Priority – Medium **Security Level** – Restricted

Fisheries New Zealand
Tini a Tangaroa

To: Hon Shane Jones, Minister for Oceans and Fisheries
From: Dan Bolger, Deputy Director-General Fisheries New Zealand

Overview of the rollout of on-board cameras on commercial fishing vessels

Date	9 February 2024	**Reference**	B24-0023

Decision required	Date decision required by
YES ☐ / NO ☒	N/A

Purpose

- This briefing provides an overview of previous policy decisions, progress made to date, and next steps for the rollout of on-board cameras on commercial fishing vessels.

Key messages
On-board cameras are currently being rolled out on approximately 255 vessels, with installation complete for 123 (48 percent) of these vessels and scheduled in priority groups for the remaining 132 vessels before the end of February 2025.
There have already been substantial increases in fisher reporting of discarded catch and protected species interactions. This is leading to more accurate data, which can be used to create value for industry and fishery management. Fisheries New Zealand is currently: • using this data to better inform decision making on the catch settings for low information fish stocks; • sharing the data in real-time with industry to reduce seabird interactions in the South Island surface longline fishery; and • working on a draft protocol with Fishserve so they can use camera-verified data to support fishers to target fishing effort and avoid bycatch.
In July 2020, Cabinet agreed to make $68 million of Crown funding available for the on-board camera programme for the period 2021/22 – 2024/25. The programme is currently under budget, partly due to delays in the rollout.

Outyear costs are forecast at approximately $15.3 million per annum, but are not fully funded. Approximately $4.8 million per annum of the outyear costs reflect activities that would be generally Crown funded. There is $3.8 million per annum in existing Crown funding available.
Approximately $10.5 million per annum of the outyear costs are potentially recoverable from industry under current cost recovery principles. Even with a $5 million per annum offset through a decrease in human observer costs, this amount would represent a significant increase in total cost recovery for affected fish stocks.
Fisheries New Zealand is working to identify cost efficiencies for both industry and the Crown. This will be informed by commissioning an independent review of ongoing programme costs. We propose to report back to you in four weeks with options.
Fisheries New Zealand has undertaken a Privacy Impact Assessment and worked closely with the Offices of both the Privacy Commissioner and the Ombudsman in the development of operational guidelines for how it considers requests for information from the camera programme. Exclusions from the Official Information Act (1982) are uncommon and require primary legislation, but the camera programme has some characteristics not commonly found and there is a precedent with the National Animal Identification and Tracing Act (2012). We can provide further advice if required.

Background

Early policy and proof-of-concept

1. In April 2017, Cabinet agreed to implement a digital transformation strategy for commercial fishing [EGI-17-MIN-0053]. This consisted of requiring:
   a) fishers to electronically report their catch/effort data daily via an electronic logbook (ER);
   b) fishers to carry geospatial position reporting (GPR) devices that provide Fisheries New Zealand with regular locational data; and
   c) the use of on-board cameras on fishing vessels, to enable monitoring of fishing activity and verification of catch/effort reporting.

2. Regulatory changes to establish requirements for fishers were introduced in July 2017, with ER and GPR rolled out on all commercial fishing vessels by the end of 2019. The Fisheries (Electronic Monitoring on Vessels) Regulations 2017 (EM Regulations) set requirements for on-board cameras in a phased rollout from October 2018; however, these dates were shifted as the approach evolved.

3. In May 2019, Cabinet agreed to a staged approach for the rollout of on-board cameras [DEV-19-MIN-0109]. The first stage saw a proof-of concept (POC) trial beginning on 1 November 2019 on selected West Coast North Island trawl and set net vessels considered to pose a higher risk to Māui dolphins. This proof-of-concept programme has operated successfully since 2019 and is now phasing out with these vessels transitioning to the new on-board camera solution.

Decisions on the wider rollout

4. In July 2020, Cabinet agreed to make Crown funding available to roll out on-board cameras on up to 300 inshore vessels. In addition to $18 million in existing Ministry for Primary Industries (MPI) funding, a $50 million business case was approved in May 2021 [CAB-21-MIN-0181], bringing total funding for the period 2021/22 - 2024/25 to $68 million. Funding beyond 2024/25 is limited as the 2021 decision on the business case did not provide funding for outyears.

5. Following public consultation, final policy decisions were made in April 2022 on the scope, deployment schedule and industry's financial contribution to the rollout [CAB-22-MIN-0110]. It was decided that:
   a) cameras would be deployed on small (<32m) trawl vessels (excluding those targeting scampi), large (>8m) set net vessels, all bottom longline, surface longline, and purse and Danish seine vessels;
   b) they would be deployed incrementally from November 2022 to November 2024, in groups according to risk presented by fishing method and location;
   c) industry would contribute as close to $10 million as possible towards the total cost of the rollout through the transition period (2023/24 and 2024/25 fishing years), via a stock-specific levy on quota holders; and
   d) from the 2025/26 fishing year onwards cost recovery for on-board cameras would be aligned with standard fisheries cost recovery provisions, as specified at that time.

6. In-scope vessels were selected and scheduled according to risk posed to some of the most threatened protected species, for example, Hector's and Māui dolphins, yellow-eyed penguins (hoiho), Antipodean albatross, and the black petrel. In-scope vessels are responsible for approximately 85 percent of the total inshore finfish catch by volume.

7. Following a public tender process, Spark Business Group (Spark) was selected as the provider of the on-board camera system. Spark contracted Guard Safety to engage directly with fishers and Aimex to provide installation services.

8. In the early stages of the programme, Spark faced several unanticipated challenges in delivering the camera system resulting in the system not being operational in time to meet the initial regulated dates. The EM Regulations were updated, and the programme is now on track to meet the regulated dates in **Table 1** below.

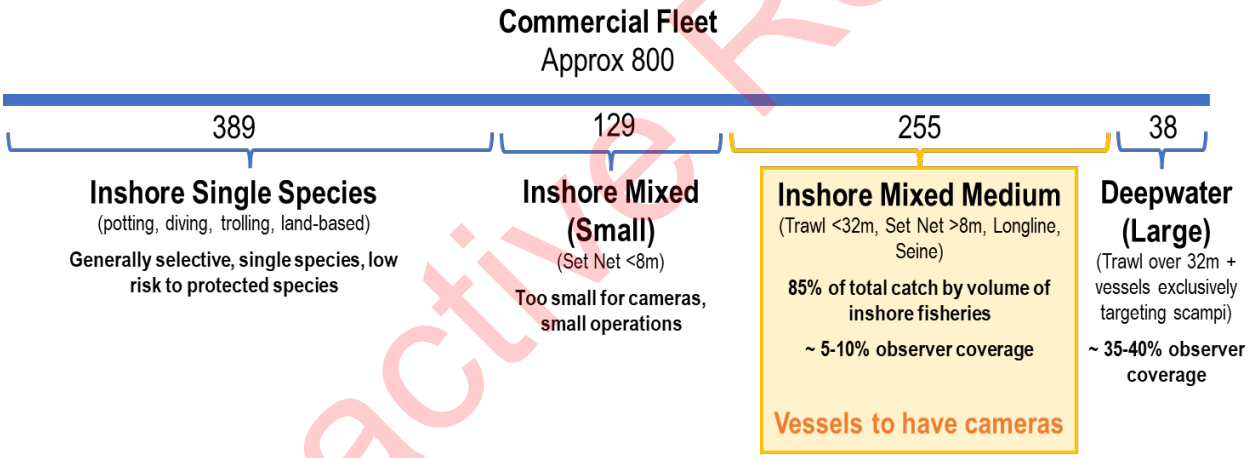
9. Cameras are currently expected to be installed on 255 vessels out of the approximately 800 vessels in the total commercial fleet (**Figure 1**). This figure will change as fishers enter and leave the in-scope fisheries.

10. Originally the rollout was expected to be closer to 300 vessels. This reduction has primarily been due to some vessels choosing to no longer undertake fishing methods requiring on-board cameras, for example, vessels that undertake both rock lobster potting and setnet choosing to stop using setnet. A broader summary of trends in vessel numbers and landings is provided in **Appendix One**.

Table 1: Current rollout dates in the EM Regulations and estimated vessel numbers as of 1 February 2024

Fishery	Regulated Go-live date	Group vessel #'s	Cumulative vessel #'s
West Coast North Island trawl and set net	1 August 2023 **Completed**	38 (incl. 4 with proof-of-concept systems)	38
North, East and South Coast South Island trawl and set net	31 October 2023 **Completed**	67	105
Surface longline – any area	16 January 2024 **Completed**	22 (incl. 4 still to be installed[1])	127 (incl. 4 still to be installed)
Northern New Zealand bottom longline	26 June 2024	37	164
Bottom longline or trawl – any area	3 December 2024	65	229
Set net, purse seine or Danish seine – any area	28 February 2025	26	255

Figure 1: Categorisation of the current New Zealand commercial fleet



11. Fisheries New Zealand holds a fixed-price contract with Spark for the installation of cameras meaning that the delays to the rollout did not result in any increase to the direct cost of this contract. The contract with Spark for the ongoing monitoring and management of the camera programme (for example, transfer, storage, and processing of footage) anticipates variable monthly costs based on variations in footage received and processing required. 9(2)(b)(ii)

[1] These vessels will not be surface longlining until later in the year.

On-board camera solution

12. The Spark camera solution comprises a range of components not combined before in an on-board camera programme. All on-board equipment is owned by Fisheries New Zealand with Spark responsible for maintenance of the equipment following any malfunctions.

13. Key features of the solution are:
    a) between two to four cameras per vessel and an on-board server (termed a yellowfin);
    b) a display to enable the vessel skipper to view the footage being captured from the cameras;
    c) footage is transferred from the vessel via Spark's 4G mobile network to a secure Amazon Web Service (AWS) site used solely for the on-board camera programme;
    d) once in the cloud, footage is automatically matched to the electronic reporting data provided by the vessel;
    e) footage is randomly selected for review by one of Fisheries New Zealand's review teams based in Wellington and Nelson, according to risk-based monitoring objectives; and
    f) data recorded by reviewers is compared to the fisher's electronic reporting data to identify any significant discrepancies.

Industry engagement

14. Fisheries New Zealand has worked closely with industry and individual fishers in both the development and roll-out of cameras. This includes a multi-stakeholder Technical Advisory Group (TAG) as well as personalised interactions with fishers through targeted phone calls and vessel visits. More than a dozen in-person workshops were held around the country throughout 2022 and 2023 and these led to strong engagement between industry and regional fisheries staff.

15. The TAG includes representatives from the following bodies, in addition to the Department of Conservation:
    a) Seafood New Zealand;
    b) Southern Inshore Fisheries New Zealand;
    c) New Zealand Rock Lobster Industry Council;
    d) First Mate;
    e) WWF; and
    f) The Nature Conservancy (TNC).

16. The following recurring questions and concerns around on-board cameras have been identified through the TAG and direct engagements with fishers:
    a) Cost: we have clarified that recoverable costs are levied from quota owners, not vessel owners, with no direct hardware, installation, or upload costs to the fisher (unlike fisher owned ER/GPR hardware). However, quota owners are concerned

about long term cost recovery, and fishers are concerned about quota owners passing on costs;

b) Privacy and security: we have provided details of how fisher information will be protected, who can access it and how external requests from third parties will be treated;

c) Transitional arrangements: fishers expect Fisheries New Zealand to provide rapid feedback to the industry on areas of non-compliance, respond quickly to new information, and adjust management settings where necessary; and

d) Access: we are working closely with industry on protocols that enable permit holders and vessel operators to access footage retrospectively. The vessel operator can currently view footage as it is being recorded on their wheelhouse monitor.

Progress on the rollout

Coverage to date

17. As of 1 February 2024, Spark cameras have been deployed on a total of 119 vessels:
    a) 101 inshore trawl and set net vessels which fish off either the West Coast of the North Island or the North, East and South Coasts of the South Island; and
    b) 18 surface longline vessels that operate throughout New Zealand's fisheries waters.

18. A further four vessels are still operating the proof-of-concept camera system giving a total of 123 vessels with camera systems currently installed. This means that, to date, 48 percent of the current estimated rollout of 255 vessels have the new Spark system installed. These vessels are responsible for one third of the catches (by volume) for the overall fleet expected to operate cameras.

19. Fisheries New Zealand has received footage for almost 6,500 fishing events (for example, trawl tow or setnet haul). Approximately 30 percent (approximately 2,100) of the fishing events have been reviewed to date and this is the general level of review that Fisheries New Zealand is expecting for the initial stages of the on-board camera rollout. To date 41 (1.9 percent) reviewed events (from a small number of vessels) have been referred to Fisheries Compliance for their assessment. We expect review and referral levels to reduce over time as reporting behaviours change.

20. The installation of the on-board camera system involves positioning and wiring cameras and other components of the solution plus any remediation of the vessel's power system necessary to ensure that the on-board camera system does not interfere with the operation of the other equipment. Most vessels have encountered little or no problem operating the on-board camera system, but a small number have experienced issues that are likely related to the system. Whilst these issues are being resolved, fishers are given temporary exemptions from the requirements under the EM Regulations. Currently six vessels have exemptions due to problems with the original installation.

21. The next rollout group of bottom longline vessels that operate around the northeast coast of the North Island has a regulated go-live date of 26 June 2024, followed by all other longline, trawl, set net, purse and Danish seine vessels by the end of February 2025 (see **Table 1** above for further details). Spark and Fisheries New Zealand are in the early stages of planning the assessments and installations of the solution on these bottom longline vessels.

Early insights from cameras

22. The key benefit of the camera programme is independently verified fisher reporting of fish catches (including fish returned to the sea) and any protected species interactions. Whilst the programme has only been operating since 1 August 2023, we have already observed some material changes in fisher reporting since vessels began operating cameras. We have compared the reporting of vessels currently operating cameras for the period from 2018 until cameras were introduced. A summary of these early insights is provided in **Table 2**.

Table 2: Changes in fisher reporting for vessels operating cameras (compared with the period from 2018 until cameras were operating)

Information	Change
Albatross interactions	3.7 times increase
Dolphin captures	2.5 times increase
Number of fish species reported in catch	25% increase
Number of fish species reported in discards	70% increase
Volume of fish discards	30% increase

23. Considering those species popular to both commercial and recreational fishers, there have been significant increases in reporting discards of kingfish (9.5 times) and undersized snapper (12.8 times) from trawl fishers. Accurate information on discarded catch is important for determining the health of fish stocks and will be critical to any evaluation of the current conditions that allow fishers to return these (and other) species to the sea. Further details of the most reported fish discarded are provided in **Appendix Two**.

Programme funding and costs to industry

24. $68 million of funding was made available for the implementation period of 2021/22 – 2024/25. Due to the early delays faced by Spark, some of the costs of the programme have been pushed beyond the available funding window and into outyears. It is possible that by 30 June 2025 the programme could have an underspend of approximately $7.3 million, see **Table 3** below.

25. The average outyear operating cost for on-board cameras is forecasted to be $15.3 million per annum. This aligns with the Single Stage Business Case. Ongoing Crown funding of approximately $3.8 million per annum has been baselined from the proof-of-concept, but no additional outyear funding has been appropriated.

Table 3: Costs for on-board cameras (implementation and ongoing)

	Total Programme Implementation (2021/22 – 2024/25)	**Average Outyear Cost** (From 2025/26)
Available funding	70.5*	3.8
Forecasted costs	63.2	15.3
Variance	7.3	(11.5)
Cost Recovery		
Potentially Recoverable	5.5	10.5
Typically Non-recoverable	57.7	4.8

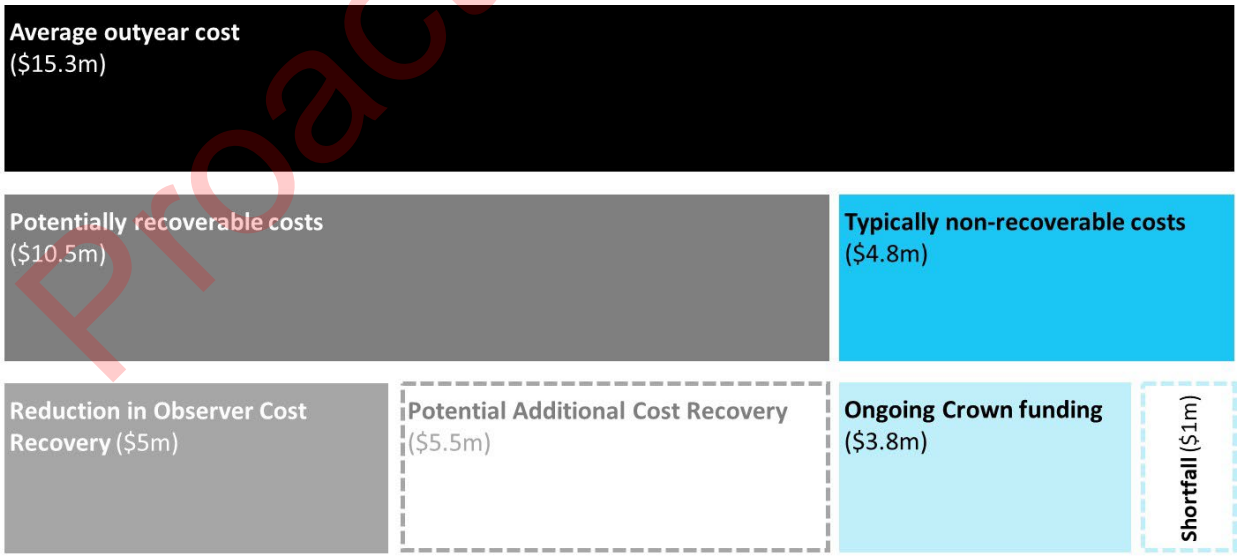
* *$68m Cabinet approved funding for wider rollout plus $2m transferred from proof-of-concept*

26. It was intended that industry would fund $10 million in total across the 2022/23 and 2023/24 transition period. For 2023/24, quota owners have been levied $2.6 million for on-board camera services. In late 2023, you decided not to change the Fisheries (Cost Recovery) Rules during the second transition year [B23-0672 refers]. At that time Fisheries New Zealand had forecast that $6.8 million would be recovered from industry based on the current Rules, but with updated information, we are now forecasting that approximately $5.5 million will be recovered across the two-year transition period.

Ongoing funding and cost recovery

27. Subject to Ministers' consideration of the programme, further decisions will be required for both Crown and industry funding for 2025/26 and beyond, see **Figure 2**.

Figure 2: Average Outyear Cost and Potential Funding Sources



28. Based on conservative assumptions for the ongoing on-board cameras costs, and an initial interpretation of current cost recovery principles, there is a potential increase of $5.5 million per annum in cost recovery to industry due to the transition from human observers to cameras and increase in verification. Even with a reduction in observer costs (up to $5 million per annum based on historical planned coverage levels), this represents a significant increase in levies on those fish stocks that would be levied for cameras.

29. If all the potentially recoverable costs were levied, and ongoing Crown funding continues at current levels, then a shortfall of $1 million per annum would remain.

30. The industry is facing a range of cost pressures, and we are considering ways to minimise this impact. Fisheries New Zealand expects cost efficiencies for on-board cameras to be found. Work is underway to identify opportunities for cost reduction and funding structures, this includes:
    a) 9(2)(b)(ii)
    b) optimisation of the footage review and compliance workforce based on changes in fisher behaviour;
    c) system improvements, for example, including greater use of AI to reduce footage capture, transmission, processing, and storage costs. Non-cost recovered funding is available within the programme budget to undertake these enhancements; and,
    d) 9(2)(g)(i)

31. We intend to support this with an independent review of ongoing programme costs. We propose to report back to you in four weeks with options.

Protecting the confidentiality of footage

32. The deployment of cameras to fishing vessels, a place not only of work, but where many fishers live for months each year, has meant that there has been a strong focus on protecting confidentiality and privacy in the development and roll-out of the programme.

33. The Official Information Act 1982 (OIA) enshrines the principle of availability - making information available unless there is good reason to withhold it.

34. The OIA also identifies circumstances where it might be reasonable to withhold official information, such as protecting privacy and trade secrets, or ensuring that the commercial position of a person supplying information is not unreasonably prejudiced. It also specifies options for making information available instead of provision in original form (for example, providing a summary or viewing opportunity).

35. Fisheries New Zealand recognises that footage of even entirely lawful fishing operations could potentially be used in a way that could negatively impact on fishers and their companies, and the image of the industry both domestically and abroad.

36. For these reasons, the design of the on-board system including controls on how footage can be accessed, and guidelines for how to treat OIA and Privacy Act requests, has been informed through undertaking a Privacy Impact Assessment[2], and discussions with the Offices of both the Privacy Commissioner and the Ombudsman.

37. You have asked for advice on the National Animal Identification and Tracing Act 2012 (NAIT Act) approach to the protection of personal and non-personal information. The NAIT Act, for which the MPI is also the administering agency, establishes an animal tracing and identification system, focusing largely on the provision, storage, and use of information.

38. The OIA does not apply to NAIT information. Specifically, section 51(1) of the NAIT Act states “nothing in the Official Information Act 1982 applies to data in the NAIT information system”. The NAIT Act provides a prescriptive regime for parties to apply to obtain information instead of the OIA's public interest balancing tests. It does not exclude application of the Privacy Act 2020, leaving the possibility for information to be provided under that regime.

39. The NAIT system is operated by OSPRI and its subsidiaries (for example, NAIT Limited). MPI has a right to access all NAIT information, but the information that MPI obtains does not automatically become subject to the OIA. MPI would generally decline OIA requests for it, on the basis that release would be contrary to the NAIT Act.

40. Exclusions from the OIA are not common, and doing so would require primary legislation. We can provide advice on this if required and would expect strong interest in any proposal from the Office of the Ombudsman as well as stakeholders.

Driving increased value from cameras

41. At the time of the 2022 decision to rollout on-board cameras, the following five benefits were identified:
    a) enhanced monitoring and verification of at-sea fishing activities, including use of protected species mitigation devices, interactions with at-risk protected species, catch and discards;
    b) more trusted fisheries data, which will enable more agile and innovative fisheries management approaches to be taken;
    c) improved environmental outcomes, such as reduced protected species captures and better managed fish stocks, as a result of more informed management decisions and improved at-sea behaviour;
    d) greater transparency and trust both domestically and across international markets; and
    e) safer, more practical, and more cost-effective monitoring of commercial fishing activity.

[2] https://www.mpi.govt.nz/dmsdocument/58234-On-board-cameras-project-privacy-impact-assessment-July-2023

42. Historically, fisher-reported data for less commonly caught species, discards, and protected species interactions has been considered unreliable and seldom used in science processes. The significant improvement in the accuracy of this information, combined with data analytics and automation, is now supporting work in three practical areas:
    a) improved and more cost-effective management of fish stocks where information is limited;
    b) reducing impacts of protected species without significant regulatory interventions; and
    c) transitioning away from human observers on small to medium sized vessels operating cameras.

Improved and more cost-effective management of fish stocks where information is limited

43. There are around 200 finfish stocks managed within the Inshore Finfish Fisheries Plan. Of these, 129 stocks are generally referred to as "low information stocks" for which only sparse catch data is available, limiting scope for use of this data in science and fisheries management decisions. For 70 percent of these stocks, the status with respect to common sustainability reference points is ‘unknown’. Further, it is generally not cost effective to have dedicated, independent research programmes for these fish stocks to support catch limit setting.

44. These include stocks meaningful to the inshore industry (for example, red gurnard, hāpuku, John Dory, and leatherjacket), with commercial landings of roughly 50,000 tonnes against commercial catch limits of 92,000 tonnes in the most recent fishing year. For 15 percent of these stocks, the commercial catch limit was almost fully caught and for ten percent it was overcaught resulting in deemed value payments and therefore an economic impact on the fleet. The penalties associated with over catching these stocks can flow on to fishers’ ability to fully catch other stocks (that is, they can become a ‘choke’ species).

45. In this area Fisheries New Zealand will:
    a) use automated analyses of fisher reported data to detect the need for catch limit reviews and reduce the work required to develop papers to support catch limit decisions in the annual “sustainability round” process. This approach will be piloted for at least one fish stock in the October 2024 Sustainability Round (consultation will occur in May-July 2024); and
    b) agree a data protocol with Fishserve to enable development of products that leverage better quality data for use by fishers, for example, to support the industry in avoiding unwanted bycatch (and deemed values) and better target fishing effort for target species (increase profitability). We expect a protocol to be in place by mid-2024. This will require agreement from individual fishers for the use of their data.

Reducing impacts on protected species without significant regulatory interventions

46. Improved protected species reporting will improve understanding of the nature and extent of interactions. Greater confidence in reporting also allows for better testing of approaches to reduce impacts, including more use of non-regulatory and spatially refined approaches, or other approaches that help drive innovation and collective action by the industry.

47. Specific programmes that use camera-verified data include:
    a) the use of camera-verified Fishing Related Mortality Limits (instead of broad closures) under the Hector's Dolphin Bycatch Reduction Plan, which allows for continued fishing and responsive management while further incentivising the industry to find solutions to reduce dolphin captures; and
    b) a pilot programme is underway with Fisheries New Zealand sending a daily report of seabird interactions to the surface longline fleet operating off the east coast of the South Island. This enables a collaborative approach with industry, including using voluntary measures to reduce interactions (for example, moving to new grounds to avoid hotspots or temporarily stopping fishing).

Transitioning away from human observers on small to medium sized vessels operating cameras

48. Historically, observers have been the primary way to monitor at-sea fishing activity, but on many small and medium-sized vessels this is considered a burden to fishers who must provide space and food for the observer and sometimes need to reduce the number of crew. On-board cameras are now the primary form of verification for inshore vessels.

49. Historical observer coverage for the fleet will be greatly reduced once the planned rollout is complete. Pre-cameras levels of coverage would cost up to $5 million per annum based on current seaday rates. Reduced coverage will help offset the costs associated with the increased verification through on-board cameras and will also reduce the burden on individual vessel operators from carrying an observer.

50. Internationally, cameras are now accepted by the Commission for the Conservation of Southern Bluefin Tuna (CCBST) as a replacement for human observers and camera coverage has also been part of New Zealand's case to maintain access to the US market.

Recommendations

51. It is recommended that you:

a) **Note** the information contained in this briefing regarding the background and progress of the wider rollout of on-board cameras.

NOTED

Dan Bolger
Deputy Director-General
Fisheries New Zealand

Hon Shane Jones
Minister for Oceans and Fisheries

…/…/2024

Appendix One: Recent trends in vessel numbers and catches in the New Zealand fishing industry

Vessel numbers

1. The following shows changes in vessel numbers over time. Inshore 'mixed-medium' is the vessel category that will be operating cameras. Note that where a vessel fits into more than one category, it is shown in only one category in the table based on greatest fishing activity. The percentage change reflects the change from 2018/19 to 2022/23.

2. The total number of active fishing vessels has decreased by approximately 16 percent between 2018/19 and 2022/23. This decrease is evident across all broad categories of the fleet but is most pronounced for inshore mixed medium and inshore mixed small vessels.

Table A1: Number of vessels that actively fished between the 2018/19 and 2022/23 fishing year.

Fishing year	Deepwater	Inshore			Total
		Mixed medium	Mixed small	Single species	
18/19	41	322	168	435	966
19/20	41	302	135	420	898
20/21	40	293	136	401	870
21/22	38	278	126	408	850
22/23	38	255	129	389	811
% change	-7%	-21%	-23%	-11%	-16%

Catch volume

3. Approximately 75 percent of the volume of total catch from wild capture fisheries is taken by deepwater vessels. The total catch from deepwater vessels is driven by catches of key high-volume species such as hoki and squid and has remained relatively constant over the last three years. The majority (approximately 85 percent) of the inshore catch is taken by mixed-medium vessels, catches from these vessels have declined 21 percent between 2018/19 and 2022/23.

Table A2: Volume, in tonnes, of the catch taken in each fishery. Figures are based on estimated catch and include both QMS and non-QMS species.

Fishing year	Deepwater	Inshore			Total catch
		Mixed medium	Mixed small	Single species	
18/19	280,696	85,168	1,757	13,627	381,248
19/20	255,934	82,131	1,659	15,012	354,736
20/21	246,873	82,515	1,687	14,951	346,026
21/22	242,142	72,426	1,614	13,810	329,992
22/23	242,438	65,466	1,555	14,366	323,825
% change	-14%	-23%	-12%	+5%	-15%

Appendix Two: Changes in reporting of discarded catch

1. The tables show the changes in fisher reporting of QMS and non-QMS species discarded for both trawl and set net vessels following the introduction of cameras. This analysis focused on the top five QMS and non-QMS species and is restricted to data for vessels currently operating cameras and the period since electronic reporting was rolled out to these vessels.

Trawl

Species	Average discards per fishing event with cameras (kg)	% increase compared to prior to cameras
QMS species		
Spiny dogfish	44	36%
Kingfish	7.7	9.5 times
Rough skate	2.4	2.6 times
Smooth skate	2.3	2.2 times
Snapper	2.1	12.8 times
Non-QMS species		
Porcupine fish	25	4.6 times
Northern spiny dogfish	10.5	7.4 times
Japanese gurnard	7.4	11.4 times
Whiptail ray	4.1	9.5 times
Eagle ray	3.9	2.4 times

Set net

Species	Average discards per fishing event with cameras (kg)	% increase compared to no cameras
QMS species		
Spiny dogfish	35.8	61%
School shark	4.3	28.9 times
Mako shark	1.7	16.1 times
Snapper	1.3	250 times
Kingfish	0.7	4.3 times
Non-QMS species		
Carpet shark	21.2	76.3%
Northern spiny dogfish	18.6	29.4 times
Sevengill shark	3.3	102%
Bronze whaler shark	2.9	20.7 times
Thresher shark	0.9	5.3 times

Appendix Three: Detailed breakdown of actual and forecast programme costs including potential cost recovery

	Programme Implementation					Outyears		
	2021/22	**2022/23**	**2023/24**	**2024/25**	**Total**	**2025/26**	**2026/27**	**2027/28**
Funding Available	6.4	10.3	28.0	25.9	**70.5***	3.8	3.8	3.8
Total operating forecast costs ($m)	6.4	8.4	12.4	21.7	**48.9**	16.8	15.3	13.6
Total capital forecast costs ($m)	-	2.8	6.3	5.3	**14.3**	-	*1.6***	*1.6***
Variance	-	(0.9)	9.3	(1.2)	**7.3**	(13.0)	(11.5)	(9.8)
Cost Recovery (Operating)								
Potential Recovery	-	-	1.9	3.6	**5.5**	11.2	10.5	9.3
Typically Non-recoverable	6.4	8.4	10.5	18.1	**43.4**	5.6	4.8	4.3

Operating Costs Categories								
Potentially Cost Recoverable								
a) installation and maintenance of cameras[3]	-	0.31	1.57	3.63	**5.5**	4.10	3.35	2.18
b) submission of footage	-	0.17	0.09	0.42	**-**	0.48	0.48	0.48
c) storage of footage	-	0.2	0.53	1.78	**-**	2.68	2.68	2.68
d) review of footage	0.49	1.31	1.33	2.64	**-**	2.60	2.59	2.59
e) Fishery Officers	-	0.33	0.92	1.23	**-**	1.36	1.36	1.36
Likely Non-recoverable								
f) compliance analysts, prosecutions, legal	0.38	0.55	1.31	1.91	**-**	1.75	1.75	1.75

[3] Only recoverable cost category in the transition years FY23/24 and FY24/25.

g) fisheries management, science, and data	-	0.94	1.33	1.08	-	1.10	1.10	1.10
h) artificial intelligence research and development	-	-	1.00	4.00	-	-	-	-
i) project implementation	4.49	2.83	2.93	2.76	-	-	-	-
j) depreciation and capital charge *(not included in a-e)*	0.62	0.68	0.89	1.34	-	1.89	1.09	0.60
k) other overheads	0.46	1.05	0.47	0.91	-	0.86	0.87	0.87

* *$68m Cabinet approved funding for wider rollout plus $2m transferred from proof-of-concept*
** *Not included in variance as would be funded from operating forecast (i.e., depreciation)*