ul style="list-style-type: none"> • Herring/Mackerel fishery: Predicted costs of EM per sea day @ USD\$326, compared to the cost of an observer sea day @ USD\$479 • Groundfish fishery: Predicted costs of EM Year 1 @ USD\$2.9m, then Year 2+ @ \$1.2m/year; human observer services @ USD\$3.5m per year | NOAA 2015a ³¹ NOAA 2015b ³² |

27 Members of the Forum Fisheries Convention, French Pacific Territories, Indonesia, Philippines, Vietnam.

28 Banks, R., Muldoon, G., Fernandes, V. 2016. *Analysis of the costs and benefits of electronic tracking, monitoring and reporting systems applied in FFA countries and identification of the required legislative, regulatory and policy supporting requirements*. Poseidon Aquatic Resource Management Ltd, Port Douglas.

29 Lara-Lopez, A.; Davis, J; Stanley, B. 2012. *Evaluating the use of on-board cameras in the shark gillnet fishery in South Australia*. FRDC Project 2010/049. Australian Fisheries Management Authority.

30 GSGilason and Associates Ltd. 2012. *Benefits and costs of E-Monitoring video technologies for Commonwealth Fisheries: Discussion document*. Prepared for the Australian Fisheries Management Authority.

31 NOAA. 2015a. *A cost comparison of at-sea observers and electronic monitoring for a hypothetical midwater trawl herring/mackerel fishery*. NOAA Fisheries Greater Atlantic Regional Fisheries Office and Northeast Fisheries Center. June 2015.

32 NOAA. 2015b. *A preliminary cost comparison of at sea monitoring and electronic monitoring for a hypothetical groundfish sector*. NOAA Fisheries Greater Atlantic Regional Fisheries Office and Northeast Fisheries Center. June 2015.

Annex III

VADE (Voluntary, Assisted, Directed, Enforced)

VADE is most commonly known as a practical guide for frontline compliance activity and is starting to see much broader application across the organisation due to its simple and yet effective structure. Since its inception, it has developed beyond interventions into an overall approach to managing compliance.

What is VADE?

It is a tool to guide the evaluation of behaviours and choice of an appropriate response or intervention. By considering those we regulate by their behaviour we can more effectively address reasons for non-compliance and achieve the desired change in behaviour and outcomes. The segments are described below in more detail.

VADE comprises of the following parts:

1. Voluntary Compliance – “voluntarily comply and informed”

Voluntary compliance is when people understand what is required of them and are happy to comply. The role of the regulator is to influence this behaviour by ensuring there is a clear purpose for the legislation and that the consequence for non-compliance is proportionate to the effect to be achieved. Invariably sensible rules and adequate sanctions will ensure high voluntary compliance once those needing to comply are aware of their obligations. The voluntary component involves people from across the agency and externally and is often not considered to be a traditional compliance intervention. Voluntary compliance outcomes are achieved through education, engagement and communication of expectations and obligations and occurs in advance of any actual transactions.

2. Assisted Compliance – “attempting to comply and uninformed”

In many cases people are happy to comply but are unaware of the rules or need some help to understand them. Assisted compliance is that range of activities that re-enforce obligations and give the organisation confidence that the desired purpose of legislation is being achieved. Interventions are shaped by information gathered through monitoring, inspection and business intelligence activities. Feedback loops help to form a picture to determine if stakeholders are attempting to comply, are aware of their obligations or indeed choosing not to comply. Assisted compliance remains heavily focussed on reminding individuals their compliance is being monitored and if no discernible behaviour change can be observed formal direction or sanction will occur.

3. Directed Compliance – “directive warnings”

Directed compliance is a range of tools that can be applied to direct a desired behavioural change. It ranges from those powers that allow directed activity such as directing a fishing vessel back to port, retaining fish product for inspection, infringement notices, and official sanctions such as warnings and in some cases regulatory or lower threshold prosecutions. Compliance interventions in this space require some powers under legislation in order to issue directions. This will often be carried out by MPI staff or those we regulate with or act on MPI's behalf.

4. Enforced Compliance – “criminal intent and illegal activities”

Enforced compliance is where the full extent of the law is applied. While it can be the decision as a consequence of no noticeable behavioural change despite Voluntary, Assisted and Directed interventions, it is also for those entities or individuals who deliberately choose to break the law and where a lesser intervention is inappropriate. This is for either serious offending or where legislation requires an enforcement action. These cases are formally investigated with a view to prosecution. Consistent with Crown Law Guidelines enforcement action by way of prosecution will apply to serious criminal offending, repetitive offenders, unacceptable practice or when high public interest demands.

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