



Vessel tracking decision post implementation impact analysis statement

Chapter 4, Part 1 of the Fisheries (General) Regulation 2019

October 2023

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Executive summary

Background

Queensland's natural marine environment belongs to everyone. It is a public resource which provides broad benefits through economic, social and ecological means. Legislation and regulations are in place to govern the use of Queensland's fisheries resources and ensure the marine environment's sustainability (and the resulting public benefits).

The Fisheries (General) Regulation 2019 regulates many aspects of Queensland's fisheries. When introduced in September 2019, the regulation included Chapter 4, Part 1, the vessel tracking regulation.

The vessel tracking regulation outlines the requirements for vessel tracking units to be operating on commercial fishing vessels in Queensland. Fishers are required to have installed and operate vessel tracking units on primary boats and tender boats when at sea. GPS data is polled from the vessel tracking units and provided to the Department of Agriculture and Fisheries (DAF). The data collected from vessel tracking units across the commercial fleet is used to inform specific aspects of the fisheries management, assist with compliance activities and in turn ensure a sustainable resource going forward.

DAF has undertaken a post implementation impact analysis statement (PI-IAS) of the vessel tracking regulations contained within Chapter 4, Part 1 of the Fisheries (General) Regulation 2019. The PI-IAS considers the impacts of the vessel tracking regulation since it was introduced and any recommendations for the regulation looking forward. The purpose of the PI-IAS is to assess the impacts (both positive and negative), effectiveness and continued relevance of the Act and consider any unintended consequences since its implementation.

In preparing the Decision PI-IAS (this report), DAF consulted with the Office of Best Practice Regulation (OBPR). The 'Decision PI-IAS' is a term prescribed by the Queensland Government Better Regulation Policy (2023) and is defined as a stand-alone document that builds on the Consultation PIR that was released for public consultation from 27 October 2022 until 14 December 2022. The 'Consultation PIR' aligned with the Queensland Government Guide to Better Regulation Policy (2019). This has recently been renamed to a Consultation PI-IAS in the Better Regulation Policy (2023).

This Decision PI-IAS incorporates findings from a rigorous engagement process with various stakeholders during the public consultation. DAF invited various stakeholders including members of the commercial fishing industry, community stakeholders, recreational fishers, peak bodies and non-government organisations, retailers and government organisations to provide feedback on their experiences with vessel tracking and recommendations on the consultation paper. Respondents provided comments via an online survey or a face-to-face interview where the survey questions were discussed.

Additional feedback was also obtained at a meeting of the vessel tracking working group in Brisbane on 13 December 2022. This Decision PI-IAS has been informed by stakeholder views.

The initial problem

In 2017, it was widely acknowledged that the existing management of the Queensland fisheries was too complex and inadequate for dealing with modern challenges faced by the fisheries¹. The *Queensland Sustainable Fisheries Strategy 2017-2027* (QSFS) identified ten specific problems with the existing legislation and management. Two of the ten problems were identified as:

1. Monitoring and research are inadequate to inform management decisions
2. Inherent challenges in current compliance approaches and limited capacity to enforce regulations.

Vessel tracking was identified as an effective method for collecting data which could then be used to improve monitoring and research activities and more effectively conduct compliance activities across the fisheries. Without the introduction of effective management practices, including vessel tracking on commercial fishing boats, the above problems would continue to exist leaving the sustainability of Queensland's fisheries at risk.

Further problems identified since the introduction of the vessel tracking regulation

Since the initial identification of the above problems, additional problems have also been identified since the introduction of the vessel tracking regulations. Specifically:

1. Access to marine parks
 - Great Barrier Reef Marine Park (GBRMP) – The Great Barrier Reef Marine Park Authority (GBRMPA) has confirmed that high resolution vessel tracking data is essential for informing their compliance activities and in turn ensuring the protection of the marine park. GBRMPA has also indicated that if vessel tracking were not in place on commercial fishing vessels, access to the GBRMP would be difficult to maintain.
 - Australian Marine Parks – More recently, Parks Australia has indicated that it intends to require all commercial fishing vessels transiting or operating in Australian Marine Parks to carry a vessel monitoring system from mid-2024.² To inform this process, Parks Australia released a Consultation Paper in February 2023 to seek feedback on the introduction of mandatory requirements for vessel tracking in Australian Marine Parks.³
2. The ability to meet fishery approvals under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approvals – the use of vessel tracking has assisted to meet certain accreditation requirements under Part 13 and Part 13A of the EPBC Act.
 - Part 13A of the EPBC Act relates to export. Failure to meet Part 13A requirements would mean fishers in the listed industries would not be able to export product to international markets.

¹ Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/319c7e02-f07b-4b2e-8fd5-a435d2c2f3c9>>

² Parks Australia 2023, *Fisheries Assistance and User Engagement Package* <<https://parksaustralia.gov.au/marine/about/fisheries-assistance/>>

³ Parks Australia 2023, *Consultation opens on new requirement for vessel monitoring systems* <<https://parksaustralia.gov.au/marine/news/consultation-opens-on-new-requirement-for-vessel-monitoring-systems/>>

- Part 13 of the EPBC Act relates to interacting with threatened, endangered and protected species in Commonwealth areas. Without this accreditation, fishers who injure or kill these species would be committing an offence under the federal legislation.

Objectives of the vessel tracking regulation

The objective of Chapter 4, Part 1 of the Fisheries (General) Regulation 2019 was to implement vessel tracking on a broader range of commercial fishing fleets. The implementation of vessel tracking on commercial vessels would provide valuable (timelier and more accurate) data that could be used for the following purposes:

1. Independently validated data (specifically logbook effort data) for use in monitoring and research activities; and
2. Real-time data for use in an intelligence-based compliance approach (real-time, locational data used to direct and carry out targeted compliance checks on the water) which complements the existing 'boots on the ground' approach (patrol boats on the water randomly intercepting boats for compliance checks).

Both outcomes seek to contribute to a more proactive and accurate monitoring and research program as well as a more effective compliance approach thus working to overcome the identified problems associated with these pillars of fisheries management. It is against these objectives that the effectiveness of the legislative amendments has been assessed in this PI-IAS.

The process had indicated that the objectives of vessel tracking have been achieved. However, the process would benefit from a number of modifications based on initial targeted consultation and feedback obtained through the vessel tracking working group. This position was confirmed during the public consultation process, where additional modifications have been suggested.

Impacts of the vessel tracking regulation

Consultation has identified several impacts which have resulted from the introduction of vessel tracking.

With respect to the objectives of the regulation, consultation has provided the following:

1. The data from vessel tracking provides a significantly richer data set which can be used to better understand effort by commercial fishers. This data is currently being used to develop more accurate models of total catch and fish stocks with the outcomes of these activities set to achieve a Total Allowable Catch (for commercial fishers) which is closer to the Recommended Biological Catch (RBC). What this means is that commercial fishers will be allocated a more optimal annual allowable catch than what is currently provided. Further, the richer data set provided by vessel tracking is also currently being used in other applications to ascertain a better understanding of the fish resources and the activity of the commercial fishers such that further improvements to management strategies can be made. Improvements in this area directly contribute to ensuring a sustainable fishery for all participants.
2. The availability of vessel tracking data and real-time identification of the location of individual boats has enabled a more intelligent and proactive approach to compliance that also reduces the compliance burden on fishers (less compliance checks for those commercial fishers doing the right thing) and works with other measures to reduce compliance costs and increase compliance capacity. It has also demonstrated an increased capacity for authorities to spend time in other areas of compliance outside of the commercial fisheries thus delivering flow-on

benefits in these areas (for example, recreational fishing and black-market activities). Again, improvements in compliance activities directly contribute to ensuring a sustainable fishery for all participants.

Additional benefits and costs have been identified from the consultation to date. A summary of all impacts identified through consultation to date are provided at Table 1 below. All impacts are discussed in detail under Section 6 of this report.

Table 1 Summary of the impacts of the regulation

Benefits	Costs
<ul style="list-style-type: none"> ● More effective fisheries monitoring and research through the development of improved fisheries models. These models are used to inform fishers management decisions around access and use of the fisheries which have historically resulted in favourable benefits to commercial fishers. ● Improved approaches to compliance activities that have resulted in a reduction in some compliance costs and a reduced compliance burden to some commercial fishers ● Increased voluntary compliance by fishers ● Assists some fisheries to meet certain requirements of their <i>Environment Protection and Biodiversity Conservation Act 1999</i> approvals ● Assists in maintaining commercial access to GBRMP fishing grounds ● A relaxation and repeal of other regulations or part thereof which has provided greater flexibility to commercial fishers with respect to how they carry out their commercial fishing operations in some instances ● Increased availability of real-time data for fishers which can be used to monitor and manage vessels in their fleet ● May be beneficial to help direct responses in the event of emergencies 	<ul style="list-style-type: none"> ● Upfront technology and ongoing polling costs to fishers, which fishers indicated represented an unreasonable cost burden particularly given costs increased following the COVID-19 pandemic ● Opportunity costs related to fishers being unable to fish when vessel tracking malfunctions ● Additional financial costs to the Queensland Government through the rebate scheme which sought to offset the fishers' upfront costs ● Additional financial costs to the Queensland Government through ongoing annual costs of running vessel tracking, maintaining access to Trackwell and employing staff to manage the system. ● Additional financial costs to the federal government through the rebate scheme which sought to offset the fishers' upfront costs ● Technology issues (including issues with suppliers of the technology (installation, operating, device reliability) that have impacted implementation and link into opportunity costs relating to fishers being unable to fish (as identified above) ● Data privacy and ownership concern ● Emotional impacts to the fishers through the use of tracking systems including anxiety about being unable to fish in the event of a tracking system not operating correctly.

Summary of public consultation findings

The public survey asked for input across three key areas:

- *Identification* including the segment of the industry where the commercial fisher respondent operated (i.e., crab, net, line, harvest or trawl)
- *Impacts* - Respondents were asked to describe as applicable any impacts (positive, negative or unintended) that have been experienced since the introduction of vessel tracking, and to quantify impacts where possible.
- *Recommendations* - Respondents were asked to provide comments on the recommendations in the Consultation post implementation review (PIR) and provide alternative suggestions.

Total pieces of feedback

Overall, there were 107 individual pieces of feedback provided through the consultation process comprising:

- 68 responses to the formal survey, in the form of:
 - Submissions made through the e-hub portal
 - Submissions of handwritten surveys
 - Submissions of views via a telephone call to the department with comments manually transferred to a survey
 - A total of 16 survey submissions were from anonymous respondents.
- 11 responses provided via a face-to-face consultation (with comments transferred to the survey form).
- 28 submissions sent via email (including written submissions not necessarily in survey form)

Among the 107 pieces of feedback, there are 14 examples of respondents submitting more than one piece of feedback (specifically were respondents submitted more than one form of feedback), hence the total number of contributors to the formal consultation process based on feedback provided is 93. Included in this number are 16 anonymous survey respondents which have been counted in the numbers for analysis, however the true number of respondents may be 77 – 93.

Identifiable respondents

Among the total 77 identifiable respondents (not including duplicate responses):

- 69 identified as commercial fishers
- 1 identified as a conservationist
- 1 identified as a recreational fisher
- 1 identified as an interested community member
- 2 identified as representing industry groups/peak bodies
- 3 identified as representing government entities

A total of 69 commercial fisher respondents represents 4.7% of the total Queensland licence cohort (1475). Where more than one piece of feedback was submitted, all views have been taken into consideration.

Formal survey and other responses

Of the total 93 respondents (identifiable and anonymous) our analysis below considers 76 survey responses comprising:

- 65 surveys (via e-portal, handwritten or verbally verbal via telephone)
- 11 face-to-face interviews which responded verbally to questions from the survey and this information was recorded in survey form.

Comments from 17 separate submissions (not in survey form and excluding duplicate submissions) have also been incorporated into the commentary. Feedback in the submissions generally echoed comments made in the survey.

Feedback was categorised under a number of key themes that summarised core concerns. A small number of respondent comments were incomprehensible and/or inappropriate (offensive) and were not considered as part of this process. Key findings are categorised under the two core questions relating to vessel tracking and the consultation paper:

Feedback on impacts

Among the formal survey respondents, participants were asked whether they had experienced any impacts described in the post implementation review. Commercial fisher respondents generally indicated 'yes' to having experienced impacts, and those that responded 'no' also provided comments about negative impacts they had experienced, which could be perceived an impact.

Responses regarding impacts were categorised into themes which are outlined below. With the bulk of identifiable respondents being commercial fishers, the feedback was that:

1. Vessel tracking represents an unreasonable expense for commercial fishers, particularly for small businesses and the state government should cover the cost.
2. Examples of malfunctioning vessel tracking units in addition to customer service problems with the polling and equipment providers have created additional costs for commercial fishers and caused emotional stress. Fishers were concerned that a malfunctioning unit may mean they cannot fish and 'earn a living.'
3. Concerns were raised that arrangements to protect the confidentiality of data obtained from vessel tracking were inadequate.
4. Vessel tracking does not facilitate access to the GBRMP and benefits relating to the value of the GBRMP catch are overstated.
5. Benefits relating to hourly wages savings obtained from vessel tracking were unreasonable.
6. Benefits obtained from facilitating export of catch were unreasonable because not all fishers export their catch.
7. Some fishers acknowledged the monitoring and compliance benefits of vessel tracking.

Feedback on recommendations

Survey respondents were asked whether they agree or disagree with the recommendations made (in the Consultation PIR). A total 14 respondents indicated that they agreed with the recommendations and 62 of respondents indicated they disagreed. When asked for an explanation as to their response, 46 respondents provided information and 30 respondents either did not provide a response to this question or the response was not relevant to the question. Those that supported the recommendations generally pointed to the benefits of compliance/stopping illegal fishing as the basis for their view.

A number of commercial fisher respondents provided comments and viewpoints on vessel tracking in Queensland and many reiterated their experiences. When asked whether they had ideas or recommendations that could provide similar or improved outcomes, a small number of respondents provided suggestions to deliver robust fisheries management (specifically with respect to monitoring, research, and compliance) and sustainable fisheries. Respondents providing written submissions generally echoed the viewpoints made in the surveys and provided further information to outline their

viewpoints. Comments, suggestions and recommendations from the survey and also in other written submissions can be categorised under the following themes:

- Removing vessel tracking completely
- Making available a supply of spare vessel tracking units in the event of malfunctions
- Increasing the number of approved units available for vessel tracking
- Making permanent manual reporting arrangements in the event of vessel tracking malfunction
- Reviewing installation safety of vessel tracking units
- Implementing geofencing as an alternative option to vessel tracking
- Subsidising vessel tracking, particularly for small businesses
- Reducing polling frequency to 15 minutes
- Extending vessel tracking to the recreational and charter fisheries
- Considering ways to improve marine safety using vessel tracking

Overall, there was a strong negative sentiment among commercial fisher respondents regarding requirements for vessel tracking with a large proportion of the cohort expressing an opinion that they did not perceive a benefit from vessel tracking, yet the requirement had incurred resource costs to their businesses as well as emotional stress. Many respondents considered costs and benefits from an individual or enterprise perspective and not necessarily from a state/community perspective, and the monitoring and compliance benefits were for the state in their view.

Many respondents indicated that the costs of vessel tracking were becoming unreasonable given other rising costs in the industry. Analysis of industry financial metrics and survivability of Queensland fisheries highlights a declining position of profitability among a number of fisheries, such that subsidising costs of vessel tracking may have limited impact on the viability of organisations and the overall rate of survivability of fisheries in Queensland.

Many respondents expressed frustration resulting from experiencing equipment malfunctions and they were not supportive of DAF's management of vessel tracking roll out and management, notably due to the impacts of faulty equipment and costs incurred.

Further analysis

Given this feedback, this report builds on work undertaken in the Consultation PIR by examining:

- Analysis of the profitability of the Queensland commercial fishing industry using Australian Bureau of Statistics (ABS) data (see Appendix E) and recent reporting undertaken by BDO in coordination with DAF⁴
- Analysis of vessel tracking in other domestic jurisdictions including a summary of arrangements and experiences in other states and territories
- Analysis of the commercial-in-confidence basis of the data that is obtained from vessel tracking
- Analysis of vessel tracking arrangements in other marine parks and noting of plans by Parks Australia to make vessel tracking mandatory in all Commonwealth marine parks by 2024.

Key findings

The Decision PI-IAS concludes that vessel tracking has addressed the initial problem, however a number of modifications have been suggested to improve the operations of the system and support

⁴ BDO EconSearch Department of Agriculture and Fisheries 2023, *Economic and social indicators for Queensland's commercial fisheries in 2020/21*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2020-21/resource/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7a>>

sustainable fishing for commercial fisheries and the government.

Vessel tracking was identified as an effective method for collecting data which could then be used to improve monitoring and research activities and more effectively conduct compliance activities across the fisheries. Without the introduction of effective management practices, including vessel tracking on commercial fishing boats, the above problems would continue to exist leaving the sustainability of Queensland's fisheries at risk.

Following the methodology as outlined by OBPR, the Decision PI-IAS has examined the initial problem that vessel tracking was implemented to address, specifically:

- Monitoring and research are inadequate to inform management decisions
- Inherent challenges in current compliance approaches and limited capacity to enforce regulations.

Additional problems that have been identified since the introduction of vessel tracking legislation include:

- Access to the Great Barrier Reef Marine Park
- Ability to meet fishery approvals under Part 13 and Part 13A of the *Environmental Protection and Biodiversity Conservation (EPBC) Act*.

Note as outlined further in Section 4, Parks Australia (Commonwealth) has indicated that it intends to require all commercial fishing vessels transiting or operating in Australian Marine Parks to carry a vessel monitoring system from mid-2024.⁵ To inform this process, Parks Australia released a Consultation Paper in February 2023 to seek feedback on the introduction of mandatory requirements for vessel tracking in Australian Marine Parks.

Stakeholder engagement confirmed that fishers require the opportunity to fish (and earn a living) in the event that a vessel tracking unit malfunctions and reasonable steps are made to repair the unit. There are a range of requirements in other states and territories where in some cases, a vessel cannot leave port unless the device is correctly operating, whereas in other cases, interim arrangements can be made to allow for fishing to occur whilst the issue is rectified. Securing the ability to fish in the event of a genuine unit malfunction is important and may reduce anxiety that is currently experienced within the cohort.

Final recommendations

Queensland's fisheries represent a unique resource: one which is common property. The Queensland Government has allocated commercial entitlements and is responsible for managing the fisheries on behalf of the broader community. Everyone has a part to play in the management of the fisheries to ensure the continued sustainability of the resource.

Feedback from the consultation process to date has identified that the vessel tracking regulation has achieved the objectives it sought to achieve. In other words, it has been reported that the vessel tracking regulation has successfully provided meaningful data that is being used to improve the modelling and research, and compliance aspects of fisheries management. As per the QSFS, any improvements to the management of the fisheries are done so to improve the long-term sustainability

⁵ Marine Parks Australia 2023, *Fisheries Assistance and User Engagement Package*
<<https://parksaustralia.gov.au/marine/about/fisheries-assistance/>>

of Queensland's fisheries which have an estimated \$770 million annual value to Queensland^{6 7 8} (for the year ended 30 June 2019). The sustainability of the overall fishery in turn provides for the sustainability of the individual fishing businesses which have recently been estimated to be worth on average \$219 000 per year in gross income² (i.e., the businesses of the fishers). A contribution to the overall sustainability of the fisheries and in turn the individual fishing businesses is a benefit that far outweighs the identified costs of the vessel tracking regulation.

Commercial fishers have realised additional benefits beyond the original objectives of the project. These include the relaxation or repeal of other regulations, providing them with greater flexibility in their fishing operations. Improved data availability has also helped them to monitor their commercial fishing operations. Additionally, vessel tracking has assisted to maintain current fishery approvals under Part 13A of the EPBC Act, which enables fishers to sell their products in export markets. Vessel tracking also helps to maintain fishery approval under Part 13 of the EPBC Act that relates to interacting with threatened, endangered, and protected species. Without this approval, fishers who injure or kill these species would be committing an offence under the federal legislation. Finally, continued use of vessel tracking on commercial fishing vessels is expected to support ongoing access to the GBRMP for commercial fishing activities.

Valuing export approvals and GBRMP access would usually be based on a comparison of the net economic return to the industry with and without such access/approvals. The scale of those approvals and access (at least \$66.7 million in GVP per annum from the GBRMP) makes such a comparison difficult, given the extent of industry adjustment (and costs) that would arise from a scenario without access/approval. An indication of that value can be made using the net economic returns from fishing in the GBRMP and exports requiring approvals, for vessels that required vessel tracking from 2019. A significant portion of those exports come from the GBRMP, and the total fishing annual GVP that requires vessel tracking is estimated to vary from \$66.7 million (i.e. when there are no other non-GBRMP exports) to \$71.8 million. Based on a midpoint annual GVP of \$69 million, the associated net economic return is estimated to be just over \$12 million per annum (using average rates of net economic return for the three years from 2018/19 to 2020/21, which include adjustments for the impacts of COVID).

The industry's long-run profitability depends on successful management of fisheries, including achieving maximum economic yield, which maximises the sector's profitability. The contribution of vessel tracking to higher profitability (and net economic return) is difficult to determine, and there is currently no direct evidence which indicates the size of that additional benefit. However, the additional value from access/approval provides a net benefit of \$9.4 million and is sufficient to justify the continuation of the requirements. The recommended adjustments in this Decision PI-IAS to the regulations should further reduce ongoing costs and improve net benefits from vessel tracking.

⁶ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

⁷ Department of Agriculture and Fisheries 2021, *Economic contribution of recreational fishing by Queenslanders to Queensland*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-contribution-of-recreational-fishing>>

⁸ Department of Agriculture and Fisheries 2020, *Economic and social indicators of the Queensland charter fishery, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/7ac87916-a5f8-44e5-9d0a-9d422a0a44d2>>

Table 2(a) Net Benefit Analysis based on average annual values (FY2018-19 to 2020-21)

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 3,007,806	\$ 1,109,409	
Quantified Rebate		\$ 235,316	\$ 4,352,532
Benefits			
Compliance saving		\$ 1,451,400	
Relaxation of regulation (wage saving)	\$ 193,097		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP)	\$ 12,103,905		
<i>Adjusted Net Economic Return (NER)</i>			\$ 13,748,402
Net Benefit (average annual values (FY2018-19 to FY2020-21))	\$ 9,289,196	\$ 106,675	\$ 9,395,870

Table 2(a) provides an analysis of net benefit, factoring average annual values (costs and benefits) of vessel tracking over FY2018-19 to FY2020-21. The analysis outlines a net benefit of \$9.4 million, largely driven by the benefit attributed to maintaining access to GBRMP and meeting fisheries approvals under the EPBC Act, thereby enabling access to export markets.

Table 2(b) Net Benefit 10-year analysis (FY2018-19 to FY2027-28) NPV (as 2019 prices)

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 23,586,064	\$ 10,848,759	
Quantified Rebate		\$ 698,271	\$ 35,133,093
Benefits			
Compliance saving		\$ 10,907,608	
Relaxation of regulation (wage saving)	\$ 1,451,169		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP)	\$ 90,963,658		
<i>Adjusted Net Economic Return (NER)</i>			\$ 103,322,435
Net Benefit NPV (as at 2018-19 prices)	\$ 68,828,763	-\$ 639,422	\$ 68,189,342

Table 2(b) provides a 10-year (FY2018-19 to 2027-28) NPV analysis indicating a net benefit of \$68 million in 2018-19 prices. See Appendix F for further details around the NPV analysis.

Despite the vessel tracking regulation largely achieving the desired objectives and demonstrating a net benefit, unintended outcomes have also resulted from the introduction of the regulation.

Therefore, to ensure the benefits realised to date continue to be realised, alongside those that are expected to materialise as current efforts in these areas progress, the recommendation of the Decision PI-IAS is that the vessel tracking regulation remain with amendment.

While it is a recommendation of this PI-IAS that the Regulation is retained, the recommendation is contingent on the following improvements also being implemented:

- Establish an ongoing exemption process to allow fishers to fish in the event of a malfunctioning unit or other circumstances (e.g. units are unavailable). This can be achieved via an administrative procedure implemented through a head of power in the fisheries legislation.
- Continuous market scanning is undertaken to identify new vessel tracking units that are found to meet the requirements of Queensland fisheries, particularly as technology evolves overtime. Commercial fishers and vessel tracking providers can also approach DAF to request an evaluation of new vessel tracking units for use in Queensland fisheries. Overall, other Australian jurisdictions experience less examples of unit malfunction however they are using predominantly higher value units (i.e. CLS). Under the current arrangements, Queensland fishers have greater flexibility in choosing a unit from an approved list and units can also be transferred between boats, which does not occur in other jurisdictions.
- Activities are undertaken to continue to implement and maintain an Information Security Management System (ISMS) based on the international standard ISO27001 including a six-monthly risk assessment and monitoring of existing data security controls in the vessel tracking system as part of the Whole of Government Information and Communication Technology planning process administered by the Queensland Government Customer and Digital Group. This enables risk mitigation activities to be identified and implemented.

It is noted, there is value in exploring opportunities where cost savings may be achieved by a single entity (i.e. the state) managing purchase of vessel tracking units and polling as opposed to the current arrangement where purchase and polling is managed at the enterprise level (i.e. between individual commercial fishers and the polling providers). Evidence obtained from other jurisdictions indicates that there may be savings to be obtained under such arrangements. However any option in Queensland would need to consider factors that are specific to the Queensland fisheries, for example, securing an arrangement that was suitable for a variety of commercial fisher business sizes (noting the comparatively high number of micro and small businesses in Queensland fisheries), meeting flexibility requirements for fishers (i.e. the ability to transfer units between vessels), enabling costs to be recouped by government as applicable (i.e. via levies as is the case in other domestic jurisdictions), and noting alignment with any future requirements for mandatory vessel tracking by Parks Australia. This issue can be considered as applicable alongside the continuous market scanning activities noted above.

Final recommendations – summary

- 1. Retain the vessel tracking regulation.**
- 2. Legislation amendment to include a head of power to implement an ongoing exemption process to allow fishers to fish in the event of a malfunctioning unit or other circumstances as deemed appropriate by the Chief Executive, for example a unit is unavailable.**

3. Continue to perform market scanning of suitable units to meet the requirements of Queensland fisheries factoring technology availability and cost.
4. Continue to implement and maintain an Information Security Management System (ISMS) based on the international standard ISO27001 including a six-monthly risk assessment and monitoring of existing data security controls in the vessel tracking system.

1. Regulatory assessment and review

1.1 Purpose of this review

The Department of Agriculture and Fisheries (DAF) committed to commissioning a post implementation impact analysis statement (PI-IAS) of vessel tracking following the recommendations of the State Development, Natural Resources and Agricultural Industry Development Committee's examination of the Fisheries (Sustainable Fisheries Strategy) Amendment Bill 2018. The PI-IAS is undertaken in accordance with the Queensland Government Better Regulation Policy.

This document is the Decision PI-IAS and it follows a Consultation PIR that was released for public feedback between 27 October and 14 December 2022. Feedback from the consultation process has been factored into this document.

1.2 Regulatory impact analysis

Regulatory impact analysis (RIA) is a critical element in developing best practice regulation. RIA is a systematic approach that critically assesses the impacts of proposed regulatory policy options. Several steps are carried out under the RIA, two of importance are the preliminary impact assessment (PIA) and the regulatory impact statement (RIS).

If a RIS is not conducted (for the reasons outlined in The Queensland Government's Better Regulation Policy), a PI-IAS may be required to be carried out.⁹

1.2.1 Post implementation impact analysis statement

The purpose of a PI-IAS is to assess the impacts, effectiveness and continued relevance of the regulations that have been recently made and are in force, specifically to understand:

- whether a problem (requiring regulation) still exists
- the actual (rather than expected) impacts of a proposal
- whether there were any unintended consequences from the regulation's implementation
- whether the regulation should continue, including whether any amendments should be made.

In conducting the PI-IAS, several key matters must be addressed, including:

- consideration of the original problem and objectives—what was the initial problem that the regulation intended to solve? What were the objectives of government action? Why was the policy (that became the regulation) preferred over other options? Does the problem still exist, and has it changed over time?
- assess the impacts of the regulation—what are the observed impacts (costs and benefits) of the regulation since implementation? Are there any unintended consequences?
- effectiveness of the regulation—is the regulation working as intended? Has the regulation solved (or made progress towards solving) the problem? Is it meeting the original policy objectives?
- should the regulation be retained? Is there a genuine need for continued regulation? If yes, is the current regulation the best option? What impacts would arise if the regulation expired / were repealed?

⁹ Queensland Treasury 2023, *Queensland Government better regulation policy*, <<https://s3.treasury.qld.gov.au/files/Queensland-Government-Better-Regulation-Policy.pdf>>

- proposed amendments—list any proposed improvements to the regulation (especially if the problem is not being adequately addressed) and discuss potential impacts.

This PI-IAS involved a two-stage process:

1. Preparation and release of the Consultation PIR (released for public comment on 27 October 2022). This was carried out under the previous Queensland Government Guide to Better Regulation (2019)
2. Preparation and release of the Decision PI-IAS (this document). This was carried out under the Queensland Government Better Regulation Policy (2023)

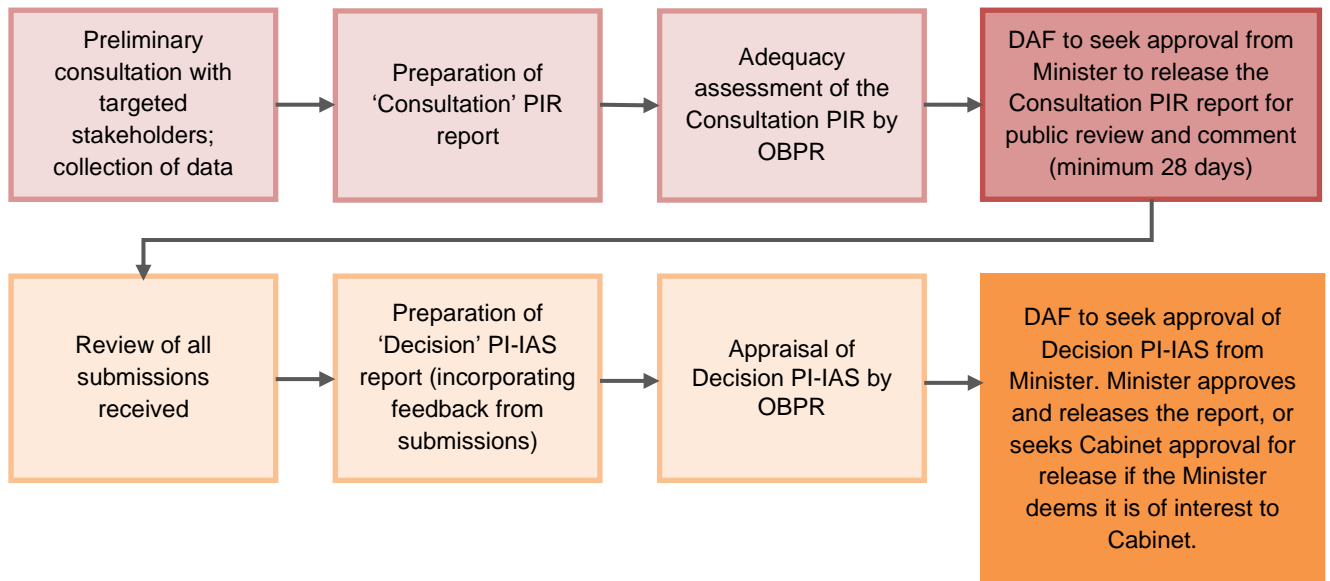


Figure 1 Process for completing the vessel tracking PI-IAS

Consultation with affected parties and the broader public is carried out throughout the PI-IAS process.

The Decision PI-IAS (this document) is used to support any proposed amendments to the regulation, to support repeal of the regulation, or to confirm that the regulation is working as intended.

For further information on PI-IAS see:

- The Queensland Government Guide to Better Regulation <<https://www.treasury.qld.gov.au/resource/queensland-government-guide-better-regulation/>>
- Guidance note: Post implementation review < <https://s3.treasury.qld.gov.au/files/Guidance-Note-Post-IAS.pdf> >

2. Consultation summary

This Decision PI-IAS (this report) has been informed by stakeholder views obtained via two phases of stakeholder engagement.

Phase 1 – Preliminary consultation with vessel tracking working group members

The vessel tracking working group comprising commercial industry members, departmental staff and other federal government entities was the primary stakeholder group that had provided feedback during preliminary consultation to inform the Consultation PIR via:

1. Vessel tracking working group monthly meetings (from July 2021 to December 2021)
2. Further targeted consultation with vessel tracking working group members. This included one-on-one sessions with those willing to participate in this consultation (offer for consultation was extended to all members).

Phase 2 – Public consultation

Formal public consultation occurred following the release of the Consultation PIR from 27 October to 14 December 2022. Feedback was obtained from stakeholders that were able to comment on the impacts of vessel tracking and recommendations of the Consultation PIR through the following channels:

1. Online survey
2. Written submissions with additional comments
3. Face-to-face consultations
4. Phone calls

In addition, DAF held a vessel tracking working group meeting in December 2022 to seek further feedback from working group members about the Consultation PIR.

An overview of the feedback received from public consultation is provided in the following subsections, and its main themes are highlighted. Throughout the report, the feedback has been integrated into relevant sections to provide a thorough analysis.

2.1 Public feedback analysis

Total pieces of feedback

Overall, there were 107 individual pieces of feedback provided through the consultation process comprising:

- 68 responses to the formal survey, in the form of:
 - Submissions made through the e-hub portal
 - Submissions of handwritten surveys
 - Submissions of views via a telephone call to the department with comments manually transferred to a survey
 - A total of 16 survey submissions were from anonymous respondents.
- 11 responses provided via a face-to-face consultation (with comments transferred to the survey form).
- 28 submissions sent via email (including written submissions not necessarily in survey form)

Among the 107 pieces of feedback, there are 14 examples of respondents submitting more than one piece of feedback (specifically where respondents submitted more than one form of feedback), hence the total number of contributors to the formal consultation process based on feedback provided is 93. Included in this number are 16 anonymous survey respondents which have been counted in the numbers for analysis, however the true number of respondents may be 77 to 93.

Identifiable respondents

Among the total 77 identifiable respondents (not including duplicate responses):

- 69 identified as commercial fishers
- 1 identified as a conservationist
- 1 identified as a recreational fisher
- 1 identified as an interested community member
- 2 identified as representing industry groups/peak bodies
- 3 identified as representing government entities

A total of 69 commercial fisher respondents represents 4.7% of the total Queensland licence cohort (1475). Where more than one piece of feedback was submitted, all views have been taken into consideration.

Formal survey and other responses

Of the total 93 respondents (identifiable and anonymous) our analysis below considers 76 survey responses comprising:

- 65 surveys (via e-portal, handwritten or verbally verbal via telephone)
- 11 face-to-face interviews which responded verbally to questions from the survey and this information was recorded in survey form.

Comments from 17 separate submissions (not in survey form and excluding duplicate submissions) have also been incorporated into the commentary. Feedback in the submissions generally echoed comments made in the survey.

Government organisations that provided feedback include the Great Barrier Reef Marine Park Authority (GBRMPA), Department of Environment and Science (DES) – Queensland Parks and Wildlife Service and Queensland Police Service (QPS) – Water Police Queensland. These are agencies with whom DAF has established an information sharing agreements under section 217A of the *Fisheries Act 1994* for the purpose of sharing vessel tracking data for compliance and search and rescue purposes.

Among commercial fishers, respondents additionally identified as recreational fishers, charter fishing operators, traditional fisher/traditional owners, seafood wholesalers, hospitality (restaurant, cafe, fish and chip shop) owner/worker, fishing tackle retailers, and interested community members. The breakdown of fisheries from those identifying as commercial fishers is provided below.

- Line – 44, (31.2%)
- Net – 34, (24.1%)
- Crab – 27, (19.1%)
- Trawl – 11, (7.8%)
- Harvest – 1, (0.8%)
- Unsupplied – 24, (17.0%)

Key findings are categorised under the two core questions relating to vessel tracking impacts and recommendations. With the majority of respondents being commercial fishers, feedback was categorised under a number of key themes. Where respondents provided additional information or suggestions, these comments have been considered and addressed in the relevant section throughout this document. It should be noted that while respondents were requested to provide quantifiable data and other evidence to support their claims, there was limited additional quantitative

evidence provided during the public consultation process, particularly regarding costs and benefits incurred to fishers. Instances where feedback has led to a change in assumptions for the Decision PI- IAS are outlined under relevant sections of this report.

A small number of respondents provided comments that were incomprehensible and/or inappropriate (offensive) and were not considered as part of this process.

2.2 Public feedback on impacts

Recap on impacts identified in Consultation PIR

In the Consultation PIR, a range of impacts including costs, benefits and unintended consequences were identified for the vessel tracking regulation. Stakeholders were invited to provide feedback on these impacts, as well as other impacts not identified in the Consultation PIR. They were encouraged to quantify the impact in terms of costs and benefits and provide evidence to support their feedback.

To prompt stakeholders, the survey questions provided several examples such as hours /petrol saved due to the regulation being introduced (i.e. no longer having to go round a green zone)*, increased catch by volume and value (i.e. from dories being able to fish further afield), removal of 1, 3 and 6 hourly prior notice requirements, and any other impacts their business has experienced (e.g. vessel tracking polling confirmation method).

* Stakeholder feedback has brought to light an error in the survey question's example, 'no longer having to go round a green zone'. It has been recognised that this example was inaccurate. Importantly, it should be clarified that this inaccuracy was limited to its appearance as an example in the survey question only and was not further detailed or discussed in the impact section of the Consultation PIR.

Commercial fisher respondents generally indicated 'yes' to having experienced impacts and those that responded 'no' also provided comments about negative impacts they had experienced, which could be perceived as an impact.

Responses regarding impacts were categorised into themes which are outlined below:

1. **Vessel tracking represents an unreasonable expense for fishers particularly for small businesses.**

A total 69% of the survey respondents expressed a view that the cost of purchase, installation and ongoing polling for vessel tracking was unreasonable and impacting on business profitability. Some respondents indicated they operated small businesses with low turnover and the costs of vessel tracking impacted on their viability. Notably, respondents indicated that cost pressures experienced since the COVID-19 pandemic have exacerbated business viability.

A large number of respondents expressed a view that since vessel tracking did not deliver a benefit to their own business, the State Government should cover the cost.

2. **Some of the approved units are unreliable, prone to malfunctioning and pose fire/safety hazard.**

A total 71% of the survey respondents noted that some approved vessel tracking units were unreliable and did not operate effectively in harsh/remote sea conditions, resulting in breakdowns

that required maintenance (examples related to less expensive models suitable for smaller vessels, i.e. Spot Trace and YB3i). Some commented that the wiring of these units is not suitable in the marine environment and that it poses a fire/safety hazard. There were supply issues impacting on the availability of some approved devices that were not readily available in Australia. There was consistent feedback regarding level of customer service vessel tracking units and polling providers (i.e. Option Audio, Pivotel) and long lead times approx. 3 months for repairs).

Fishers indicated that these issues created stress and anxiety to resolve and due to risks, that they would not be able to work in the event of a malfunctioning device.

3. Fishers have intellectual property rights to the commercial-in-confidence data that is collected from vessel tracking and should be compensated accordingly.

A total of 20% of survey respondents noted concerns regarding the security of information obtained through the vessel tracking process, because information relating to fishing locations was of commercial value. Respondents requested further clarification regarding data management including who can access data and when it can be accessed.

Some fishers expressed an opinion that in their view, location data had been compromised due to new fishers being observed in previously unknown locations. Others claimed that data was being accessed without a password and some fishers provided a video during a face-to-face consultation that they believed demonstrated an example of access without a password. Note it was later verified that the video that was shown related to a separate matter that had occurred in 2018, namely a breach of the FishNet Secure system that did not contain vessel tracking data. This matter was separately investigated.¹⁰

4. Calculations in Table 18 in the Consultation PIR regarding annual average value of the Great Barrier Reef Marine Park (GBRMP) catch in the post-implementation review is inaccurate.

A total of 13% of survey respondents disagreed with the figures presented in the Consultation PIR regarding the value contribution from GBRMP catch. Specifically, respondents indicated that spanner crabs and Mud Crabs were not caught within GBRMP. Others were of the view that vessel tracking did not enable commercial fishing access to GBRMP.

5. Calculations in Table 15 in the Consultation PIR regarding the overall benefits of the vessel tracking regulation are inaccurate.

A total of 12% of survey respondents disagreed with the position made in the Consultation PIR that there had been labour cost savings to commercial fishers from the introduction of vessel tracking.

6. Calculations in Table 19 in the Consultation PIR regarding the value of exports to individual fisheries should be adjusted, given that only a small proportion of fishers export.

A total of 9% of survey respondents disagreed with the figures presented in the Consultation PIR which referred to export value of vessel tracking, noting that not all fishers export catch, hence the value misrepresented the benefit.

¹⁰ Department of Agriculture and Fisheries 2022, *Review report on Fishnet Secure breach investigation*, <<https://daf.engagementhub.com.au/vessel-tracking-review-engagement-portal>>

7. Vessel tracking has delivered a positive benefit in terms of monitoring and compliance.

A small number of respondents including some commercial fishers and non-commercial fishers expressed a view that vessel tracking delivered a positive benefit, specifically by:

- Allowing all fishers to be held accountable through supporting compliance efforts and enhanced safety
- Improved data for research, monitoring, and management of the industry
- Allowing for the removal of the black market and associated undercutting of seafood retail price, thereby allowing fishers to receive a fair price for their catch that is reflective of the resource value and sustainability of the fishery.

Feedback from GBRMPA, DES and QPS unanimously agreed that vessel tracking has enhanced the effectiveness and efficiency of compliance activities related to monitoring commercial fishing vessels (see section 6.3.2.1). In addition, QPS has submitted that vessel tracking has been used numerous times for search and rescue purposes.

Feedback that was also mirrored by industry members during the vessel tracking working group meeting in December 2022 has been noted. This meeting was convened to deliberate on the impacts and recommendations outlined in the Consultation PIR. A communique summarising the discussion and feedback from the working group meeting is available on DAF website¹¹. Key points of feedback include:

- There is a disproportionate cost impact of vessel tracking on small businesses compared to larger ones. This suggests that the cost impact analysis should take into account the varying degrees of impact on operators of different sizes.
- The purported benefit of vessel tracking in maintaining access to the GBRMP was questioned. Since there is no regulatory mandate for commercial fishers to have vessel tracking units to operate within the GBRMP, industry members argued that the benefits mentioned in the Consultation PIR are misleading.
- There were also objections regarding the stated benefit of vessel tracking in maintaining fisheries export approval under the *Environment Protection and Biodiversity Conservation (EPBC) Act*. The contention is that this benefit only applies to a subset of commercial fishers, not to all.
- The validity of identifying commercial fishing profits as a benefit of vessel tracking was being questioned. Industry members argued that these profits existed before and apart from vessel tracking and submitted that vessel tracking and profits are independent variables, not linked as suggested in the Consultation PIR.

2.3 Public feedback on recommendations

Recap on recommendation proposed in Consultation PIR

The recommendation proposed in the Consultation PIR was to retain the vessel tracking regulation in Chapter 4, Part 1 of the Fisheries (General) Regulation 2019 on the basis that the following actions are carried out to address specific costs identified from phase 1 targeted consultation with the vessel tracking working group members.

¹¹ Vessel tracking working group communique, meeting 7 <<https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/fishery-working-groups/vessel-tracking-working-group/vessel-tracking-working-group-communications/communique-12-december-2022-meeting-7>>

1. Introduce a temporary exemption system that allows fishers the ability to fish while the unintended technology issues experienced during implementation are resolved and to gather sufficient data to consider the costs and benefits of such a system longer term. Specifically, it is recommended that the short term risk-based exemption system either as proposed by DAF (Appendix C) or similar to that proposed by DAF be implemented and used for a period of 12 months to provide 'cover' for fishers while the technology issues are resolved and to gather sufficient data to clearly quantify the benefits and costs of such a proposed approach longer term. An interim review of the temporary exemption process and its effectiveness should be carried out at 6 months with a complete review at the end of the 12-month period. This will inform whether regulation amendment is required to legislate a long-term exemption system should it be warranted.
2. Continually review and update the Vessel Tracking Installation and Maintenance Standard to identify and incorporate new vessel tracking units that are found to meet the requirements for use in Queensland fisheries. Given technology constantly evolves over time, it is expected that this approach would continue to increase the selection available.
3. Conduct a review of the current and existing arrangements in place to share, use and protect the vessel tracking data and, if required, establish any additional arrangements between DAF, the service providers and the fishers that ensures that the data generated from the vessel tracking regulation is protected across the entire course of its creation, holding and use.

During public consultation, stakeholders were invited to express their agreement or disagreement with the proposed recommendation. They were invited to comment on the proposed recommendation, as well as to propose alternative ideas or strategies that could work to provide similar or improved outcomes to deliver robust fisheries management (specifically with respect to monitoring and research, and compliance aspects of management) and in turn, sustainable fisheries.

Survey respondents were asked whether they agreed or disagreed with the recommendations in the Consultation PIR. A total 14 respondents agreed with the recommendations and 62 of respondents disagreed. When asked for an explanation as to their response, 46 respondents provided information and 30 respondents either did not provide a response to this question or did not provide adequate information for analysis. Those that supported the recommendations generally pointed to the benefits of compliance/stopping illegal fishing as the basis for their view, noting that vessel tracking had proven to be successful in this regard.

A number of commercial fisher respondents provided comments and viewpoints on vessel tracking and many reiterated their experiences as outlined in the question on impacts. When asked whether they had ideas or recommendations that could provide similar or improved outcomes, a small number of respondents provided suggestions to deliver robust fisheries management (specifically with respect to monitoring, research, and compliance) and sustainable fisheries.

Respondents providing written submissions generally echoed the viewpoints made in the surveys and contributed further information to outline their viewpoints. Comments, suggestions and recommendations from the survey and also in other written submissions can be categorised under the following themes:

1. Issue related to costs

- Subsidising vessel tracking, particularly for small businesses
- Reducing polling frequency to 15 minutes or having government fund 5-minute polling

2. Issue related to unit reliability and malfunctions

- Making available a supply of spare vessel tracking units in the event of malfunctions
- Increasing the number of approved units available for vessel tracking

- Making permanent manual reporting arrangements in the event of vessel tracking malfunction
- Reviewing installation safety of vessel tracking units

3. Others

- Removing vessel tracking completely
- Implementing geofencing as an alternative option to vessel tracking
- Extending vessel tracking to the recreational and charter fisheries
- Considering ways to improve marine safety using vessel tracking

Overall there was a strong negative sentiment among commercial fisher respondents and associated peak bodies regarding requirements for vessel tracking with a large proportion of the cohort expressing an opinion that they did not perceive a benefit from vessel tracking, yet the requirement had incurred resource costs to their businesses as well as emotional stress. Many respondents considered costs and benefits from an individual or enterprise perspective and not necessarily from a state/community perspective, and the monitoring and compliance benefits were for the state in their view.

Many respondents indicated that the costs of vessel tracking were becoming unreasonable given other rising costs in the industry. Others expressed frustration resulting from experiencing equipment malfunctions and they were not supportive of the DAF management of vessel tracking roll out and management, notably due to the impacts of faulty equipment and costs incurred.

Feedback from industry members of the vessel tracking working group suggests considering key insights or lessons from other jurisdictions that have implemented vessel tracking. These insights could help inform DAF approach moving forward, specifically in addressing the costs and malfunction issues. Moreover, they have indicated that a 'one size fits all' pricing and costing model may not account for the diversity of commercial fisheries within the state. They suggest conducting a cost analysis that factors in businesses of different sizes, aiming to provide more tailored cost-related recommendations. In addition, they have emphasised the need for a long-term procedure to assist fishers to continue to work in the event of a unit malfunction.

GBRMPA, DES and QPS supported the recommendation to retain the vessel tracking regulation. One agency requested a future improvement to increase polling frequency (less than the current 5 minutes) for the crab and net fisheries because they have identified commercial fishers working boundary zones and undertaking short (less than 5 minutes) incursions into the Marine National Park zones for alleged illegal fishing activities. Increased polling frequency will provide better insight into activities undertaken in the zones. Another agency disagreed with the malfunction procedure that allows fishers to operate in the event of unit failure due to compliance concerns.

3. The vessel tracking regulation

3.1 Overview of the Queensland fishing industry

Queensland is home to over 7,000 kilometres of coastline, half of which is adjacent to the unique and remarkable Great Barrier Reef World Heritage Area. Queensland's natural marine environment belongs to everyone. It is a public resource which provides broad benefits through economic, social and ecological means. Administering legislation is in place to govern the use of Queensland's fisheries resources and ensure the marine environment's sustainability (and the resulting public benefits).

With such an extensive natural resource here in Queensland, the fisheries are diverse. The commercial fishing industry currently comprises 2016 commercial fisher licence holders and 1684 primary commercial fishing licence holders¹² operating regional businesses along the entire coastline providing employment to thousands, fresh seafood for local and export markets and an estimated \$400 million to the State's economy per year¹³. Recreational fishing by Queenslanders in Queensland generated an estimated \$333.7m in total Gross State Product (GSP) throughout the State's economy (i.e., including direct and flow-on contributions), \$209.5m in total household income and 3,136 FTE jobs¹⁴. Aboriginal and Torres Strait Islands people have practised fishing for millennia and it has an important cultural significance, especially to coastal indigenous communities.

Queensland's extensive fisheries provide a significant contribution to the state's economic, cultural, and social way of life. Its common-property and open-access nature means all stakeholders have a responsibility to protect the fisheries from over-exploitation and sustain a viable resource for future generations.

As the benefit of the fisheries in Queensland is widespread, ensuring the sustainability of the fisheries is paramount. The Queensland Government is responsible for managing the fisheries on behalf of all Queenslanders. This is done so by Fisheries Queensland under DAF. With the international significance of the Great Barrier Reef, the responsibility is heightened.

The *Fisheries Act 1994* is the primary legislative instrument for the management, use, development and protection of the Queensland fisheries resources and fish habitats¹⁵. Its objectives focus on balancing the use, conservation, and enhancement of the resource. Other state regulations and declarations also support the management of the fisheries alongside the Act.

In addition to state-based legislation, federal legislation and agreements must also be upheld by Queensland's fisheries. In particular, the *Great Barrier Reef Intergovernmental Agreement 2015*, the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

3.2 The Sustainable Fisheries Strategy and the introduction of the vessel tracking regulation

In June 2017, the Queensland Government released the *Sustainable Fisheries Strategy 2017-2027*¹⁶ (QSFS) outlining its vision for the future management of Queensland's fisheries resources. The QSFS outlined 10 key areas of reform and several actions, which once implemented will align Queensland's fisheries management framework with current best practice principles. One of the key initiatives of the strategy relates to vessel tracking requirements in Queensland's fisheries, specifically:

Action 9.6 states: "Require installation of vessel monitoring system (VMS) on all commercial boats by 2020, with a priority to install VMS on net, line and crab boats by 2018".

¹² Department of Agriculture and Fisheries, *FishNet Public*, viewed July 2022, <<https://fishnet.fisheries.qld.gov.au/Content/Public/LicenceAndPermitAuthorities.aspx>>

¹³ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

¹⁴ Department of Agriculture and Fisheries 2021, *Economic contribution of recreational fishing by Queenslanders to Queensland*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-contribution-of-recreational-fishing>>

¹⁵ Queensland Fisheries Act 1994 <<https://www.legislation.qld.gov.au/view/html/inforce/current/act-1994-037>>

¹⁶ Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/319c7e02-f07b-4b2e-8fd5-a435d2c2f3c9>>

More information on the fisheries reform process can be found at Appendix A.

3.3 Vessel tracking regulation

Fisheries Act 1994

Section 80 of the *Fisheries Act 1994* provides the authorisation to require vessel tracking units to be installed on certain commercial vessels. Commercial fishers must use a Fisheries Queensland approved vessel tracking unit and comply with the Vessel Tracking Installation and Maintenance Standard when configuring, installing and maintaining vessel tracking units. All approved units must be purchased from an approved provider and associated with an approved polling rate and data plan.

Section 80 of the *Fisheries Act 1994* provides that:

- Relevant vessels that must have approved equipment installed;
- The approved equipment must be working;
- And a person must not interfere with the vessel tracking unit

Definition of approved vessel tracking unit, for a boat, means vessel tracking unit—

- a) of a kind approved by the chief executive and published on the department's website¹⁷; and
- b) whose serial number or other identifying details have been given to, and recorded by, the chief executive for the boat.

Fisheries (General) Regulation 2019

Chapter 4 Part 1 of the Fisheries (General) Regulation 2019 specifies the detailed vessel tracking requirements, summarised below:

- General matters
 - Commercial fisheries and boats to which the requirements apply
 - Installation requirements
 - Period when the vessel tracking unit must be operational
- Requirements if vessel tracking unit malfunctions
 - When commercial fishers are aware of malfunction
 - Requirements for primary boats
 - Requirements for tender boats

¹⁷ Department of Agriculture and Fisheries 2020, *Approved vessel tracking units*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/vessel-tracking/approved-units>>

General matters

- Vessel tracking requirements apply to majority of commercial fisheries i.e., net, line, crab, trawl and harvest fisheries. (See Table 3 for the detailed list of fisheries.)
- Primary boats and any tender boats with an engine power of more than 3kW must have approved vessel tracking unit installed in accordance with the Vessel Tracking Installation and Maintenance Standard.
- The vessel tracking units must be polling at the required interval (5 or 15 minutes depending on fishery type) from the start until the end of the commercial fishing operation.

Requirements if vessel tracking unit malfunctions

- Commercial fishers must ensure that their vessel tracking units are operational before commencing a trip. This can be achieved via one of the following:
 - Confirmation text message sent by DAF
 - Calling the Automated Interactive Voice Response (AIVR) telephone system to confirm
 - Commercial fishing app (for fisheries in scope of the app)
 - Checking unit polling in the online tracking platform given by their vessel tracking provider
- The licence holder or commercial fishers must provide a boat contact for DAF to communicate with the person in control of the boat. The alternative way of communication must not involve the use of vessel tracking equipment and must allow communication to be received on the boat instantaneously.
- If a vessel tracking unit on the primary boat malfunctions during a trip, the commercial fisher in control of the operation must manually report the position of the primary boat:
 - every hour if the boat is being used in the east coast trawl fishery
 - every 4 hours for all other fisheries.
- The commercial fisher must ensure the boat travels to a landing place within 5 days, or longer if permitted by the chief executive, from the day the malfunction is identified.
- For trawl operators in the M1, T1 or T2 fisheries within the major scallop area, the commercial fisher in control of the operation must ensure the boat travels to a landing place as soon as practicable.
- If the vessel tracking unit on a tender boat malfunction during a trip, the tender boat must remain attached to the primary boat and must not be used to take any fish for the remainder of the trip.
- If a vessel tracking unit starts operating again on a primary or tender boat, and the person in control of the operation receives a confirmation that the unit is working properly, normal fishing operations may resume. If the unit is on a primary boat, the requirement to return to port no longer applies.
- Vessel tracking units may be moved between primary and tender boats, as well as between primary commercial fishing licences held by the same licence holder.

The regulation was effective for commercial net, line and crab fisheries from 1 January 2019 with all remaining commercial harvest and inshore trawl fisheries (excluding the charter fishery) commencing from 1 January 2020. Table 3 below shows the list of fisheries and the relevant fishery symbols to which vessel tracking requirements apply.

Table 3 Fisheries to which vessel tracking requirements apply

Fisheries that require vessel tracking*		Fisheries that do not require vessel tracking**	
Fishery symbol	Fishery	Fishery symbol	Fishery
A1, A2	Aquarium fish fishery	P	Pearl fishery
B1	Sea cucumber (beche-de-mer) fishery	E	Eel fishery (adults)
C1	Crab fishery (other than spanner crab)	F	Shell fishery
C2, C3	Crab fishery (spanner crab)	G	Shell grit fishery
D	Coral fishery	H	Star sand fishery
J1	Trochus (east coast)	JE	Juvenile eel fishery
K1, K2, K3, K4, K5, K6, K7, K8	Net fishery (ocean beach)	O	Oyster fishery
L1, L2, L3, L4, L8	Line fishery	W1	Worm fishery (beachworm)
M1	Moreton Bay trawl fishery	W2	Worm fishery (bloodworm)
M2	Moreton Bay trawl fishery	Y	Yabby fishery
N1, N2, N3, N4, N10, N11, N12, N13	Net fishery		
R	Crayfish and rock lobster fishery		
T1, T2	Trawl fishery		
T4	Trawl fishery (fin fish)		
T5, T6, T7, T8, T9	Trawl fishery (river and inshore)		

Notes:

* Number of primary commercial fishing licences with fishery symbols that require vessel tracking = 1475

**Number of primary commercial fishing licences with fishery symbols that do not require vessel tracking = 209

The data collected by vessel tracking systems consists of GPS position information that is reported at a regular rate, depending on the fishery in question. Largely data is polled either every 5 or 15 minutes.

For context, the approved vessel tracking units by fisheries and the required reporting rates are listed below in Table 4.

Table 4 Current approved units and their polling intervals

Equipment	Approved fisheries	Polling interval
SPOT Trace	Net, crab, and trawl (T5, T6, T7, T8 and T9 only)	<ul style="list-style-type: none"> • 5 minutes for net, crab and trawl (T5, T6, T7, T8 and T9 only)
Rockfleet	Net, line, crab, trawl, and harvest	<ul style="list-style-type: none"> • 5 minutes for net, line, crab and trawl (T5, T6, T7, T8 and T9) • 15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest
IDP690/ST6100 (AFMA approved)	Net, line, crab, trawl, and harvest	<ul style="list-style-type: none"> • 5 minutes for net, line, crab and trawl (T5, T6, T7, T8 and T9) • 15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest
IDP800	Net, line, crab, trawl, and harvest	<ul style="list-style-type: none"> • 5 minutes for net, line, crab and trawl (T5, T6, T7, T8 and T9) • 15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest
CLS Triton ADV (AFMA approved)	Net, line, crab, trawl, and harvest	<ul style="list-style-type: none"> • 5 minutes for net, line, crab, and trawl (T5, T6, T7, T8 and T9) • 15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest

Should a vessel tracking unit malfunction, the person in control of the boat must send the boat's location to the chief executive every hour in the east coast trawl fishery, and every 4 hours in other fisheries.

4. The problem addressed by the vessel tracking regulation

4.1 The problem as identified prior to the introduction of the vessel tracking regulation

As discussed in the Section 3 and Appendix A of this report, in 2017, it was widely acknowledged that the existing management of the Queensland fisheries was too complex and inadequate for dealing with modern challenges faced by the fisheries¹⁸.

The QSFS identified ten specific problems with the existing legislation and management. While each problem identified was communicated in the QSFS to be relevant and significant when considering the development of an overarching sustainable strategy going forward, two of the ten problems were interlinked and relevant to the introduction of the vessel tracking regulation: monitoring and research, and enforcement of regulations (compliance).

Underpinning various aspects of the reform was the adoption of new technologies. Electronic monitoring technologies or vessel tracking was identified as a means for collecting data which could be used to inform the management of the fisheries. Specifically, under the seventh area of reform in the *Green Paper on Fisheries Management Reform in Queensland*¹⁹ (the Green Paper), it outlined that there are limited mechanisms available to validate commercial catch and effort reporting. Under the ninth area of reform, the Green Paper identified that information captured by vessel tracking could be used in compliance activities to redirect efforts in the current on-ground approach to a more sophisticated information-driven compliance effort as well as increasing compliance with area closures.

These problems are considered in more detail below.

4.1.1 Monitoring and research

Through the review of fisheries management in Queensland leading up to the development of the QSFS, it was identified that the existing information base available to fisheries managers in Queensland was weak in several key areas. Of particular relevance, the information was largely self-reported information with no independent verification, paper-based and not-reported in real time. Limited cross checking of information submitted through commercial logbooks and limited verification of logbooks through existing means (for example, buyer returns) was carried out. Note that quantified costs relating to these activities were not available for this assessment. A weakness in the information and data which informed key decisions, for example quotas and fish stock abundance, reduced the overall capacity to achieve a sustainable resource. If the information and data could not be strengthened, an alternative future pathway would be to establish quotas/reduce quotas across individual fisheries to counter the weakness in data and, in turn, ensure the sustainability of the fisheries. Vessel tracking provides more defined and independently validated fishing effort and location information which is a valuable addition to fisheries monitoring, assessment and decision rules for management.

¹⁸ Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/319c7e02-f07b-4b2e-8fd5-a435d2c2f3c9>>

¹⁹ Department of Agriculture and Fisheries 2016, *Green paper on fisheries management reform in Queensland*, <<https://www.publications.qld.gov.au/dataset/green-paper-on-fisheries-management-reform-in-queensland>>

4.1.2 Enforcement of regulations – compliance

Consultation through the review process revealed a strong concern about illegal fishing and black marketing. It was also acknowledged that the current ‘boots on the ground’ approach was limited in its ability to effectively enforce compliance. Grid based data otherwise received from logbook information after the event was not sufficient to drive change in this approach (see section 6.3.2.1).

Broadly it is accepted across industry and fisheries management (as confirmed during the consultation process discussed at Appendix A) that Queensland’s fisheries require good compliance to ensure the commercial viability of the industry and maintain the brand strength of the Australian seafood industry. The large coastline and large number of fishers dictate a smarter approach to compliance which incorporates sophisticated, risk and intelligence driven methods to support the traditional ‘boots on the ground’ approach. Data from vessel tracking could be used to facilitate the movement from a ‘boots on the ground’ approach to an intelligent compliance approach which uses the real-time data produced from vessel tracking to identify fishers and facilitate a more targeted and effective compliance approach. The vessel tracking itself would also help to facilitate a voluntary compliance approach to adhering to other fishing regulations (for example, deterring fishers from entering green zones and illegally fishing), thus delivering additionality for achieving industry compliance.

Without a smarter approach to compliance, increased costs would need to be incurred to sufficiently enforce compliance (i.e., from more patrol boats and more compliance officers), costs that would in turn need to be covered by Queensland Government and industry at large. Without this, the sustainability of the fisheries would be at risk as identified during the review. As concluded during the review of fisheries management in Queensland, doing nothing was not an option.

4.2 Problems identified since the regulation has been introduced

While the work done prior to the implementation of the vessel tracking regulations specifically identified and articulated the problems discussed in section above, additional problems have since been identified that are relevant to the continued consideration of the vessel tracking regulations or potential other solutions.

With respect to each of the problems identified below, they specifically identify vessel tracking as part of the solution/agreed management practices and do not currently consider other options for achieving a similar outcome.

4.2.1 Access to marine parks

4.2.1.1 The Great Barrier Reef Marine Park (GBRMP)

The GBRMP is protected under federal law through the GBRMP Act and the EPBC Act. The high court has determined that the federal government has jurisdiction over waters to the edge of the territorial sea (12 nautical miles from the low water mark, under international law). The Offshore Constitutional Settlement²⁰ between the states and the federal government gives the states some control over the coastal waters (3 nautical miles from the low water mark) and is implemented through legislation such as the GBRMP Act and the EPBC Act. Queensland and the federal government have

²⁰ Australian Attorney-General’s Department, *Offshore Constitutional Settlement*, <<https://www.ag.gov.au/international-relations/international-law/offshore-constitutional-settlement>>

signed the *Great Barrier Reef Intergovernmental Agreement 2015*²¹ (GBR Agreement) which outlines how control of the reef will be split between the federal and state jurisdictions, and through the agreement both parties agree to enact the *Reef 2050 Long Term Sustainability Plan*²² (The Reef 2050 Plan).

The purpose of the GBR Agreement is to ensure an “integrated and collaborative approach by the Commonwealth and Queensland” and outlines the principles under which the jurisdictions collaborate to solve issues. The GBRMP Act outlines zoning rules that are required to be enforced across the fisheries. Neither specifically dictate that vessel tracking is required for access to the GBRMP however, the GBRMP Act identifies that vessel tracking assists with enforcing the zoning rules. Further, the agreement refers to The Reef 2050 Plan, which further references the QSFS and the implementation of vessel tracking as one of the priorities of that strategy.

Essentially the requirements of access to the GBRMP align with and leverage the content of the QSFS to satisfy itself of the appropriate use of the GBRMP. While not specifically dictated by the GBRMP Act, GBRMPA has confirmed that higher resolution vessel tracking data is essential for informing their compliance activities and in turn ensuring the protection of the marine park. GBRMPA has also indicated that if vessel tracking were not in place on commercial fishing vessels, access to the GBRMP would be difficult to maintain. DAF has reiterated its position that while it is not currently a Commonwealth regulation, the federal government is relying on the state government regulation which requires commercial fishers to have vessel tracking to undertake their work, including access to the GBRMP.

An estimated annual commercial catch of \$66.7 million derived from the GBRMP would be affected, which equates to a calculated net economic return of \$11.6 million. Calculation of this estimated value is shown in Section 6.3.3.

Public feedback received on the Consultation PIR

During the consultation sessions and also during the vessel tracking working group meeting in December 2022, a number of commercial fishers expressed a view that vessel tracking did not facilitate access to GBRMP because there was no legislative requirement and therefore any associated benefits were not relevant.

In response, DAF reiterated its position that while it is not currently a Commonwealth regulation, the federal government is relying on the state government regulation which requires commercial fishers to have vessel tracking to undertake their work, including access to the GBRMP.

DAF further added that in the *Great Barrier Reef Intergovernmental Agreement*, duplication of management arrangements that relate to fishing and the collection of fisheries resources should be avoided through collaboration and where appropriate through the principle of mutual recognition. DAF has collaborated with and been supported by GBRMPA throughout the implementation of vessel tracking. If DAF does not have vessel tracking regulations in place, a vessel tracking requirement for commercial fishing in the Great Barrier Reef would be regulated by GBRMPA.

²¹ Department of Climate Change, Energy, the Environment and Water 2022, *Great Barrier Reef Intergovernmental Agreement*, <<https://www.environment.gov.au/marine/gbr/protecting-the-reef/intergovernmental-agreement>>

²² Department of Climate Change, Energy, the Environment and Water, *The Reef 2050 Plan*, <<http://www.environment.gov.au/marine/gbr/long-term-sustainability-plan>>

The value of vessel tracking to compliance tool in the GBRMP was also noted in a 2022 International Union for Conservation of Nature (IUCN)/ United Nations Educational, Scientific and Cultural Organization (UNESCO) report:

*'The mission learned that illegal fishing activities have reduced in recent years due to improved vessel tracking systems, and high-level compliance monitoring through the Joint Field Management Program and integrated compliance program. Today, regulation infringements are more commonly related to issues of discards and bycatch.'*²³

4.2.1.2 Australian Marine Parks

Furthermore, Parks Australia has indicated that it is proposing to mandate vessel monitoring systems on commercial fishing vessels that operate in or transit Australian Marine Parks from mid-2024 and a consultation paper on this issue has been released on 27 February 2023.²⁴ Queensland licenced commercial fishers for example from the trawl, coral and L8 deepwater fisheries, transit and operate in the applicable zones of Australian Marine Parks. If this proposed vessel monitoring system requirement is enacted, it will apply to Queensland commercial fisheries as well. However, since Queensland already mandates vessel tracking for these fisheries, they are already meeting this requirement and are therefore well-positioned to comply with the proposed federal requirements without significant operational changes.

This information came to light after the public consultation of the vessel tracking Consultation PIR has ended. Parks Australia's consultation documents described compliance being a crucial factor in meeting the primary objective of protecting and conserving biodiversity and other natural, cultural and heritage values of marine parks while supporting ecologically sustainable use. Current surveillance measures in marine parks do not provide enough information to measure compliance with zoning, except for fisheries with vessel tracking requirements. This recent news further demonstrated that compliance monitoring in marine parks is becoming an increasingly pressing issue, requiring further action to be taken. Consequently, vessel tracking was identified by Parks Australia as an option to address the issue.

4.2.2 Fishery approvals under the EPBC Act

Since 2000, the Australian Government has required that all fisheries which export product or interact with protected marine species (including cetaceans) in Australian waters, be assessed and accredited under the *Environment Protection and Biodiversity Conservation Act 1999 (cth)* (EPBC Act). This accreditation demonstrates Queensland's fisheries operate under national sustainability guidelines (Guidelines for the Ecologically Sustainable Management of Fisheries – Edition 2). EPBC accreditation is important to ensure Queensland commercial fisheries continue to operate, export and trade, and be a contributor to the state's economy.

4.2.2.1 Part 13A of the EPBC Act

Part 13A of the EPBC Act relates to export. Since 2000, approvals for Wildlife Trade Operations have been issued under Part 13A of the EPBC Act by the Australian Government environment minister. These accreditations last between 2-10 years and allow products from specific fisheries to be exported overseas.

²³ Report on the Joint World Heritage Centre/IUCN Reactive Monitoring Mission to the Great Barrier Reef Australia from March 21 - 30 March 2022, p.46.

²⁴ <https://consult.dcceew.gov.au/vms-in-amps-consultation-paper>

Currently 13 fisheries are accredited under Part 13A of the EPBC Act²⁵. For some fisheries, the implementation of vessel tracking has formed a component in the analysis of the fishery performance against the guidelines used by the federal government to assess a fishery, thus contributing to enabling DAF to maintain export approvals for some Queensland fisheries.

The following is a list of fisheries with vessel tracking requirements that hold approval under Part 13A of the EPBC Act as at June 2023²⁶:

- Aquarium fish
- Crayfish and rocklobster
- Commercial trawl (fin fish)
- Coral
- East coast trawl
- Line fishery (reef)
- Ocean beach
- Spanner crab
- Sea cucumber

Vessel tracking as a means to assist with compliance activities, and to facilitate validation of fishing effort data has been used as an example to demonstrate alignment with some of the national sustainability guidelines, thus contributing to maintaining export approvals.

While not well defined as an original problem that would be addressed by the introduction of the vessel tracking regulation, in the absence of an alternative verifiable tracking capability it would be difficult for the state and all fishers under the industries listed that have or had active approvals to meet the requirements of the EPBC Act approvals. Specifically, in the absence of vessel tracking, stakeholders would need to verify that their export catch is compliant with legislative requirements through some other means, with a comparable evidential basis (other than log books). Failure to meet these requirements would mean fishers in the listed industries would not be able to export product to international markets.

The total export value for the affected fisheries is estimated to be \$29.0 million per annum as presented based on an average over the three years to 2020-21 in Section 6.3.4 below.

Feedback received on the Consultation PIR

During the consultation session, fishers noted that not all commercial operators export their product, hence this identified problem was applicable only to a specific number of fishers and therefore not a representative matter.

This position is noted. In calculating the benefits, the methodology considers net economic return relating to access to the GBRMP and an additional estimate for non-GBRMP exports for those vessels that were required to implement vessel tracking from 2019.

The export value of catch has been updated to incorporate recent data from 2020-21.

²⁵ Department of Climate Change, Energy, the Environment and Water, *Queensland managed fisheries 2023* <<https://www.dcceew.gov.au/environment/marine/fisheries/qld>>

²⁶ Department of Climate Change, Energy, the Environment and Water, *Queensland managed fisheries 2023* <<https://www.dcceew.gov.au/environment/marine/fisheries/qld>>

4.2.2.2 Part 13 of the EPBC Act

Although the Consultation PIR did not include a section specifically about Part 13 of the EPBC Act, it is an important aspect of the issues that must be considered in the Decision PI-IAS.

Part 13 of the EPBC Act relates to interacting with threatened, endangered and protected (TEP) species in Australian areas. Without this accreditation, fishers who injure or kill these species while undertaking commercial fishing operations would be committing an offence under the federal legislation. Currently, all commercial fisheries in Queensland are accredited under Part 13 of the EPBC Act.

Key fisheries have specific conditions in place that require management systems to independently validate commercial fishing interactions with TEP species, including spatially. Accurate logbook reporting of interactions with threatened, endangered and protected species is an important part of the process to meet these conditions. Vessel tracking also forms an integral system to maintain this accreditation as it provides essential information to validate fishing effort and protected species interaction data, serving as a critical tool for monitoring compliance with zoning regulations related to protected species and important habitat. Due to its capacity to provide a verifiable monitoring approach, vessel tracking helps to facilitate access to export markets by supporting compliance with the legislation.

4.3 Evidence that the existing regulation was not adequately addressing the problem

Prior to the release of QSFS, vessel tracking was a requirement to several specific fisheries from 1999 (under the repealed Fisheries Regulation 1995 and Fisheries Regulation 2008). For the most part, these fisheries were required to have vessel tracking to provide critical effort-based data which was used for effort monitoring (i.e., to track how much the trawl fishery was fishing in line with their effort units held). In addition, for specific industries considered to be at high risk of non-compliance, vessel tracking was considered a risk reduction measure. In other words, vessel tracking was already successfully being used in a subset of industries for the purposes of monitoring and research that led to informed management decisions, and compliance activities of the fisheries management.

The industries that were required to implement vessel tracking prior to 1 January 2019 are identified in Table 5 below.

Table 5 Fisheries with vessel tracking requirement prior to 1 January 2019

Fishery symbol	Fishery
B1	Sea cucumber fishery
N4, N12 and N13	Net fisheries (large net)
T4	East coast fin fish trawl fishery
T1, T2 and M1	East coast trawl fishery

The concept of vessel tracking (i.e., approach, type of data collected) referred to here is the same concept of vessel tracking as the current vessel tracking regulation.

Published studies on vessel tracking benefits

In January 2007, the Queensland Government and the Australian Government jointly published a report discussing the findings of a Fisheries Research and Development Corporation project that investigated the use of vessel tracking and electronic logbooks for stock assessments and effort mapping in Queensland's fisheries²⁷.

Since most vessel tracking implementations recorded only vessel location at set time intervals with no regard to vessel activity, the project sought to develop a methodology to determine which position data corresponded to fishing activity (i.e. to identify strings of position data that were characteristic of trawling or 'trawl signatures').

Given the availability of vessel tracking data at the time was largely limited to the trawl industry, the efforts of the project were focused on trawl vessel tracking data and developing approaches for the specific sub industries of scallops, eastern king prawns and tiger/endeavour prawns.

More broadly the project sought to empower the Queensland trawl industry and fishery managers to meet present and future challenges specifically through providing the following three key outcomes:

1. Better information about the status and sustainability of the resource
2. Reliable information on the distribution of trawled and untrawled areas
3. Tools to help make informed strategic decisions.

In summary, the overarching goal of the project was to enable better trawl fishery management by using vessel tracking data to provide better quality global information which led to changes in management arrangements.

Importantly the project achieved several key outcomes that were considered beneficial to not only the immediate goal of using vessel tracking data for the purposes of stock assessments and effort mapping but also the end goal of improved fisheries management. Specifically, the project reported the following benefits:

- The use of high-resolution vessel tracking data enabled the enhancement of the basic concepts and computer algorithms that will drive the future development of fisheries resource assessment.
- Acceptance by the fishing industry of the importance of vessel tracking data in fishing effort mapping and resource assessment as demonstrated by the 2005 Queensland Seafood R&D Award from the fishing industry to the vessel tracking project (awarded by the Queensland Seafood Industry Association)
- Improved tools to help make informed strategic decisions about the fisheries.

The project's vessel tracking mapping and trawl signature recognition algorithms/software were adopted by the (then) fisheries management unit.

Other broader benefits of the project and the outcomes achieved have been the use of the methods developed by the project to produce maps detailing the amount of Gross Value of Production (GVP) lost because of the introduction of the Representative Areas Program. This work was done specifically for the then Australian Government Department of Environment and Heritage

²⁷ Gribble et al. 2007, Innovative stock assessment and effort mapping using VMS and electronic logbooks, *Fisheries Research and Development Corporation*

and aided the development of a structural readjustment package to compensate fishers where the program had adversely affected commercial fishers.

In addition to the above, vessel tracking data has also been used to verify the footprint of an industry in a particular region where this information can then be used to inform and enable access to particular areas²⁸. In 2007, the then Department of Agriculture, Fisheries and Forestry (DAFF) used vessel tracking from trawl vessels (under the earlier vessel tracking regulations) for this very reason. In this instance, vessel tracking data was used to analyse spatial patterns over time and create an accurate footprint for the trawl industry. This more accurate footprint supported the position that trawlers did not have the impact otherwise thought and thus could remain in the GBRMP.

As demonstrated by the above studies and research projects, for the Queensland trawl fishery, vessel tracking data has proven invaluable to improve stock assessments, provide continuing access to the marine park areas, provide quantitative data to assess risks due to trawling, improve compliance activities and compliance rates in the fishery. Vessel tracking has also resulted in management changes through the use of regional effort caps to manage individual stocks across the fishery which has been a big step forward. By only having vessel tracking in the select fisheries and not all fisheries, the benefits of vessel tracking which have been observed in Queensland are not currently observed across all fisheries.

4.4 The base case

The impacts of any regulation are assessed against a base case. A base case represents a scenario where the regulation does not exist. In the case of the vessel tracking regulation, this is only appropriate for those fisheries that were not required to have vessel tracking before the regulation was introduced.

For clarity, prior to implementation of vessel tracking in 2019, positional data collected from the impacted fisheries was manually submitted after the fishing operation via logbook, which has the following challenges:

1. Logbook information is estimation-based which indicated a single vessel location reported as a region (the region most likely fished in on a given day's fishing trip)
 - Reported by grid (30 x 30 nautical miles) and site (6 x 6 nautical miles)
 - The requirement of only providing one set of grid and site for a day where fishing mostly occurred
2. No validation of accuracy of logbook information (i.e. where and when fishing occurred)

Where vessel tracking regulations were in place prior to the introduction of the Fisheries (General) Regulation 2019, specifically for the sea cucumber fishery, some net fisheries and the east coast trawl fishery, the base case is with reference to the prior vessel tracking regulations contained under Fisheries Regulation 2008. The earlier regulation required these industries to operate vessel tracking, providing data to the then DAFF for the purposes of monitoring, research, and compliance purposes (as discussed in Section 3). For these fisheries, DAF was paying for the polling costs (approximately \$200k/annum).

²⁸ Roy et al. 2005, Can vessel monitoring system data also be used to study trawling intensity and population depletion? The example of Australia's northern prawn fishery, *Canadian Journal of Fisheries and Aquatic Sciences*

5. Objectives of the vessel tracking regulation

As per the *Fisheries (General) (Vessel Tracking) Amendment Regulation 2019 Explanatory notes*²⁹, the objective of the vessel tracking regulation is to deliver in line with the relevant actions and targets outlined in the QSFS. Specifically, the implementation of vessel tracking across all commercial boats by 2020 would support a more responsive, evidence-based approach to fisheries management.

To deliver on this objective, real-time data collected from the commercial fishing fleet was identified by the explanatory note to be used to:

- Monitor the use of quota in near real time
- Monitor compliance with fishing rules, area and seasonal closures
- Provide intelligence and evidence for investigations
- Assist with validating logbook information on where and when fishing occurred
- Provide more accurate information on fishing effort that is used in stock assessments
- Estimate the biomass of a fish stock
- Help inform future fishery management arrangements.

In summary, the implementation of vessel tracking across the commercial fleet of fishing vessels was largely identified to provide data which could enhance compliance capabilities and contribute to improving monitoring and research activities.

Delivering on the regulation's specific objective would directly contribute to achieving the overarching objective of the *Fisheries Act 1994*, that being the sustainability of Queensland's fisheries. A sustainable fishery benefits not only the commercial fishers from the various industry sectors with strong fish populations but also the broader group of stakeholders which access the fisheries (i.e., recreational and cultural).

It is against these objectives that the effectiveness of the legislative amendments has been assessed in this PI-IAS.

6. Impacts of the vessel tracking regulation

This section identifies the intended and unintended impacts of the regulation based on consultation to date.

6.1 Limitations

In collecting feedback to inform the Consultation PIR and further consultation to inform this Decision PI-IAS, it must be noted that efforts were made to quantify the size of the impacts reported. Despite this, it has proven difficult to quantify the impacts reported due to several reasons:

- As outlined in the background (Section 3 and Appendix A) of this report, several reforms have been introduced through recent changes to legislation and regulations. As previously mentioned, the purpose of these reforms was to improve the management of the fisheries for the purpose of ensuring the future sustainability of the fisheries. It has been communicated that it is difficult to appreciate the quantum of the impacts realised from the introduction of the vessel tracking regulation given this was not the sole change introduced over the reform period. Instead, other items from the reform were also introduced which are contributing to data points or the broader reform pillars of monitoring and research, and compliance, which in

²⁹ Fisheries (General) (Vessel Tracking) Amendment Regulation 2019 Explanatory notes for SL 2019 No. 180 <<https://cabinet.qld.gov.au/documents/2019/Aug/Fish/Attachments/FishVessExNotes.PDF>>

turn contribute to the overall objective of the fisheries management and the sustainability of the fisheries.

- As the various fisheries reform items introduced seek to ensure the future of these resources, it is difficult to attribute the value of the resource without in fact considering the resource as a whole and the value that is derived from this. While it is not correct to attribute the entire value of the resource to any one initiative or act of management, collectively these acts are done for the purpose of ensuring the value and benefit of the resource into the future.

Feedback received on the Consultation PIR

During the public consultation, stakeholders were encouraged to quantify the impact they reported. For example, this could be a breakdown of the specific individual costs incurred to date of a report of the number of days lost due to vessel tracking malfunctions. Where possible, it was encouraged that evidence was provided to support feedback.

It should be noted, there was limited quantifiable data and evidence provided through the process. A small number of fishers provided information relating to days lost and/or costs incurred due to malfunctioning units and these costs were consistent with assumptions in the Consultation PIR and did not warrant a change to the assumptions.

6.2 Costs

Based on consultation to date, the annual aggregated costs to both government and industry over FY2018-19 to FY2020-21 due to the introduction of the vessel tracking regulation is estimated to be approximately \$4 352 532. Table 6 below provides a summary of costs of the regulation based on average annual values (FY2018-19 to 2020-21).

Table 6 Annual overall cost of the regulation

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 3,007,806	\$ 1,109,409	
Quantified Rebate		\$ 235,316	\$ 4,352,532

A further breakdown of the costs presented in Table 6 above is provided in the sections immediately below.

6.2.1 Costs to industry

Costs have been and are expected to continue to be incurred by industry as a result of the vessel tracking regulation. These costs are described below.

6.2.1.1 Financial costs

In implementing the vessel tracking regulations, it was acknowledged that commercial fishers would incur costs through the introduction of vessel tracking technology. These costs would largely relate to the purchase, installation and polling of the vessel tracking units.

Prior to the introduction of the regulation, in June 2018, the costs of equipment prescribed by the Vessel Tracking Installation and Maintenance Standard are presented in Table 7. A fisher's choice of equipment for their vessel would determine the cost incurred.

Table 7 Cost of equipment in 2018 when the regulation was introduced

Items	SPOT Trace	Rockfleet (also known as YB3i)	IDP690/ST6100 (ex GST)	IDP800 (ex GST)
Equipment cost	\$169	\$280.50	\$750	\$957
Installation cost	NA	\$206.50	NA	NA
Other fees	Extended warranty \$65 (optional)	Activation fee \$20	Activation \$36.60 Freight \$121 Hosting service \$120 (year) Unit registration \$150	Activation \$36.60 Freight \$121 Hosting service \$120 (year) Unit registration \$150
Airtime monthly fee (12 monthly contracts)	\$33.30	\$44 (5 min polls) \$41.80 (15 min polls) \$8 when not in use	\$77.55 (5 min polls) \$56.10 (15 min polls) Subject to AUD/USD exchange rate fluctuation	\$77.55 (5 min polls) \$56.10 (15 min polls) Subject to AUD/USD exchange rate fluctuation

Following the release of the pricing structure, an update was provided to the fishers in November 2018 to reflect price reductions made by Pole Star. Largely these changes related to airtime monthly costs and activation charges. These updated prices are provided at Table 8 below.

Table 8 Updated Pole Star pricing structure (prices are excluding GST) November 2018

Items	IDP690/ST6100	IDP800
Equipment cost	\$750	\$750 – unit with internal antennae \$895 – unit with external antennae
Installation cost	NA	NA
Other fees	Activation \$33 Freight \$121 Hosting service \$120 (/year) Unit registration \$150	Activation \$33 Freight \$121 Hosting service \$120 (/year) Unit registration \$150
Airtime monthly fee (12 monthly contracts)	\$49 (5 min polls) \$42 (15 min polls)	\$49 (5 min polls) \$42 (15 min polls) Subject to AUD/USD exchange rate fluctuation

As demonstrated in Table 7 and Table 8 above, fishers could either select a less expensive option in either the SPOT Trace or the Rockfleet, or a more expensive option in the IDP690 or the IDP800. This optionality catered to the broad spectrum of fishers enabling them to select units that are suitable for their fishing operations and businesses. On average it was expected that the cost (cost of equipment, activation and freight) for implementing vessel tracking on an individual boat would be between \$169 and \$507 upfront for the less expensive options and between \$994.40 and \$1153.90 upfront for the more expensive options. Ongoing costs such as polling and hosting costs were initially

identified to be between \$33.30 and \$55 per month depending on the equipment selected and frequency of the polling required.

In February 2023, Pole Star has announced an increase to their vessel tracking pricing structure that commenced in April 2023. Pivotel has also advised an increased Rockfleet unit pricing that commenced in May 2023. Pivotel has also indicated to DAF about pricing changes to their Rockfleet airtime plan, which are being finalised and anticipated to commence in late 2023. Table 9 outlines price increases in 2023 as indicated by Pivotel and Polestar, including a near doubling of the unit price for the Rockfleet units and a 33% increase in unit price for the IDP690/ST6100 units. Polling costs will increase by approximately 25-35% for Pole Star's units.

Table 9 Updated provider pricing structure in 2023

	Pivotel (inc GST)	Polestar (inc GST) – commenced in April 2023	
Items	Rockfleet (YB3i)	Rockfleet (YB3i)	IDP690/ST6100
Equipment cost	In May 2023, from \$615 to \$1249	From \$615 to \$1476.20	From \$825 to \$1094.50
Airtime monthly fee	From end 2023, for a small number of fishers (less than 20) currently on the Option Audio legacy \$44 plan – polling fee to be increased to \$55 for consistency with other fishers. Separately, Pivotel is developing new options for fishers to reduce data costs, including a home location feature*. Fishers who do not opt into the home location feature may see a 50% increase in monthly polling fee – from \$55 to approximately \$82.50. Fishers who opt in will not be affected.	From \$60.50 to \$71.50	15-minute reporting – from \$46.20 to \$66 5-minute reporting – from \$53.90 to \$73.70

Notes: * Pivotel anticipated that most fishers would opt into the new home location feature. The set up can be managed by fishers on their client tracking platform (Tracertrak) and would take approximately 5 to 15 minutes. Pivotel will provide support to fishers to perform this set up where required.

A rebate was offered to commercial fishers to offset the original purchase and installation costs of the vessel tracking units. Fishers were able to access a rebate of \$300-\$750 for equipment costs and \$220 for installation costs, reducing the initial outlay costs. This rebate was only available for licence owners (not for those that lease the licence from licence owners) for initial purchase and installation of equipment. Note for the purpose of the assessment, the total number of leases is unknown as well as the cost of the lease arrangements between the parties. Fishers can operate under a private lease arrangement not known to DAF. Some of these fishers may purchase their own vessel tracking units; some may be using the licence owners' vessel tracking units. As of 30 June 2022, approximately 750 rebate applications totalling \$730,213 were approved and paid to fishers. Using the total number of primary commercial fishing licences with relevant fishery symbols that require vessel tracking as the comparison measure, approximately 50% uptake of the rebate was realised. Reasons for why fishers did not apply for the rebate included:

- it was not worth the effort for such a small cost
- fishers have not applied as yet but intend to apply before the rebate offer ends (extended to 30 June 2024).

- fishers already had vessel tracking unit so not needing to buy another and thus apply for the rebate
- fishers were not eligible given the licence was leased and the owner of the licence (eligible claimant) would not pass on the rebate.

For those fisheries that were already operating vessel tracking units under the earlier Fisheries Regulation 2008, no additional outlay for equipment was required as they were able to continue using their existing units however, the cost of polling moved from DAF (which had been historically paying these costs) to the fisher aligning with the broader approach to the updated vessel tracking regulation. Therefore, the additional cost to these fisheries is the ongoing polling costs.

It appeared that during the initial years of the scheme, costs identified at the commencement of the regulation were largely consistent with the costs experienced by industry with some exceptions noted below.

1. The cost of the Rockfleet has significantly increased to a price point around \$600 in 2019. In 2023, the cost of Rockfleet has increased to approximately \$1300.
2. With respect to the Rockfleet equipment, a replacement unit can be arranged in the event the original unit is found to be faulty and must be returned. The cost for this service is \$85 and the user is provided with a refurbished unit. While optional, fishers have been utilising this service at the identified cost to prompt a faster replacement option for faulty units.
3. Backup Rockfleet equipment purchased at the expense of the fishers must also incur a secondary airtime monthly standby fee of \$8.
4. There have been polling price increases since the scheme commenced, for example the monthly polling price for Rockfleet (Pivotel) was initially \$44 (5 min polling), compared to the increased price of between \$55 to \$82.50 for Rockfleet (Pivotel).
5. Duplicate installation costs incurred for backup equipment purchased where this equipment was not installed.
6. One provider charged fishers for equipment that were never delivered, meaning the fishers were required to purchase another unit.³⁰
7. A fifth Pacific Islands Forum Fisheries Agency (FFA) approved unit, CLS Triton, has since been included on the Vessel Tracking Installation and Maintenance Standard. DAF has recorded only a couple of fishers currently using this equipment (and it is understood that one of the fishers already had this equipment installed for vessel tracking purposes).

Price increases as outlined in Table 9 point to rising unit costs and 20-30% increase in polling costs for Pivotel and Polestar. These cost increases have been factored in the aggregated costs to industry as outlined on Table 14.

Fishers would also be required to pay for replacement units when the units have reached their end of life. The lifetime of vessel tracking units differ among different types of units. Factors such as installation and operating conditions also affect the unit lifetime. Information from vessel tracking providers indicate that the estimated lifetime of Rockfleet and IDP690/ST6100/IDP800 may range from 5 to 10 years; while estimated lifetime of CLS Triton may range from 7 to 8 years. Estimated lifetime of Spot Trace is unknown. To provide an estimated replacement unit cost, assumptions are

³⁰ DAF offered funding assistance to fishers for out-of-pocket expenses in this respect. This was done so as part of their role in actively managing issues with vessel tracking units. Further, fishers were allowed to operate without vessel tracking units while these early issues were resolved (no polling charges were incurred by the fishers during this time).

made that the replacement of Rockfleet and IDP690/ST6100/IDP800 to occur every 5 years, while replacement of Spot Trace to occur every 2 years.

Public feedback received on the Consultation PIR

During stakeholder engagement to develop the Consultation PIR, the consensus among fishers was that vessel tracking was not prohibitive to continuing operations, however, it was another bill (fixed cost) (and alongside the many other business costs) which was required to be paid each month regardless of operations that month.

In response to the Consultation PIR, commercial fishers indicated that the costs of vessel tracking placed an unreasonable burden on their business, particularly given increased cost pressures (particularly on small businesses) and in the wake of COVID-19 and general inflationary pressures in the current environment.

During consultations, a number of commercial fishers pointed to examples of equipment malfunction, unreliability and unavailability of the Rockfleet unit from Pivotel and Option Audio. Some respondents noted that the approved units from Option Audio and Pivotel (specifically the Rockfleet) were not safe, were unreliable, and constantly switching off with the harsh sea conditions.

Further, many fishers indicated that unit supplier Pivotel was quoting long lead times (about 3 months) to replace devices sourced offshore. Fishers noted that managing issues associated with malfunctions involved a cost and time resource.

It is acknowledged that there were costs incurred for some fishers relating to device malfunction, however it is difficult to accurately quantify these costs from an industry perspective. Quantified evidence regarding costs incurred (time and resources) provided was consistent with assumptions outlined in Table 12.

Evidence suggests that malfunctions related to specific models (i.e. YB3i/Rockfleet) which are typically used in smaller vessels. However, given the size of the commercial fishing cohort (1475), examples are limited to a relatively small number of commercial fishers.

6.2.1.2 Profitability of industry

In response to public feedback from commercial fishers and industry members in the vessel tracking working group regarding concerns about the cost pressures of vessel tracking, further analysis was undertaken to understand the profitability of the Queensland commercial fisheries and its comparison to fisheries in other Australian jurisdictions.

Appendix E includes an analysis of the Queensland fisheries using Australian Bureau Statistics (ABS) data for FY 2021-22, considering a breakdown of the industry by size (micro, small, medium and large) and rates of business survivability compared against other Australian states and territories.

This analysis indicates that the Queensland commercial fisheries have a comparatively high presence by micro and small businesses; defined by no employees for micro businesses, and less than 20 employees for small businesses at 72% and 27% respectively. The remaining 1% of businesses are classified as medium businesses (more than 20 employees).

Measured by annual turnover for Queensland, a total

- 26% of the industry had less than \$50,000 annual turnover
- 38% between \$50,000 and \$200,000 annual turnover
- 32% between \$200,000 and \$2 million, annual turnover and
- 4% with over \$2 million annual turnover.

From these statistics, the annual survival rate considers the number of business exits during the year, based on the number operating at the beginning of the year.

As outlined in Appendix E, Queensland microbusiness experienced a lower rate of survivability (88% in FY2021–22 compared to 96% for businesses with between 5 to 19 employees). All businesses with 20 or more employees survived. This trend is consistent when turnover is considered.

For sub-industry survival rate in Queensland during this same period, line fishing was 93%, followed by other fishing (90%), prawn fishing (90%), rock lobster and crab potting (89%), and fish trawling, seining and netting (87%).

When compared with the other fishing jurisdictions and the national average, the following can be observed:

- Queensland's share of microbusinesses (72%) is higher than the national average (70%)
- The survival rates of micro and small businesses in Queensland's fishing industry (89%) are lower than the national average (91%), with the same patterns when measured by annual turnover.
- The percentage of businesses operating at a loss is higher than the national average in all but the line and prawn fishing businesses for Queensland; that is, the rock lobster and crab potting, fish trawling, seining, netting, and other fishing sub-industries were operating at a loss at a higher rate than the national average.

This analysis is based on data taken at the start of the COVID-19 pandemic and does not reflect recent inflationary cost increases (FY2022–23) (i.e. fuel, electricity, freight, supplies etc), which commercial fishers noted have placed further pressures on their businesses.

6.2.1.3 Industry financial performance

Further analysis on the financial characteristics of the industry was considered factoring findings from DAF research conducted by BDO EconSearch.^{31 32 33} The BDO analysis provides details of financial performance per fishery including indicators such as fishing activity, employment, variable and fixed costs (including vessel tracking costs), profitability, capital and rate of return for a number of Queensland fisheries noted below:

- | | |
|-------------------------------------|-------------------------------|
| • Blue swimmer crab | • East coast trawl |
| • Coral harvest and marine aquarium | • Gulf of Carpentaria inshore |
| • Line fishery (reef) | • East coast Spanish mackerel |
| • East coast inshore fin fish | • Mud crab east coast |

³¹ BDO EconSearch, Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926c>>

³² BDO EconSearch, Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/14a32b86-096d-4b17-ae5a-2cbc94a133a3/economic_and_social_indicators_1920_qld-commercial-fisheries_final_220427.pdf?ETag=1cdf0705b8c8f027e7653bd4016b94a>

³³ BDO EconSearch Department of Agriculture and Fisheries 2023, *Economic and social indicators for Queensland's commercial fisheries in 2020/21*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2020-21/resource/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7a>>

- Mud crab Gulf of Carpentaria
- Other harvest
- Rocky reef fin fish
- Spanner crab

Whilst the Queensland commercial fishery remains profitable from an industry perspective, as outlined in the table below, there is high variance of profitability among the fisheries and within specific fisheries, based on business size. Among the 12 fisheries analysed by BDO, a total of 5 (41%) achieved a negative net profit margin in one of, or both years, during FY2019-20 and FY2020-21, namely: blue swimmer crab, east coast inshore fin fish, trawl, rocky reef fin fish and east coast Spanish mackerel (see Table 10).

Table 10 Percentage of total cost of vessel tracking, and net profit margins for each financial year for each identified fishery

Fishery ^{34 35}	Total cost of vessel tracking (%)		Net Profit Margin (%)	
	FY 2019-20	FY 2020-21	FY 2019-20	FY 2020-21
Blue swimmer crab	0.63%	0.68%	-26.53%	-30.53%
Coral harvest and marine aquarium	0.32%	0.29%	41.64%	43.24%
Line fishery (reef)	0.84%	0.82%	11.34%	10.74%
East coast inshore fin	1.01%	1.02%	-30.74%	-24.64%
East coast trawl	0.26%	0.26%	-9.32%	8.62%
Gulf of Carpentaria inshore	0.76%	0.64%	57.92%	63.31%
Mud crab east coast	0.77%	0.77%	24.14%	24.19%
Mud crab Gulf of Carpentaria	0.57%	0.66%	32.43%	26.76%
Other harvest	0.73%	0.70%	16.41%	10.08%
Rocky reef fin fish	1.19%	1.55%	-222.82%	-227.56%
Spanner crab	0.36%	0.40%	48.51%	41.29%
East coast Spanish mackerel	0.84%	0.94%	-40.42%	-41.77%

Furthermore, within individual fisheries, there is evidence of profitability variance based on business size (represented by quartiles) as outlined in Table 11. Smaller fisheries tend to be less profitable than larger fisheries, although there are exceptions based on Table 11.

³⁴ BDO EconSearch Department of Agriculture and Fisheries 2023, Economic and social indicators for Queensland's commercial fisheries in 2020/21, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2020-21/resource/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7a>>

³⁵ Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2019-20/resource/14a32b86-096d-4b17-ae5a-2cbc94a133a3>>

Table 11 Quarterly profitability for each identified fishery during FY19-20.³⁶

Fishery	Profit (\$)				
	Q1	Q2	Q3	Q4	Average
Blue swimmer crab	-\$22	-\$6,706	-\$14,635	-\$10,142	-\$7,784
Coral harvest and marine aquarium	\$4,691	\$61,472	\$343,054	\$637,450	\$259,342
Line fishery (reef)	-\$4,800	-\$17,601	-\$21,982	\$107,445	\$15,766
East coast inshore fin fish	-\$678	-\$3,400	-\$11,526	-\$24,553	-\$10,039
East coast trawl	-\$39,307	-\$89,392	-\$61,256	\$69,417	-\$30,029
Gulf of Carpentaria inshore	-\$8,269	\$60,284	\$156,028	\$701,406	\$227,362
Mud crab east coast	-\$8,290	-\$4,077	\$22,967	\$55,943	\$16,692
Mud crab Gulf of Carpentaria	-\$479	\$6,331	\$21,270	\$68,026	\$23,787
Other harvest	\$64,476	-\$29,788	-\$17,619	\$162,430	\$47,618
Rocky reef fin fish	-\$30	-\$148	-\$1,231	-\$15,021	-\$4,091
Spanner crab	\$4,089	\$26,755	\$249,637	\$502,512	\$195,748
East coast Spanish mackerel	-\$532	-\$3,666	-\$6,879	-\$27,325	-\$9,601

The analysis points to characteristics of the Queensland fishing industry with a relatively higher proportion of small and microbusinesses which appear to be less viable compared to the national average. Some fisheries are facing significant profitability constraints based on this analysis. If the declining trend in profitability were to continue, the rate of survivability of Queensland fisheries is likely to decrease further, particularly given there is a trend toward user-pays systems for vessel tracking in Australian jurisdictions as explained further in this document.

Given the financial position of many Queensland fisheries, and that vessel tracking represents a relatively small percentage of total costs, a vessel tracking subsidy may have limited (if any) long-term impact on financial performance and rates of survivability of Queensland fisheries.

6.2.1.4 Opportunity costs

The most significant reported cost by fishers during the consultation process was the cost of not being allowed to fish if the vessel tracking unit is not correctly polling, effectively an opportunity cost. While technology faults have largely been reported as the reason why vessel tracking units cannot correctly poll, in some instances, outages in the satellite network, which is responsible for providing the accurate polling information and which verifies that the vessel tracking unit is working, has been the root cause.

It is worth noting, seven commercial fishing industry members were interviewed during the targeted consultation to inform the Consultation PIR and only two instances of lost fishing days due to a failure

³⁶ BDO EconSearch Department of Agriculture and Fisheries 2023, Economic and Social Indicators for Queensland's Commercial Fisheries in 2919/20: Addendum Employment FTE Financial Quartile Tables, 24 January 2023.

of vessel tracking units were reported. During consultation to inform the Decision PI-IAS, a small number of fishers provided data regarding the impact to their business highlighting a loss of days between 5 days per year and 30 days per year.

In the absence of further data and evidence, it is considered that the assumptions outlined in Table 12 are reflective of the opportunity cost. However, as reported in the paragraph above, all fishers saw the potential for lost fishing days to be a significant cost. The cost varies among commercial fishing operations as it depends on factors such as fishery type, value of different species, size of operation and fishing frequency.

While it has been particularly difficult to quantify the cost to fishers of not being able to fish if their vessel tracking unit is not operational/correctly polling, specific examples have been provided through the consultation process which provide further insight into the costs associated with not being able to fish. These examples are provided in Table 12 below.

Table 12 Reported instances of fishing effort missed due to equipment failures

Fisheries	Days missed	Cost per day	Annualised cost
Mud crab	6 days per year	\$500-\$4000	\$3 000-\$24 000
Line - Spanish Mackerel	14 days in a 6-month period	\$1500 - \$3000 (+ an additional cost of \$6750 in fuel costs to steam to port unscheduled, the same applies to steam back to sea)	\$34 500-\$55 500 (fishing was only carried out for 6 months of the year)

Note: These are two specific instances provided during initial targeted consultation for the PI-IAS.

Table 14 below provides a detailed breakdown of fishers' costs associated with vessel tracking. The 'opportunity cost' reflects the cost of lost fishing days due to unit malfunction. The total 7-days over a year period was derived based on information from stakeholder feedback. Unit malfunctions were reported for all models except for the CLS Triton and Inmarsat C units, where no opportunity cost is recorded. Further comment has also been provided in relation to the setback which is realised if fishers miss a day fishing in some fisheries. Consultation to date has not been able to quantify this cost.

Further exacerbating this impact is the lack of service available to solve technology problems at the times required to be solved. Specifically, fishing is a 24/7 industry where early mornings and late nights are common. It has been reported that there is a lack of afterhours support from the vessel tracking providers in the event of a malfunction to transfer over to backup equipment (i.e. activate backup equipment in the event they are required) and simply troubleshoot problems with the technology. The same is experienced by fishers when trying to contact DAF outside of traditional business hours to troubleshoot problems with changing over equipment and resolving potential issues. This lack of support also results in lost fishing days as it is often too late to head out once assistance is available due to specific circumstances (e.g., high tide has now been and gone and access to the crab pots is no longer available).

This regulation has had a greater impact on those that live in regional areas. This is due to little or no access to technical support in the event of technology issues and lengthy delays when equipment is required to be shipped back to the vessel tracking provider (it takes longer for this to happen from remote areas). While backup equipment is an option, feedback has confirmed that given the issues with the technology, often the backup can also be down with lengthy delays experienced to receive

replacements or repair the backup. Further impacts with respect to the technology (the vessel tracking unit) is described in Section 6.4.1 below.

Public feedback received on the Consultation PIR

During the consultation process, commercial fishers reiterated the anxiety they experienced due to the risk of a unit malfunctioning which would prevent them from being able to fish and hence 'earn a living', also meaning that they would nevertheless incur fixed costs (fuel, transport etc). Some fishers outlined how they undertook detailed preparations in an attempt to avoid a potential malfunction (for example turning the unit on the night before).

A small number of fishers provided data regarding the impact to their business highlighting a loss of days between 5 days per year and 30 days per year. In the absence of further data and evidence, it is considered that the assumptions outlined in Table 12 are reflective of the opportunity cost.

6.2.1.5 Aggregated costs to industry

The estimated aggregated costs to industry are presented in Table 13 below.

Table 13 Estimated aggregated costs to Industry

Cost type	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
Initial set up costs (hardware and installation)	\$178 101*	0	0	0
Replacement hardware**	0	0	\$90 600	0
Ongoing polling costs	\$897 139	\$981 487	\$981 487	\$981 487
Opportunity costs	\$1 956 780	\$1 956 780	\$1 956 780	\$1 956 780
Total	\$3 032 020	\$2 938 267	\$3 028 867	\$2 938 267

Note:

*Net initial set up costs after deducting total rebate amount claimed as of 30 June 2022. For calculation purposes, assumptions are made that initial units for all commercial fisheries were purchased in FY18-19 and all units remain polling monthly consistently.

** Assumptions that Spot Trace will be replaced every 2 years. Other units to be replaced every 5 years.

The calculation of the estimated aggregated costs to industry is shown in Table 14 below. Note that Table 14 factors recently advised increases in polling costs in 2023. The Rockfleet polling cost has also been revised to include the different pricings by the two providers Pivotel and Pole Star.

Table 14 Calculation of estimated costs to industry*

Unit type	Item	Annual cost/unit (\$)	Estimated annual cost by unit type (\$)										Net Present Value (NPV) in 2019 (\$)	
			FY2018-19	FY2019-20	FY2020-21	FY2021-22	FY2022-23	FY2023-24	FY2024-25	FY2025-26	FY2026-27	FY2027-28		
Spot Trace	Initial unit cost (\$169)	169	51,038	-	-	-	-	-	-	-	-	-	-	51,038
	Replacement unit cost (\$300)	300	-	-	90,600	-	90,600	-	90,600	-	90,600	-	90,600	261,352
	Annual polling fee (\$33.30/month)	400	120,679	120,679	120,679	120,679	120,679	120,679	120,679	120,679	120,679	120,679	120,679	906,931
	Opportunity cost (assume 7 loss days/year; \$2250/day)	15,750	285,390	285,390	285,390	285,390	285,390	285,390	285,390	285,390	285,390	285,390	285,390	2,144,772
Rockfleet	Initial unit cost (Option Audio \$507)	507	310,284	-	-	-	-	-	-	-	-	-	-	310,284
	Initial one-off fee (Option Audio activation \$20)	20	12,240	-	-	-	-	-	-	-	-	-	-	12,240
	Installation cost	300	91,800	-	-	-	-	-	-	-	-	-	-	91,800
	Replacement unit (Pivotel \$1249 - new price from end 2023)	1,249	-	-	-	-	-	696,942	-	-	-	-	-	496,910
	Replacement unit (Pole Star \$1476.20 - Apr 2023 onwards)	1,476	-	-	-	-	-	79,715	-	-	-	-	-	56,836
	Replacement unit installation cost	300	-	-	-	-	-	91,800	-	-	-	-	-	65,452
	Annual polling fee (Option Audio \$44/month)	528	323,136	-	-	-	-	-	-	-	-	-	-	323,136
	Annual polling fee (Pivotel \$55/month)	660	-	368,280	368,280	368,280	368,280	368,280	368,280	368,280	368,280	368,280	368,280	2,399,430
	Annual polling fee (Pole Star \$60.50/month - until Mar 2023)	726	-	39,204	39,204	39,204	9,801	-	-	-	-	-	-	110,361
	Annual polling fee (Pole Star \$71.50/month - Apr 2023 onwards)	858	-	-	-	-	34,749	46,332	46,332	46,332	46,332	46,332	46,332	171,437
Opportunity cost (assume 7 loss days/year; \$2250/day)	15,750	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	1,542,240	11,590,292	
IDP690/ ST6100/ IDP800	Initial unit cost	825	338,250	-	-	-	-	-	-	-	-	-	-	338,250
	One-off fees (activation \$36.30 + freight \$55)	91	37,433	-	-	-	-	-	-	-	-	-	-	37,433
	Installation cost	300	61,500	-	-	-	-	-	-	-	-	-	-	61,500
	Replacement unit cost (\$1094.50 - Apr 2023 onwards)	1,095	-	-	-	-	-	448,745	-	-	-	-	-	319,949
	Replacement unit one-off fees (activation \$44 + freight \$55)	99	-	-	-	-	-	40,590	-	-	-	-	-	28,940
	Replacement unit installation cost	300	-	-	-	-	-	61,500	-	-	-	-	-	43,849
	Annual polling fee (\$53.90/month - until Mar 2023)	647	265,188	265,188	265,188	265,188	66,297	-	-	-	-	-	-	1,011,703
	Annual polling fee (\$73.70/month - Apr 2023 onwards)	884	-	-	-	-	-	271,953	362,604	362,604	362,604	362,604	362,604	1,341,705

	Opportunity cost (assume 7 loss days/year; \$2250/day)	15,750	129,150	129,150	129,150	129,150	129,150	129,150	129,150	129,150	129,150	129,150	129,150	970,592
Inmarsat C	Unit cost (units already on boats pre 2019)	-	-	-	-	-	-	-	-	-	-	-	-	-
	Replacement unit cost (assume IDP/ST)	1,095	-	-	-	-	-	94,127	-	-	-	-	-	67,111
	Replacement unit one-off fees (activation \$44 + freight \$55)	99	-	-	-	-	-	8,514	-	-	-	-	-	6,070
	Replacement unit installation cost	300	-	-	-	-	-	12,900	-	-	-	-	-	9,198
	Annual polling fee (Sat C \$180/month)	2,160	185,760	185,760	185,760	185,760	185,760	-	-	-	-	-	-	814,968
	Annual polling fee (IDP/ST - \$73.70/month - Apr 2023 onwards)	884	-	-	-	-	-	68,112	68,112	68,112	68,112	68,112	68,112	213,056
CLS Triton	Unit and replacement unit cost	2,420	4,840	-	-	-	-	4,840	-	-	-	-	-	8,291
	One-off fees (activation \$33 + freight \$132)	165	330	-	-	-	-	330	-	-	-	-	-	565
	Installation cost	300	600	-	-	-	-	600	-	-	-	-	-	1,028
	Annual polling fee (\$99/month)	1,188	2,376	2,376	2,376	2,376	2,376	2,376	2,376	2,376	2,376	2,376	2,376	17,856
Estimated annual cost to industry		3,762,234	2,938,267	3,028,867	2,938,267	3,107,275	4,465,766	3,015,763	2,925,163	3,015,763	2,925,163	3,015,763	2,925,163	24,284,335
Actual vessel tracking rebate claimed as at 30/6/2022		358,006	270,695	77,248	24,265	-	-	-	-	-	-	-	-	698,271
Estimated annual cost to industry less rebate		3,404,228	2,667,572	2,951,619	2,914,002	3,107,275	4,465,766	3,015,763	2,925,163	3,015,763	2,925,163	3,015,763	2,925,163	23,586,064
Estimated average annual cost		3,139,231												
Estimated average annual cost/unit		2,223												

Note:

- The estimated annual cost by unit type is calculated based on the average total number of units polling which is 1412 and the following breakdown:
 - Number of Spot Trace (21.4%) = 302
 - Number of Rockfleet (43.3%) = 612 (558 Pivotel, 54 Polestar)
 - Number of IDP690/ST6100/IDP800 (29.1%) = 410
 - Number of Inmarsat C (6.1%) = 86
 - Number of CLS Triton (0.1%) = 2
- Replacement cost
 - Lifetime of vessel tracking units vary depending on type, installation and working condition.
 - Warranty period of Spot Trace is 1 year; warranty period for Rockfleet, IDP690/ST6100/IDP800 and CLS Triton is 2 years.
 - Information from providers indicate the following estimated lifetime: Rockfleet 5 to 10 years; IDP690/ST6100/IDP800 5 to 10 years; CLS Triton 7 to 8 years. For calculation purposes, assumption is made that replacement of Rockfleet, IDP690/ST6100/IDP800, Inmarsat C and CLS Triton to occur every 5 years.
 - Assumption is made that the same type of unit is purchased as the replacement unit. Assumption is also made that Inmarsat C (grandfathered) would be replaced with IDP690/ST6100/IDP800.
 - Estimated lifetime of Spot Trace unknown. For calculation purposes, assumption is made that replacement of Spot Trace will occur every 2 years.
- Opportunity cost (due to malfunction that result in loss of fishing days)
 - Opportunity cost from two instances were reported during targeted consultation with vessel tracking working group members – see Table 12.
 - Estimated average cost/day is \$2250. Estimated number of lost fishing days range from 6 to 14 days.

- Opportunity cost varies among different commercial operations due to factors such as fishery type, value of species, size of operation and fishing frequency. For calculation purposes, assumption is made that the number of annual lost fishing days per unit is 7 days, taking into consideration time taken to replace a malfunctioned unit.
 - The annual opportunity cost is calculated using the malfunction rate information presented in Table 24.
 - Polling costs
 - Polling costs are calculated based on providers' pricing structure, which includes the price increase by Pole Star in 2023.
- | Unit | Monthly polling costs |
|--------------------------|-------------------------------------------------------------------------|
| Spot Trace | \$33 (5-min polling) |
| Rockfleet (Option Audio) | \$44 (5-min polling) |
| Rockfleet (Pivotel) | \$55 (5-min or 15-min polling) |
| Rockfleet (Pole Star) | \$60.50 (5-min or 15-min polling) – 2019 until Mar 2023 |
| | \$71.50 (5-min or 15-min polling) – Apr 2023 onwards |
| IDP690/ST6100/IDP800 | \$53.90 (5-min polling); \$46.20 (15-min polling) – 2019 until Mar 2023 |
| | \$73.70 (5-min polling); \$66 (15-min polling) – Apr 2023 onwards |
| CLS Triton | \$99 (5-min or 15-min polling) |
- Annual polling costs for Spot Trace, Rockfleet, IDP690/ST6100/IDP800 and CLS Triton are calculated based on a 5-minute polling pricing structure from providers.
 - Annual polling costs for the Inmarsat C units (mainly used in trawl vessels) is calculated based on a 15-minute polling pricing structure from Pole Star.
 - Airtime for Inmarsat C units is charged by the number of polls. Monthly 15-min polling is approximately \$180.
 - For Rockfleet, Option Audio's polling fees were used to calculate annual polling cost for the first year.
 - Assumption is made that the costs remain constant yearly based on currently known pricing information (including the price increase from Pole Star in 2023).
 - Installation cost
 - Assumption is made that professional installation only applies to Rockfleet, IDP690/ST6100/IDP800 and CLS Triton.
 - Approximately 350 installation rebates have been claimed in the first 4 years of the vessel tracking rebate scheme. Based on this and industry knowledge about the units, assumption is made that professional installation applies to 50% of Rockfleet and IDP690/ST6100/IDP800; 100% for CLS Triton.
 - Installation cost ranges from \$200 to \$400. For calculation purposes, assumption of \$300 installation cost is made.
 - Other assumptions
 - The average number of units polling and types of approved units remain constant yearly.
 - Units are on a monthly polling plan 12 months of the year consistently without going into standby mode.
 - All initial units were purchased in year 1.
 - Cost increases
 - Note that unit and polling cost increases as outlined in Table 9 have been factored into the calculations to inform the Decision PI-IAS.
 - Net present value (NPV)
 - The discount rate in NPV calculation is 7 per cent annually (central case), based on Queensland Government's Cost Benefit Analysis Guide Release 3³⁷.
 - *Note that raw data is drawn from values that reflect the total over a calendar year (Jan – Dec) period. The value as a reflection of the financial year period is therefore an estimate over that specific timeframe (Jul – June).

³⁷ Queensland Government 2023, *Cost Benefit Analysis Guide Business Case Development Framework Release 3*, <https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0013/55030/further-guidance-04-cost-benefit-analysis-guide.pdf>

As outlined in Table 14 (see Appendix F for more detail), the 10-year NPV of various aggregated costs (polling costs, capital costs and opportunity costs) are outlined below:

- polling costs: \$7,310,582
- capital costs (initial outlay and replacement cost): \$2,268,096
- opportunity costs: \$14,705,656

The highest reflected NPV relates to opportunity cost of 'not fishing' specifically where units malfunctioned. Malfunction is the highest reflected NPV cost in this analysis, which is also reflected in fishers' voiced concerns that were outlined during the stakeholder consultations.

6.2.2 Costs to government

Costs have been and are expected to continue to be incurred by the government as a result of the vessel tracking regulation. These costs are described below.

6.2.2.1 Financial costs to the state government

It was expected that there would be a financial cost to DAF for the implementation and ongoing management of the vessel tracking regulation. Given the challenges that were present with the rollout of vessel tracking (specifically technology and supplier issues), DAF has experienced a much higher administrative burden than originally expected. While some of this additional administrative burden has been resolved, DAF is still investing heavily in resolving other administrative issues with the rollout of vessel tracking (e.g. the process of registering vessel tracking units to boats and assisting industry with such processes). In FY 2021–22, the direct costs associated with managing vessel tracking by DAF totalled \$1 648 191. This figure covers wages and other employee expenses for the staff members in the vessel tracking team as well as administrative costs, software licences and software development required to administer vessel tracking by DAF. The costs to the state government in previous financial years are presented in Table 15 below (see Appendix F for further details).

Table 15 Costs associated with managing vessel tracking by DAF

FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
\$419 057	\$975 830	\$979 156	\$1 373 241	\$1 648 191

Note: The figure in FY 2020/21 differs from the figure provided in the Consultation PIR Report due to an oversight. The figure has been corrected in this report to reflect the updated information.

In addition, DAF contributed around \$900 000 to the cost of the vessel tracking rebate program. These funds have not been exhausted, and the amounts spent in each financial year are listed below.

The amount that was spent under the vessel tracking rebate scheme and the value of the rebates claimed is listed in the Queensland Rural and Industry Development Authority's (QRIDA) annual reports³⁸ and presented in Table 16 below. The total amount of rebate claimed since its introduction in 2018 until June 2022 is \$730 214.

³⁸ Queensland Rural and Industry Development Authority, *QRIDA Annual Reports*, <<https://www.qrida.qld.gov.au/annual-report>>

Table 16 Vessel tracking rebate uptake

	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
Rebate amount	\$358 006	\$270 695	\$77 248	\$24 265
Number of applications approved	415	226	73	26

Public feedback received on the Consultation PIR

During the consultation process, a number of commercial fishers highlighted that the full amount allocated to the rebate has not been claimed, and they raised questions about the use of unutilised funds.

It is noted that only the claimed amount has been included in the calculations. Any remaining funds may be allocated towards new initiatives based on the Decision PI-IAS outcome, subject to consultation and approval by state and federal governments.

6.2.2.2 Financial costs to the federal government

The federal government, through GBRMPA, contributed \$2.2 million to the cost of the vessel tracking rebate program. This was a once-off contribution and is separate to any funds reported or contributed by DAF.

6.2.2.3 Aggregated costs to government

The aggregated costs to the government at both the state and federal level are presented in Table 17 below.

Table 17 Aggregated costs to government

FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
\$419 057	\$1 333 836	\$1 249 851	\$1 450 489	\$1 672 456

Note: These figures are obtained by adding up the costs to state government (Table 15) and amount of vessel tracking rebate claimed (Table 16). As of June 2022, \$730 214 of the allocated \$3.1m under the vessel tracking rebate scheme was used.

6.3 Benefits

Based on consultation to date, the annual aggregated cost saving benefit to both government and industry through the introduction of the vessel tracking regulation is estimated to be approximately \$1.65 million. Other benefits of vessel tracking include contributing to maintaining commercial access to GBRMP fishing ground and maintaining fisheries export (Part 13A of *EPBC Act*) approval. These two benefits combined account for an adjusted net economic return of approximately \$12.1 million. Overall, vessel tracking contributes to the sustainability of Queensland's \$254 million commercial

fishery³⁹. Table 18 below provides the summary benefit analysis based on average annual values (FY2018-19 to 2020-21).⁴⁰

Table 18 Benefits analysis based on average annual values (FY2018-19 to FY2020-21)

Benefits	Fishers	Government	Total
Compliance saving	-	\$ 1 451 400	
Relaxation of regulation (wage saving)	\$ 193 097	-	
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP) <i>Adjusted Net Economic Return</i>	\$ 12 103 905	-	\$ 13 748 402

When introducing the vessel tracking regulations, it was intended that the benefits would be substantial. The most important intentional benefit of vessel tracking technology was that the data generated would enable real-time monitoring of commercial fishing fleets and facilitate more responsive and evidence-based decision making which would support monitoring and research efforts and compliance activities. This supported the *Fisheries Data Validation Plan*⁴¹ released in March 2018 and provided a mechanism for cross-checking self-reported logbook data.

6.3.1 Monitoring and research

Monitoring and research activities are carried out by DAF to inform the management of the fisheries, with the end goal of ensuring sustainable fisheries that provide sustainable fish stocks for commercial fishers to continue to utilise.

Vessel tracking provides data which is superior to earlier data capture prior to the vessel tracking regulation being introduced (i.e., logbooks), specifically data which includes / is:

- Spatial location by longitude and latitude
- Real-time data at a high frequency.

The data is also independently generated reducing the potential for error in reporting.

The data provides a significantly more precise measure of fishing activity by commercial fishers and consequently, improves the evidence base available to inform management strategies with respect to harvest/access controls. This has been demonstrated through earlier studies as discussed in Section 4.3.

³⁹ Figures based on the average of annual catch from 2018-19 – 2020-21 (gross value of production (beach price) (\$m) see Executive Summary xii <https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7a/economic_and_social_indicators_2021_qld-commercial-fisheries_230213.pdf?ETag=e6b23478e18b083d5e29d68654b1f29c>

⁴⁰ BDO EconSearch all reports from 2018-19 to 2020-21, net economic return adjusted for COVID, accounting for government and vessel tracking costs. Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <https://www.publications.qld.gov.au/ckan-publications-attachments-prod/resources/14a32b86-096d-4b17-ae5a-2cbc94a133a3/economic_and_social_indicators_1920_qld-commercial-fisheries_final_220427.pdf?ETag=1cdf0705b8c8f027e7653bd4016b94a>

⁴¹ Department of Agriculture and Fisheries 2018, *Fisheries data validation plan (March 2018)*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/dfbdda3-f0e4-47a2-ba25-644b999734d8>>

A summary of the applications for which the data has been used / is being used and the realised benefit is summarised in Table 19 below.

Table 19 Applications of vessel tracking for monitoring and research

Application	Benefit
<p>Optimising fishing quotas and improving catch rate analysis</p>	<p>The data captured to date is currently being used in specific projects that will develop effort models/maps. Once these models are developed, these will be used to inform how the resource is being used and for the purpose of conducting more accurate stock assessments (with comparison to stock assessments that do not include vessel tracking data). As per the benefits realised from earlier projects of this nature (as discussed in Section 4.3), it is expected that the results from this application will produce effort models and maps that have a higher accuracy.</p> <p>A higher accuracy will in turn provide more accurate information for future management decisions relating to effort quotas and similar which seek to ensure the sustainability of the resource while also optimising fishers' quotas. This is possible because, with improved overall model confidence, the Total Allowable Effort (TAE) may be set closer to the effort level consistent with the biological sustainability of the resource. Conversely, if model confidence is lower, a larger "buffer" is needed between the TAE and the biologically relevant value to adjust for uncertainty.</p> <p>Since the vessel tracking data has become available, the data has been used in the scallop fishery to understand how quickly scallop abundance is depleted at the opening of the season. Vessel tracking data has also been used to understand the spatial distribution of different prawn species and identify fine resolution of information not available from commercial logbooks. It is currently being used in a Spanish mackerel catch rate improvement project, as well as to assist in the reconstruction of catch history relevant to sharks.</p>
<p>Alternative management arrangements</p>	<p>Vessel tracking has allowed implementation of alternative management arrangements that allow for sustainable use of the resource and continued access. A recent example is the management arrangement which was put in place on 1 January 2021 to allow trawl fishers who possess scallop to traverse through the scallop closure area to access their home port. Without vessel tracking this arrangement may not have been allowed and operators would be forced to unload at an alternative port to their home port which may incur mooring fees, transport fees to transport scallop to home port, accommodation and more time away from family.</p>

Given the relative recency of the data received as a result of the vessel tracking regulation and the time required to develop the proposed models using the data (i.e. the mathematical relationships and associated modelling algorithms), it must be noted that the broader benefits which stem from vessel tracking data are still in their relative infancy. However, given sufficient time, the demonstrated benefits of vessel tracking data when used for monitoring and research purposes (as reported in Section 4.3) are also expected to be realised across the Queensland commercial fisheries as the current activities in this area continue to progress. As outlined in Section, 8.3.2.1 vessel tracking has provided monitoring and compliance benefits in other states and territories and at the Commonwealth level.

As per earlier research and early benefits already identified from the introduction of the vessel tracking regulation, along with other management improvements, the use of vessel tracking data in monitoring and research activities contributes to the overarching effective management of the

fisheries and the long-term sustainability of the commercial fishing industry, which had an annual contribution of around \$400 million⁴² to the Queensland economy in FY18-19.

6.3.2 Compliance

6.3.2.1 Compliance activities carried out by delegated agencies

Queensland Boating and Fisheries Patrol (QBFP) is a business unit within Fisheries Queensland and delivers compliance and enforcement functions on behalf of Fisheries Queensland. Compliance with the fisheries laws not only ensures the sustainability of Queensland's fisheries but also to ensure the safe use of Queensland's waterways.

QBFP adopts a risk-based compliance approach in order to ensure the most effective use of its limited resources (limited in comparison to the 7000 km of coastline, hundreds of inland fishing areas, 250 000 recreational vessels, 639 000 recreational fishers and over 1400 commercial fishing vessels). A risk-based approach means that the resources available are directed towards addressing the highest risks where risks are assessed for individual fisheries based on those which threaten the:

- sustainability of target fish stocks, including by-product species
- environment, ecology, and conservation value of the fishery ecosystem, including fishery bycatch and protected species
- social and community impacts
- profitability of compliant industry participants.

The compliance strategy also focuses on encouraging voluntary compliance from the fishers.⁴³ All compliance activities are carried out for the purpose of ensuring the sustainability of the fisheries and the ensuing benefit to Queenslanders.

Data collected from vessel tracking is used by QBFP to observe in real time the commercial fishing fleet (identified down to an individual fishing vessel) in order to:

- monitor compliance with closures
- monitor real-time movement of vessels for at sea and landing inspections
- manage compliance of reporting obligations such as logbooks.

Overall, it has been reported by QBFP that data from vessel tracking has enabled QBFP to improve its compliance activities in line with its risk-based compliance approach. While QBFP acknowledge that there have been many changes to the *Fisheries Act 1994* and fisheries regulations in line with the introduction of the vessel tracking regulation (e.g. other reform items introduced in the QSFS, COVID, etc), a comparison of data from individual fisheries before and after the introduction of vessel tracking identifies a pattern of less patrol days (and less patrol/man hours), a reduction in vessels inspected and an increase in the number of acts of non-compliance caught by QBFP (i.e. an increase in identified acts of non-compliance).

Several specific examples of the changes to individual compliance approaches which have delivered known benefits, and which can be seen to directly feed into the statistics before and after the implementation of vessel tracking are discussed in Table 20 below.

⁴² Gross State Product (GSP) value \$413.1 million for commercial fisheries in FY18-19 as reported in Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

⁴³ Department of Agriculture and Fisheries 2015, *Managing fisheries compliance in Queensland*, <https://www.daf.qld.gov.au/data/assets/pdf_file/0018/284112/fisheries-compliance-qld.pdf>

Table 20 Applications of vessel tracking for compliance purposes

Application	Benefit
Monitoring the commercial fleet and adopting an intelligent approach to compliance inspections	<p>Vessel tracking data is used to monitor 24/7 the fleet of commercial vessels and prioritise routine compliance inspections in line with the risk framework. Using vessel tracking data, officers can identify high risk industries, areas, or fishers. Using this 'intel', officers can directly approach higher risk fishers and conduct compliance checks in this space. An example of significant gains which have been observed through an intelligent compliance approach is with respect to the offshore fisheries. Traditional methods of conducting compliance investigations in this industry would involve a QBFP patrol steaming out to the offshore location at night and approaching vessels as they identified them. Unfortunately, given the nature of at-sea operations, the vessel being approached and thus chosen for a compliance check was unable to be identified until the vessel had been reached and boarded. Now officers can investigate historic vessel tracking data to identify vessels which are considered high risk and more efficiently locate and board the individual vessel to conduct a compliance inspection. Not only does this approach offer a significant time saving and in turn increased capacity for QBFP patrols (there is no longer the need to find a needle in a haystack as per the old approach of searching for boats at sea) but also ensures those that are more likely to benefit from a compliance check are in fact reached and those that are doing the right thing, may not be interrupted with a compliance check. In other words, QBFP is better able to focus limited resources on higher risk activities. Overall, this provides an improved accuracy with respect to the compliance activities and a reduced workload on both QBFP and commercial fishers (those doing the right thing can get on with their fishing activities).</p> <p>In addition to being able to adopt a risk-based approach to compliance, QBFP has been able to develop an alert-based system that identifies specific incursions, vessel tracking failures (for any reason) and other activities that alleviates the need for round-the-clock on-the-water monitoring by inspectors. Instead, incursions can be investigated as they are identified in real time.</p>
Fishing in closed fishing waters	<p>QBFP officers are able to monitor the location of an individual fishing vessel and track their position to identify if they enter closed fishing areas. Using this approach and by way of example, QBFP has recently identified a vessel which was appearing in a closed fishing area (closed to the take of a specific species). QBFP was able to directly approach the vessel on the water and conduct a compliance investigation. Compliance based activities of this nature help to keep the playing field level for all commercial fishers. Traditional approaches would see a QBFP patrol out on the water hoping to 'run into' fishers fishing in a closed area.</p>
Investigating complaints from the public	<p>The general public is able to lodge a complaint about suspected illegal fishing through the FishWatch hotline. QBFP is tasked with investigating these reports. With vessel tracking, when a complaint is received about a commercial vessel, QBFP can use the real-time vessel tracking data to identify the individual vessel that is the subject of the report. If at this time it is confirmed that the vessel has the necessary licences to conduct the reported fishing activities at the location in question, no further time or cost investment is required to resolve the matter. This significantly reduces the need for in-person inspections that can occur out-of-hours and which significantly increase the cost of compliance (at least two QBFP officers and a vessel per inspection which is likely to take up to 6 patrolling hours). Further, it provides a positive benefit to fishers as it reduces the number of unnecessary compliance investigations (which are often seen as a negative by fishers when they are doing the right thing). On the other hand, this approach also</p>

	quickly identifies reports which Need to be investigated and which lead to identifying illegal fishing activities (i.e. those where the vessel tracking data cannot identify a lawful fishing vessel/activity). This is in contrast to historical methods that would see physical compliance investigations carried out for complaints and thus the associated costs of two officers and the vessel being incurred for the investigations.
Prioritisation of compliance activities	Port checks are a routine part of compliance with QBFP approaching and conducting compliance checks on vessels as they dock at port. Given the finite resources of QBFP, it is regularly the case that two vessels are approaching port at the same time and officers must choose which vessel they approach for compliance checks. Real-time vessel tracking data has enabled QBFP to conduct preliminary analysis of where and when fishing occurred and duration of the fishing trip for those vessels, allowing QBFP to apply a risk-based approach in determining which vessel to inspect. Prior to vessel tracking, officers would apply no specific framework and simply choose to approach one of the boats. Similar to the example directly above, this approach provides a positive benefit to fishers as it reduces the number of compliance investigations on likely compliant fishers.
Compliance audits	<p>Compliance audits are carried out across the fisheries to investigate whether fishers are compliant. Two examples of compliance audits are in the crab and net fisheries.</p> <p>Crab apparatus (i.e. crab pot) audits are carried out by QBFP in order to confirm the fishers are operating as per their licence (e.g. not exceeding the number of crab pots permitted). With the introduction of vessel tracking, QBFP officers are able to review historic vessel tracking locations and the surrounding areas (given vessel tracking unit polls every 5 minutes) to identify pots. Using this approach audits can be conducted by two officers in a day. Previously, a crab pot audit would require six to eight officers and take around two days. It should be noted that apparatus audits are not a routine exercise. They are conducted in response to complaints or intelligence developed.</p> <p>In the net fishery, QBFP is able to use vessel tracking data in order to approximately identify where the nets are set and identify instances where equipment has been used in a non-compliant way. Such an approach would have proven impossible without vessel tracking.</p>
Prosecuting offences	<p>Vessel tracking data is used by QBFP to provide positional information allowing for monitoring of and prosecution of regulated waters offending. Already vessel tracking data has been used as evidence to confirm the location of a given vessel and prosecute against vessels that are in restricted waters (i.e. legislation prohibits vessels from entering these areas).</p> <p>Vessel tracking data is also used to validate logbooks. In this application, inconsistencies between logbook data and vessel tracking data are identified. Prosecution actions have been instituted based on these inconsistencies (the outcomes of these prosecutions are still pending).</p>

Overall, the introduction of vessel tracking and access to the real-time data it provides has enabled QBFP to enhance intelligence-based compliance activities in addition to its more traditional 'boots on the ground' approach. What this means is that QBFP is able to identify and track the location of individual vessels on the water and strategically set about conducting compliance investigations on higher-risk fisheries and operations. This is in contrast to prior methods that could not selectively target higher-risk vessels but instead conducted the same compliance-based checks on all vessels that QBFP encountered during their patrols. As demonstrated in the examples provided above, time savings have been realised across its compliance activities meaning an increased capacity and

efficiency has been realised. A flow-on benefit has been realised by commercial fishers through a reduction in unnecessary compliance checks being carried out on compliant fishers.

Prior to vessel tracking, if QBFP needed to inspect a specific commercial operation, an assumption could be made that it may take up to three trips to successfully intercept the operation. Using vessel tracking information, this could be achieved in one trip. Using the assumptions that a trip involves 6 patrolling hours and two QBFP officers, the labour cost associated with one patrol trip is equal to \$492⁴⁴. By only undertaking one trip to intercept a specific commercial operation using vessel tracking data, the labour cost saving is equal to \$984. If each licence holder is inspected once a year, the annual labour cost saving is estimated to be \$1 451 400⁴⁵. This does not include costs associated with use of a boat, fuel and allowances. The estimation provided above may vary depending on individual circumstances.

As a secondary benefit, with a more efficient commercial compliance program, QBFP has reported an increased capacity for compliance activities in other areas. Specifically, QBFP has identified that due to the time savings presented by its more intelligence-based compliance approach, more time can be spent on compliance activities in other high-risk areas which compromise the sustainability of the fisheries including the fishers that operate within. One area which has benefitted and for which more time is now able to be dedicated to compliance efforts is black marketing activities (for example, non-licensed fishers catching and selling commercial quantities of fish species). QBFP has anecdotally reported an increase in time able to be spent in investigating black marketing fishing activities since the introduction of vessel tracking. As identified in the fisheries review conducted in 2014, black marketing activities pose a significant risk to the sustainability of fisheries and the viability of commercial fishers in the industry.

A second authority which also has access to the vessel tracking data for compliance purposes is GBRMPA. Under an information sharing agreement established under section 217A of the *Fisheries Act 1994*, GBRMPA is provided vessel tracking data to be used for compliance purposes. Compliance activities in this sense only relate to those which are undertaken in the GBRMP and which relate to enforcing the Great Barrier Marine Park Zoning Plan⁴⁶. As the location of every commercial fishing boat can now be accurately determined in real time, GBRMPA can use this information to aid the identification of acts of non-compliance (e.g., fishing in a green zone). This represents an advancement from prior methods (e.g. fly overs which can only be conducted during the day) as data to inform the compliance activities is available in real time and 24/7.

Given the improvements that have been observed with respect to using vessel tracking data for facilitating compliance activities in the commercial fishing sector, GBRMPA has also realised an increase in capacity which has enabled them to target other areas under its mandate, specifically:

- compliance-based activities for recreational fishers
- preventing damage to indigenous cultural sites.

In addition, Queensland Parks and Wildlife Services (QPWS) of the Department of Environment and Science also has an information sharing agreement with DAF under section 217A of the *Fisheries Act 1994* to access vessel tracking data for compliance purposes. QPWS has provided feedback that vessel tracking has enhanced the delivery of the state's compliance function in all State Marine Parks, namely the Great Barrier Reef Coast Marine Park, the Great Sandy Marine Park and the Moreton Bay Marine Park. Vessel tracking has allowed for remote monitoring of commercial fishing activities to

⁴⁴ Based on the wage for Technical Officer (TO3-1) of \$41/hour in the State Government Entities Certified Agreement 2019 - Wages Determination - Certified Agreement reprint (CB/2020/78)
<https://www.qirc.qld.gov.au/sites/default/files/2020_cb78_reprint.pdf?v=1616728595>

⁴⁵ Based on 1475 primary commercial fishing licences required to have vessel tracking since 2019.

⁴⁶ Great Barrier Reef Marine Park Authority 2003, *Great Barrier Marine Park Zoning Plan 2003*,
<<https://elibrary.gbrmpa.gov.au/jspui/handle/11017/382>>

better plan and enhance the effectiveness and efficiency of targeted on water patrolling focusing on non-compliant commercial fishers. Vessel tracking data has provided information to allow investigations into alleged breaches of illegal fishing activities.

In summary, the availability of vessel tracking data has enabled not only an improvement to the nature of the compliance activities carried out but an increase in the breadth of compliance activities able to be carried out by the relevant compliance agencies.

Feedback received on the Consultation PIR

During the consultation process, whilst some commercial fishers acknowledged monitoring and/or compliance benefits of vessel tracking, many did not perceive a direct benefit individually or to their own businesses (i.e., enterprise level). On this basis, fishers expressed a view that the state government should absorb the cost of vessel tracking since it obtained a benefit.

In the majority of other jurisdictions around Australia, the cost of vessel tracking is recouped by government via levies, pointing to a national trend toward a user-pays system.

It is noted that the PI-IAS takes an industry/state or community perspective in considering the impact of the regulation and that vessel tracking is a cost of maintaining and sustaining a state/community resource, from which commercial fishers derive a benefit.

6.3.2.2 Voluntary compliance and general deterrence

It has been reported by both state and federal government authorities that an increase in voluntary compliance and general deterrence was realised with the introduction of vessel tracking. That is, commercial fishers are more likely to do the right thing on the basis that they know they are being monitored. One example of how this has practically translated is through a reduction in fishers in green zones meaning an increased compliance by fishers with regulations that prevent fishing in these areas. This finding is consistent with results published by studies in the commercial fishing sector⁴⁷ and, more broadly, studies which demonstrate an increased rate of voluntary compliance when participants are being 'watched' either by camera or an authoritative figure⁴⁸.

6.3.3 Maintaining access to marine parks

6.3.3.1 Great Barrier Reef Marine Park

GBRMPA has indicated that higher resolution vessel tracking data is essential for informing their compliance activities and in turn ensuring the protection of the marine park. GBRMPA has also indicated that if vessel tracking were not in place on commercial fishing vessels, access to the GBRMP would be difficult to maintain. Table 21 identifies the commercial catch in the GBRMP to be worth an estimated \$66.7 million annually, which equates to a calculated value for adjusted net economic return of \$11.66 million. Vessel tracking has assisted these fisheries to maintain access to the GBRMP fishing ground and continue to yield economic benefit from the world heritage area (see Appendix F for further details).

⁴⁷ Thoya et al. 2019, Trawling effort distribution and influence of vessel monitoring system (vessel tracking) in Malindi-Ungwana Bay: Implications for resource management and marine spatial planning in Kenya, *Marine Policy*

⁴⁸ Jansen et al. 2018, The influence of the presentation of camera surveillance on cheating and pro-social behavior, *Frontiers in Psychology*

Table 21 Annual average value of GBRMP catch (FY2018-19, FY2019-20 and FY2020-21)

Fishery	Annual average GVP*	Average catch by weight from GBRMP**	Annual average value of GBRMP catch
Coral Reef Fin fish (line fishery)	\$33.1 million	97%	\$32 million
East Coast Inshore Fin Fish	\$16.6 million	22%	\$3.6 million
East coast Spanish mackerel	\$4.2 million	90%	\$3.8 million
Mud Crab East Coast	\$19.6 million	29%	\$5.7 million
Rocky Reef Fin fish	\$0.7 million	43%	\$0.3 million
Spanner Crab	\$10.2 million	7%	\$0.7 million
Coral Harvest	\$19.8 million	99%	\$19.6 million
Marine Aquarium	\$1.6 million	66%	\$1.0 million
Total	\$105.8 million		\$66.7 million

Note: Table above includes fisheries that require vessel tracking from 2019.

* based on commercial fisheries GVP values in FY18-19, FY19-20 and FY20-21^{49,50}

** based on commercial fishers' logbook information

Feedback received on the Consultation PIR

A number of commercial fishers queried the claim and benefit outlined in the Consultation PIR related to vessel tracking securing access to GBRMP. Two key points were raised:

1. Fishers expressed their understood position that there was no legislative requirement for vessel tracking to enable commercial fisher access to GBRMP and therefore any associated benefits resulting from vessel tracking were invalid.
2. Secondly, commercial fishers did not agree with the calculations to determine the benefit associated with access to GBRMP, notably the allocation to mud crab and spanner crab since these species are not generally caught within the GBRMP.

In response to point 1, DAF reiterated its position that while it is not currently a Commonwealth regulation, the federal government is relying on the state government regulation which requires commercial fishers to have vessel tracking to undertake their work, including access to the GBRMP.

DAF further added that in the *Great Barrier Reef Intergovernmental Agreement*, duplication of management arrangements that relate to fishing and the collection of fisheries resources should be avoided through collaboration and where appropriate through the principle of mutual recognition. DAF

⁴⁹ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

⁵⁰ Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2019-20/resource/14a32b86-096d-4b17-ae5a-2cbc94a133a3>>

has collaborated with and been supported by the GBRMPA throughout the implementation of vessel tracking. If DAF does not have vessel tracking regulations in place, a vessel tracking requirement for commercial fishing in the Great Barrier Reef would be regulated by the GBRMPA.

Furthermore, Parks Australia recently released a paper examining the cost-effectiveness of vessel tracking to inform its proposal to make vessel tracking mandatory for all commercial fisheries operating in Australian Marine Parks.⁵¹ The paper noted that the introduction of mandatory vessel tracking by GBRMPA in 2019 has proved highly successful, resulting in increased detection of illegal commercial fishing'. Specifically, the report noted that:

“Of relevance is the recent introduction of mandatory VMS on all commercial fishing vessels by the Great Barrier Reef Marine Park Authority in 2019. The Authority achieved this result, in part, by supporting QLD Fisheries with \$3 million grant funding to offset the establishment costs of VMS, considered a major hurdle for its introduction in the state. With the introduction of VMS, the Authority has detected a level of non-compliance previously unknown. For example, VMS detected an increase in the number of offences in the Coral Reef Fin Fishery, from a previous average of 24.5 offences yearly to 145, of which 16 per cent indicated illegal fishing.”

On point 2, the methodology that was used to determine the benefit related to securing access to GBRMP in the Consultation PIR factored catch data that was allocated to a grid (30 x 30 nautical miles) overlapping a map of the park boundary. In response to feedback, an alternative method was used which factored catch sites (6 x 6 nautical miles) from grid references taking into account sites with ≥25% GBRMP area. The alternative method was considered to provide greater spatial accuracy factoring an average catch over FY2018–19, FY2019–20 and FY2020–21.

Notably, the alternative attributes a lower proportional catch to the mud crab (\$5.7 million) with the total GVP of average catch at \$66.7 million.

6.3.3.2 Australian Marine Parks

Parks Australia (Commonwealth) has indicated that it intends to require all commercial fishing vessels transiting or operating in Australian Marine Parks to carry a vessel monitoring system from mid-2024.⁵² To inform this process, Parks Australia released a consultation paper in February 2023 to seek feedback on the introduction of mandatory requirements for vessel tracking in Australian Marine Parks.⁵³

The paper notes that currently around 60% of fishers active in Australian Marine Parks have a vessel tracking unit installed as part of their fishery management arrangements, and that the use of vessel tracking has proven an effective and mutually beneficial tool for park managements and fishers. Parks Australia cites the rationale for the proposed mandatory requirement being an aid to on-water awareness. Vessel tracking is a proven cost-effective compliance tool. Given that the majority of fishers seek to comply with parks requirements, vessel tracking has proven an effective compliance and enforcement tool in other state and territory managed fisheries.

⁵¹ ADR Consulting, Parks Australia 2022, Cost-Effectiveness Analysis for the Introduction of Mandatory Vessel Monitoring Systems on Commercial Fishing Vessels Operating and Transiting in Australian Marine Parks, p. 5, <[https://storage.googleapis.com/files-au-climate/climate-au/p/prj2516e23bf374a6bac8392/public_assets/Cost-effectiveness%20analysis%20for%20the%20introduction%20of%20mandatory%20VMS%20\(draft\).pdf](https://storage.googleapis.com/files-au-climate/climate-au/p/prj2516e23bf374a6bac8392/public_assets/Cost-effectiveness%20analysis%20for%20the%20introduction%20of%20mandatory%20VMS%20(draft).pdf)>

⁵² Marine Parks Australia 2023, *Electronic and Vessel Monitoring Systems Assistance Program* <<https://parksaustralia.gov.au/marine/electronic-and-vessel-monitoring-systems-assistance-program/>>

⁵³ Park Australia 2023, Consultation Paper for the commercial fishing sector - requirement for vessel monitoring systems in AMPs, <<https://consult.dcceew.gov.au/vessel-tracking-in-amps-consultation-paper/>>

6.3.4 Meeting fishery approvals under the *EPBC Act*

In Australia, Part 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) regulates the:

- import and export of specimens protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- exports of Australian native specimens
- imports of live specimens.

Export approval under the *EPBC Act* must be obtained in order to export Australian native animal or plant specimens and/or Convention on International Trade in Endangered Species (CITES) listed specimens for commercial purposes. These specimens must come from an approved program such as a wildlife trade operation, of which commercial fishery is categorised under. Assessment and approval of a wildlife trade operation are conducted by the then federal Department of Agriculture, Water and the Environment (now Department of Climate Change, Energy, the Environment and Water) based on a set of guidelines⁵⁴ that outline specific principles and objectives designed to ensure a strategic and transparent way of evaluating the ecological sustainability of fishery management arrangements. The implementation of vessel tracking has formed a component in the analysis of a fishery performance against the guidelines, thus contributing to enabling DAF to maintain export approvals for some Queensland fisheries.

For example, the guidelines require that the fisheries management regime to “contain the means of enforcing critical aspects of the management arrangements”. Vessel tracking as a means to track commercial fishing vessel locations, validate reported fishing activity and enhance DAF’s capacity to undertake vessel inspections has formed a component to demonstrate alignment with these criteria.⁵⁵

In addition, the guidelines also require that “there is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring”. In other words, independent data validation of fisheries catch and effort data is required. Vessel tracking data is able to assist with validating fishing effort, thus has demonstrated partial alignment to these criteria.⁶¹ It should be noted that vessel tracking data is unable to validate catch or bycatch data and options to achieve this are being considered by DAF.

The following is a list of fisheries with vessel tracking requirements that hold approval under Part 13A of the EPBC Act as at June 2023⁵⁶:

- Aquarium fish
- Crayfish and rocklobster
- Commercial trawl (fin fish)
- Coral
- East coast trawl
- Line fishery (reef)
- Ocean beach

⁵⁴ Department of Climate Change, Energy, the Environment and Water, *Guidelines for the Ecologically Sustainable Management of Fisheries 2007*, <<https://www.dcceew.gov.au/sites/default/files/documents/Guidelines%20for%20the%20ecologically%20sustainable%20management%20of%20fisheries.pdf>>

⁵⁵ Assessment reports prepared by the then Department of Agriculture, Water and the Environment for the following fisheries: Queensland aquarium fin fish 2021, commercial trawl (fin fish) 2020, east coast otter trawl 2021, east coast Spanish mackerel 2018, Gulf of Carpentaria line 2019, coral reef fin fish 2021 and sea cucumber 2021 – assessment reports downloadable from <<https://www.dcceew.gov.au/environment/marine/fisheries/qld>>

⁵⁶ Department of Climate Change, Energy, the Environment and Water, *Queensland managed fisheries 2023* <<https://www.dcceew.gov.au/environment/marine/fisheries/qld>>

- Spanner crab
- Sea cucumber

The value of the exports under each of these fisheries is presented in Table 22 below.

Table 22 Value of exports to individual fisheries

Fishery ^{57 58 59}	Average export value per annum for FY 2018-19, FY 2019-20 and FY 2020-21*
Blue swimmer crab	\$0
Coral harvest and marine aquarium**	\$16.2 million
Line fishery (reef)	\$9.6 million
East coast inshore fin fish	\$0.9 million
East coast trawl	\$1.7 million
Gulf of Carpentaria inshore	\$0
Mud crab east coast	\$0.1 million
Mud crab Gulf of Carpentaria	\$0
Other harvest (beachworm, bloodworm, crayfish & rock lobster, eel, pearl, sea cucumber, trochus, yabby)	\$11.8 million
Line fishery (rocky reef)	\$0
Spanner crab	\$2.2 million
East coast Spanish mackerel	\$0
Total export value for all above fisheries	\$42.5 million
Total export value for fisheries that only require vessel tracking since 2019**	\$29.0 million

Notes: * Export values include only the value of transactions that were directly made between the fisher and its immediate customer where the customer was an international customer for FY 2018-19, FY 2019-20 and FY 2020-21.

** Total export value for fisheries that only require vessel tracking since 2019 was obtained after excluding east coast trawl and 'other harvest' fisheries. Note that within 'other harvest' fisheries, rock lobster and trochus should be included but fishery-specific export values are not available.

⁵⁷ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

⁵⁸ Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2019-20/resource/14a32b86-096d-4b17-ae5a-2cbc94a133a3>>

⁵⁹ Department of Agriculture and Fisheries 2023, *Economic and social indicators for Queensland's commercial fisheries in 2020/21*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2020-21/resource/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7a>>

Public feedback received on the Consultation PIR

During the consultations, commercial fishers indicated a view that they did not agree with the methodology used to calculate the export benefit of vessel tracking because only a proportion of fisheries export their catch.

Table 22 has been updated to reflect available data from 2020-2021⁶⁰

The vessel tracking regulation contributes to the sustainable management of the above identified fisheries to maintain their Part 13A of the EPBC Act approvals. In turn, these fisheries can continue to export their product, realising on average approximately \$42.5 million in exports to the Queensland economy in the past two years, of which \$29.0 million is allocated to fisheries that have required vessel tracking since 2019. A large proportion of the value of exports are already accounted for in the GVP estimate from GBRMP (Section 6.3.3.1). Exports outside of the GBRMP, for the vessels that were only required to get vessel tracking from 2019, have been calculated as having a maximum possible GVP value of \$5.1 million. This increases the calculated adjusted net economic return in Section 6.3.3.1 (of \$11.66) by \$1.37 million to a maximum upper limit of \$13.03 million. A mid-point between the two values yields a final average estimate of adjusted net economic return of \$12.1 million (see Appendix F for further details).

It is expected that without vessel tracking, and with no other means introduced to satisfy the relevant requirements of Part 13A of the EPBC Act approvals, the value of the current export markets may not have been realised. Whilst these operators could seek alternative domestic buyers, domestic prices may not be as high to offload the excess supply.

Furthermore, it is noted that vessel tracking assists with maintaining accreditation to Part 13 of the EPBC Act that relates to interacting with threatened, endangered and protected (TEP) species in Australian areas. Without this accreditation, fishers who injure or kill these species would be committing an offence under the federal legislation. Currently, all commercial fisheries in Queensland are accredited under Part 13 of the EPBC Act. Vessel tracking forms an integral system to maintain this accreditation as it provides essential information to validate fishing effort and protected species interaction data, serving as a critical tool for monitoring compliance with zoning regulations related to protected species and important habitat.

6.3.5 Relaxation and removal of other regulations

The introduction of the vessel tracking regulation has contributed to several other regulations or part thereof being repealed or relaxed. These regulations were repealed or relaxed partly on the basis that vessel tracking data could be used to better understand the fishing activities carried out and facilitate compliance activities. These regulations are:

1. Fishers are no longer required to give a prior notice to report their catch of quota species 1, 3 or 6 hours⁶¹ before landing at a landing location to facilitate landing compliance checks (all fisheries)

⁶⁰ Department of Agriculture and Fisheries 2023, *Economic and social indicators for Queensland's commercial fisheries in 2020/21*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2020-21/resource/895ed74e-e9a6-4b9b-b970-8fc3d6f89c7>>

⁶¹ Prior notice deadline in previous regulation was 1 hour for landing places south of latitude 15°50.30' south and 3 or 6 hours for landing places above latitude 15°50.30' south.

2. Fishers in the C1 and east coast inshore net fisheries are no longer required to have their assistant fishers under direction within 800m of the commercial fisher.
3. Fishers in the reef line fishery are no longer required to have their tender vessels within 5 nautical miles of their primary vessels under fisheries legislation.
4. The size of tender boats has increased from 7 meters to 10 meters.

In all instances, the removal or relaxation of the above regulations has provided more freedom and flexibility to commercial fishers around how they conduct their fishing operations. Further, they provide a larger range to be achieved by their fishing operations (specifically due to a larger tender boat size and a longer distance between their primary and tender boats).

This estimated saving is calculated using the Fair Work minimum wage of \$21.38/hour⁶² and based on the assumptions that 12 commercial fishing trips are undertaken per year per licence, each operation will wait at the landing locations for 1 hour before leaving the landing locations and there are two crew members in each operation. The estimation above may vary depending on individual commercial fishing operations and factors such as fishery type, size of operation, fishing frequency, location, phone reception and weather. It does not include other potential cost saving benefits derived from the reduced wait time, for example, cost to maintain fish quality (i.e. cold chain management) and managing health and safety (i.e. fatigue management).

It is difficult to estimate the expected savings from a relaxation of regulations around the need for direction of assistant fishers or the range and size increases now available to tender boats given this represents a smaller component of the industry with no data on the prior and after fishing behaviours of the fishers impacted by the changes to these regulations (i.e. no knowledge of how many tender boats have been upgraded, duration of fishing undertaken by tender boats under direction, etc).

Public feedback received on the Consultation PIR

From the total survey responses, and working group meetings, fishers did not agree with the savings noted within the Consultation PIR, noting that many small business owners do not pay staff by the hour; many are paid per day or operate as family businesses and hence are salaried employees. Further, some fishers noted that arrangements could be made such that the 1, 3 or 6-hourly notice periods could be completed in advance of the hired crew arriving on location, thereby making the above calculation unnecessary.

In recognition of the feedback, microbusinesses have been excluded from the assumption regarding labour savings. Leveraging ABS data microbusinesses account for 72% of the total Queensland fisheries (equivalent 978 based on the cohort considered under this PI-IAS process). The revised calculation results in a benefit of \$193,097 (see Appendix F for further details).

There was also positive feedback in that vessel tracking removed the notice period allowing fishers to save time.

6.3.6 Data for fishers

To a lesser extent, it was reported by commercial fishers that the data received from vessel tracking was providing further benefits to the fishers individually. Specifically, it was reported that the data was being beneficially used for the purposes of:

⁶² Minimum wages as of 1 July 2022 – Fair Work Ombudsman <<https://www.fairwork.gov.au/pay-and-wages/minimum-wages>>

- Observing the location of a fisher for the purposes of confirming where they are (i.e. a partner of the fisher on land could view the vessel tracking data and identify that the fisher was still moving and just running late home rather than experiencing issues at sea).
- Where a fleet of vessels were owned, the location of all vessels could be observed when at sea. This is beneficial for fleet managers to monitor performance of their fishers (employees) and the fishing operation.

It must be noted that this feedback was not consistent for all stakeholders interviewed for the purposes of the Consultation PIR with some fishers reporting that they saw no personal value in the data.

DAF has also received positive stories about commercial fishers using vessel tracking information to successfully retrieve stolen vessels, enabling them to continue to fish with minimal financial and time losses.

Public feedback received on the Consultation PIR

A small number of commercial fisher respondents acknowledged the benefits of vessel tracking, particularly in terms of monitoring and compliance benefits. In most cases, these respondents also pointed to areas for improvement which have been discussed throughout this document, including implementing processes to manage equipment malfunction.

6.3.7 Maritime safety

A side benefit of vessel tracking is that it provides useful locational data to assist marine search and rescue incidents in Queensland waters.

The Australian Maritime Safety Authority (AMSA) is Australia's national agency responsible for maritime safety and maritime aviation search and rescue. AMSA administers legislation including the *Maritime Safety (Domestic Commercial Vessel) National Law Act 2012 (Cth)* and its associated subordinate legislation. AMSA regulates safety with respect to commercial fishing operations.

DAF is responsible for administering the *Fisheries Act 1994* and its associated subordinate legislation to ensure fisheries resources are managed in a manner that is ecologically sustainable, socially acceptable and economically viable to Queenslanders. Vessel tracking was implemented by DAF under the QSFS to help modernise fisheries management in Queensland, leading to more informed and responsive decision-making to protect fish stocks. Although DAF is not responsible to monitor safety in relation to fishing vessels in Queensland, DAF has always taken steps to ensure that timely vessel tracking data is made available to appropriate authorities such as AMSA by providing its last known positions of vessels and information on nearby vessels to assist with search and rescue operations in Queensland waters. It is important to note that DAF has entered into an information sharing agreement under section 217A of the *Fisheries Act 1994* with AMSA, which provides access to vessel tracking data on a demand basis for search and rescue purposes. This agreement enables a faster response to search and rescue situations by allowing AMSA to quickly obtain vessel tracking data from DAF.

It is noted that DAF has received advice from AMSA that the emergency position-indicating radio beacon (EPI-IASB) station satellite detection system remains the best and most reliable distress system, but that vessel tracking data will provide extremely valuable complementary information on the position of any vessel in distress as well as nearby vessels that can also assist in search and rescue efforts. The EPI-IASB system is monitored at all times (24 hours per day and seven days per week) by AMSA and is actioned in a matter of minutes. Combined, it is hoped that these measures

will significantly improve the effectiveness and efficiency of search and rescue efforts in a coordinated manner across agencies in Queensland.

6.4 Unintended consequences

6.4.1 Vessel tracking equipment issues

The Vessel Tracking Installation and Maintenance Standard prescribes a list of vessel tracking units which can be selected by fishers for installation and use. Despite initial trials being conducted with the equipment (including by industry fishers), feedback received through the consultation to date has identified that there are certain reliability issues with some of the equipment. Feedback received is presented in Table 23 below. It is understood that this is in no way exhaustive, however, it goes some way to illustrating the reliability issues of the equipment.

Table 23 Known reliability issues with vessel tracking units

Equipment	Reliability issues
SPOT Trace	<ul style="list-style-type: none"> • Cabling issues where cables were not made with suitable materials for the environment in which they would be exposed to • Insufficient waterproofing to deal with the environment it operates in (water and humidity)
Rockfleet	<ul style="list-style-type: none"> • Unable to identify when the equipment is successfully working (i.e. light on equipment) • Cabling issues where cables were not made with suitable materials for the environment in which they would be exposed to • Power supply issues – discrepancies between the power supply advertised and the actual power supply realised in operation • Unreliable where the reset required a magnet needed to be swept across the equipment in a specific direction • Not charging from the battery supply • Back up battery insufficient for duration at sea if power failure occurs • Insufficient waterproofing to deal with the environment it operates in (water and humidity)
The IDP690 to IDP 800	<ul style="list-style-type: none"> • Difficulties with use in vessels with 12V power systems

With respect to the Spot Trace, all equipment was replaced between the period November 2019 and April 2020 due to issues with the equipment and cabling. This was done at no cost to the fishers, with fishers requested to transfer their equipment over once replacements were provided (i.e., to ensure no lost fishing time).

Table 24 and Table 25 illustrate the malfunction information provided by the current vessel tracking providers (Pivotel and Pole Star) current as of end 2021.

Table 24 Malfunction rate by vessel tracking unit type

Provider	Type	Number dispatched	Number of malfunctions ⁱ	Malfunction rate (%)
Pivotel	Rockfleet	880 ⁱⁱ	137	16%
	Spot Trace	643 ⁱⁱⁱ	36	6%
Pole Star	Rockfleet ^{iv}	38	1	3%

	IDP690 ^v	53	0	0%
	ST6100 ^v	629	12	2%
	IDP800 (with internal antenna) ^v	25	0	0%
	IDP800 (unit only without antenna) ^v	43	1	2%
	External antenna for IDP 800 ^v	56	3	5%

Notes:

ⁱ Equipment was assessed by the providers and a fault was found

ⁱⁱ Equipment dispatched from June 2019

ⁱⁱⁱ Equipment dispatched from May 2020 (after mass replacement program of Spot Trace)

^{iv} Equipment dispatched from April 2019

^v Equipment dispatched from 1 January 2019

Table 25 Causes of equipment malfunctions

Provider	Type	Number of malfunctions	Equipment failure ⁱ	Customer caused failure ⁱⁱ	Supplier-- installation issues
Pivotel	Rockfleet	137	76%	2%	22%
	Spot Trace	36	50%	50%	N/A
Pole Star	Rockfleet	1	100%	0%	N/A
	IDP690	0	0%	0%	N/A
	ST6100	12	83%	17%	N/A
	IDP800 (with internal antenna)	0	0%	0%	N/A
	IDP800 (unit only without antenna)	1	0%	100%	N/A
	External antenna for IDP 800	3	0%	100%	N/A

Notes:

ⁱ Failure with internal parts or configuration

ⁱⁱ Damage caused by customer, improper installation, customer caused water ingress, incorrect use of AAA batteries for Spot Trace

As mentioned above, the regulation has had a greater impact on those that live in regional areas. This is due to little or no access to technical support in the event of technology issues and lengthy delays when equipment is required to be shipped back to the supplier (it takes longer for this to happen from remote areas). While backup equipment is an option, feedback has confirmed that given the issues with the technology, often the backup can also be down with lengthy delays experienced to receive replacements or repair the backup.

Technology issues with the vessel tracking units was an unintended consequence of the regulation implementation that intrinsically links to other unintended impacts.

Public feedback received on the Consultation PIR

Throughout this consultation process, many commercial fishers reiterated concerns around reliability of the technology and the suitability of the devices for remote conditions at sea.

These issues are highlighted and noted below:

- Availability of devices in Australia - many respondents noted that there were no approved units in the country.
- Reliability and customer service provided by suppliers (Pivotel and Option Audio) - long wait times when phoning support lines, lack of customer service
- Wait times to receive replacements and processing warranty claims - it was a common theme that warranty claims had lead times of approximately 12 to 18 weeks and were serviced offshore
- Internals of the units - respondents noted that the copper wiring and internal battery of the YB3i and Spot Trace units were not fit for purpose, specifically noting corrosion, and increased risk of fires, explosions, amperage drop, or meltdowns. Some suggestions were made to source units with tin wiring instead of copper.
- Inaccurate polling and polling locations - anecdotal evidence from multiple respondents noting that whilst units are flashing green and appear to be polling, they were in fact not. In addition to this, the YB3i and Spot Trace units at times were inaccurate and were reporting incorrect locations, if pinging at all.
- Some respondents indicated that they have used a number of different units (i.e. 7-8) since the introduction of the regulation.
- Respondents suggested that a phone app may be more efficient and effective and using the approved devices

Whilst a small number of commercial fishers provided data relating to costs associated with malfunctioning units, the data was consistent with assumptions provided in the Consultation PIR. It is noted that the existing recommendations address concerns related to equipment malfunction.

6.4.2 Data security, intellectual property and ownership issues

Public feedback received on the Consultation PIR

Some fishers expressed an opinion that in their view, location data had been compromised due to new fishers being observed in previously unknown locations. Others claimed that data was being accessed without a password and some fishers provided a video during a face-to-face consultation that they believed demonstrated an example of access without a password. Note it was later verified that the video that was shown related to a separate matter that had occurred in 2018, namely a breach of the FishNet Secure system that did not contain vessel tracking data. This matter was separately investigated.⁶³

Many fishers identified the need for greater transparency around individuals with access to the data due to the commercial-in-confidence nature of the information.

Some respondents expressed a view that commercial fishers had ownership rights over the vessel tracking data and that there should be a contractual arrangement between the fisher and government to access the data, including specifying compensation arrangements if the data were to be compromised.

⁶³ Department of Agriculture and Fisheries 2022, *Review report on Fishnet Secure breach investigation*, <<https://daf.engagementhub.com.au/vessel-tracking-review-engagement-portal>>

Almost all industry stakeholders that provided feedback identified that data leakage was a concern. The data captured through vessel tracking provides a complete set of reference points for where a vessel has been on a given trip. This includes the identification of specific fishing marks (productive fishing locations) that many fishers consider to be the intellectual property of the fisher who identified them (largely through years of experience). While this is not considered an issue for some fisheries for example, crabbing (pots are already easily identifiable in the water), it is considered an issue for other fisheries (e.g. line and net fisheries).

As a consequence of this, it was suggested in some specific feedback that the real-time tracking data collected from vessel tracking units which allows QBFP to identify and track the location of an individual vessel on the water amounts to a 'transference' of that fisher's intellectual property rights. This is because the real-time location data that identifies the movement of an individual vessel will naturally identify productive fishing locations (though presumably the real-time location data would need to be utilised in conjunction with other sources of data in order to specifically pinpoint a productive fishing location). On this premise, the feedback further contended that fishers should be compensated for this 'transference' to the Queensland Government due to the perceived value attaching to the tracking data of each individual vessel.

A recurring theme in the feedback from commercial fishers was the view that because productive fishing locations can be extracted from the individual vessel tracking data, the data itself has significant value to their competitors in the market. This has led to concerns that the Queensland Government has not discerned this value in implementing the regulation and should be demonstrating that it is actively taking steps to keep the vessel tracking data collected by DAF confidential and secure.

Fishers have also expressed concerns about data held by the vessel tracking airtime providers (i.e. those providing the vessel tracking monthly polling) and how this data might be used by these third parties. While dependent on the contracts signed between the fisher and the vessel tracking airtime providers (not DAF), fishers are concerned that the providers have access to and can use the data collected from the vessel tracking device. Further it was also reported that the data is being retained by the original provider when contracts from one provider are transferred over to another (such as with contracts that were originally entered into with Option Audio).

While it is acknowledged by the fishers that the government bodies which receive and use this data have specific protocols in place to ensure the data remains confidential and is not shared beyond the specified use for that government body, fishers have reported that they have observed new fishers appearing at highly guarded fishing marks, sparking concerns that this may have come from inappropriate third party access to vessel tracking data.

During public consultation, fishers were encouraged to bring forward evidence to support claims of inappropriate access of vessel tracking data by authorities. However, to date, no clear evidence has been provided through the consultation process.

Stakeholder feedback related to intellectual property and data ownership has been considered. Independent legal opinion has been sought on these matters. This is outlined below.

PwC view on intellectual property

If data amounts to an enforceable intellectual property right, it is generally accepted that there should be financial consideration payable to the 'owner' of the intellectual property if a third party

intends to use that data. The Queensland Information Privacy Principles supports this view⁶⁴ and reinforce that the Queensland Government will always seek to ensure that it has all necessary third-party permissions in order to licence intellectual property that is owned by a third party.⁶⁵

However, this would require the vessel tracking data to meet the requirements of a specific 'type' of intellectual property. Under Australian law, in order for data to constitute intellectual property, it must be a:

- trademark (a sign that identifies a unique product or service);
- patent (a legally enforceable right of a device, substance, method or process that is new, useful, inventive or innovative);
- design (the overall appearance of a product resulting from one or more visible features);
- copyright (the exclusive right of the author of a creative work to reproduce that work);
- plant breeder's right (exclusive commercial rights to plant varieties); or
- circuit layout (the plans of integrated circuits used in computer-generated designs).

Ultimately, the vessel tracking data generated by an individual vessel is unlikely to fall within any of these long-established categories of intellectual property. Accordingly, we do not consider that fishing locations obtained from vessel tracking would amount to a transference of intellectual property. Whilst locations of productive fishing locations may be attributable of a fisher's experience, this by itself would not hold an enforceable right against the Queensland Government.

PwC view on data security and ownership

To date, there has been no clear evidence of data leakage or disclosure in respect of vessel tracking data by the Queensland Government and evidence to support the above claims has not been provided to date through the consultation process. While fishers have noted the appearance of new fishers in some productive fishing locations, there are many ways that a third party could have identified these locations which are in no way connected to the vessel tracking device (including via logbooks which have manually recorded this data for many years). Accordingly, this feedback cannot be directly attributed to the effects of the regulation.

However, we consider that it is reasonable that the Queensland Government should take active steps to maintain the security and confidentiality of the vessel tracking data, particularly in view of the commercial value that may be attached to it by fishers. Adopting security protocols in line with good industry practice and imposing the same protocols on any third-party contractors involved in the broader vessel tracking regime would address the concerns raised throughout the consultation process. This includes the Queensland Government ensuring that all third-party contractors with access to the vessel tracking data returning and / or destroying any vessel tracking data in its possession or control at any time when it ceases to be a contractor, unless that information is required to be retained by law.

Some specific feedback contended that as the 'owners' of the vessel tracking data, each fisher should have a contractual arrangement in place with the Queensland Government which authorises the Queensland Government's 'access' to the vessel tracking data. The feedback further suggested that this contractual arrangement should then impose a financial compensatory regime for the benefit of an affected fisher if the confidentiality of their vessel tracking data was compromised.

Importantly, under Australian law, an individual cannot assert ownership over information and the law would not support a view that an individual fisher is the 'owner' of the vessel tracking data

⁶⁴ Department of Science, Information Technology, Innovation and the Arts, Queensland Public Sector IP Principles, https://www.forgov.qld.gov.au/__data/assets/pdf_file/0024/182706/qps-ip-principlesfinal-v.2.pdf

⁶⁵ Department of Science, Information Technology, Innovation and the Arts, Queensland Public Sector IP Principles, https://www.forgov.qld.gov.au/__data/assets/pdf_file/0024/182706/qps-ip-principlesfinal-v.2.pdf pg. 12ve

generated by that fisher's vessel. Accordingly, we do not believe that a contractual arrangement of this type is necessary in view of the relatively broad rights that the Queensland Government has under the regulation to require all vessels to install and use vessel tracking requirements.

The Queensland Government is not seeking to profit from the collection or use of the vessel tracking data (despite the commercial value that may be attached to it in the industry). Ultimately the primary policy objective of the regulation is to enable the real-time monitoring of the Queensland commercial fishing fleet and the pursuit of this has brought many benefits, such as allowing QBFP to undertake robust compliance activities and prosecute offending vessels more accurately. This objective sits quite inconsistently with the imposition of a financial compensatory regime, particularly when some fisheries have been required to provide vessel tracking data to the Queensland Government for some time. While there is certainly a sufficient incentive for the Queensland Government to maintain the security and confidentiality of the vessel tracking data, there is some uncertainty on the extent to which fishing locations are truly 'secret', as there is a variety of ways in which fishing locations could be identified (even if it is just on a visual basis by other vessels). On this premise, were the vessel tracking data to be compromised, it would be difficult to quantify any direct losses to the fishers that were attributable to the compromise itself and the payment of compensation may be considered too remote to be legally recoverable by the affected fisher.

6.4.3 Vessel tracking confirmation text messaging system

Public feedback received on the Consultation PIR

Several commercial fishers raised concerns about the performance of the current daily vessel tracking confirmation text messaging (SMS) system whereby there were reported delays of receiving the SMS.

The daily vessel tracking confirmation SMS was first introduced in 2019 when vessel tracking regulation was implemented. Issues about delayed receipt of the SMS were reported by commercial fishers and identified in the Queensland Ombudsman's observations and proposed actions following their investigation into the vessel tracking administration.⁶⁶

In response to this, DAF has progressively implemented other polling confirmation methods over the years. Currently, the confirmation options currently available to fishers are:

- daily confirmation SMS sent by DAF
- calling the Automated Interactive Voice Response (AIVR) telephone system to confirm
- commercial fishing app (for fisheries in scope of the app)
- checking unit polling in the online tracking platform given by their vessel tracking provider.

6.4.4 Emotional impacts

Several fishers described the vessel tracking legislation as emotionally confronting. The idea of being tracked electronically is associated with criminals, so a similar approach to fishers has prompted additional emotional load. This represented an unintended impact of the regulation.

Public feedback received on the Consultation PIR

⁶⁶ Queensland Ombudsman's observation and proposed actions
<<https://daf.engagementhub.com.au/projects/download/8309/ProjectDocument>>

Feedback received during the working group meetings, submitted surveys and face-to-face interviews reiterated the emotional stress that fishers experienced because of concerns that malfunctioning devices would result in them not being able to fish and earn a living.

Fishers also reported that the vessel tracking requirement made them feel like 'criminals' and caused anxiety.

Some respondents were of the view that vessel tracking should be extended to recreational and charter fishers.

Public feedback affirms the findings relating to this impact.

6.4.5 Competition impacts

Prior to the introduction of the vessel tracking regulation, DAF conducted market scanning and also allowed vessel tracking providers to contact them and arrange to become an approved vessel tracking provider. Trials were undertaken at the Government's expense, the result of which identified only a small number of businesses that were able to provide the necessary vessel tracking units and airtime services to assist Queensland's fishers in fulfilling their vessel tracking obligations. The vessel tracking units provided by these providers were identified in the Vessel Tracking Installation and Maintenance Standard.

Since the introduction of the vessel tracking regulation, one original vessel tracking provider has left the market resulting in a limited pool of available providers.

While not the intent, the process adopted has resulted in difficulties for fishers to move between vessel tracking providers to meet their vessel tracking obligations.

Public feedback received on the Consultation PIR

Through the various feedback sessions, commercial fishers indicated they had experienced customer service problems with the polling providers, namely Pivotel and Option Audio. This included a lack of support and responsiveness regarding unit maintenance, and a lack of responsiveness to replace faulty units. Fishers noted these problems exacerbated their concerns that a faulty unit would prevent them from fishing.

6.5 Assessment against the objectives

The objective of the *Fisheries Act 1994* is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to—

- (a) apply and balance the principles of ecologically sustainable development; and
- (b) promote ecologically sustainable development.

The objective (as outlined in Section 5) of the vessel tracking regulation was to implement vessel tracking on the vast majority of commercial vessels to provide valuable (timelier and more accurate) data that could be used for monitoring and research and compliance activities. The resulting outcomes would seek to contribute to a more proactive and accurate monitoring and research program as well as a more effective compliance approach across the fisheries and lead into the overarching objective of ensuring the sustainability of Queensland's fisheries, which will benefit the marine resources upon which many operators and regional communities are dependent.

Based on the feedback gathered from the consultation process informing this Consultation PIR, it appears that the regulation has achieved its objective. There is now an improved approach to compliance activities which provides greater capacity for authorities across their compliance activities and a reduced compliance burden on commercial fisheries that are compliant. Improvements to how monitoring and research activities are carried out have also been realised with early-stage benefits observed and clear future benefits articulated.

Overall, the introduction of the vessel tracking regulation has been shown to contribute to improved fisheries management which in turn provides for an ecologically sustainable fishery.

6.6 Consistency with other policies and legislation

Regulations must be consistent with Clause 5 of the Competition Principles Agreement and the fundamental legislative principles as defined by section 4 of the *Legislative Standards Act 1992*. This was handled in the explanatory memorandum of the Fisheries (General) Regulation 2019.⁶⁷

“Section 84 provides that the vessel tracking unit on a boat is to be installed in a way stated in the vessel tracking standard. The potential Fundamental Legislative Principles issue is whether the legislation has sufficient regard to the institute of Parliament by allowing an external document that is not subject to Parliamentary scrutiny to prescribe an approved facility.

A standard for the way a vessel tracking unit must be installed can be an extensive, technical document dealing with various types of equipment which is more suited to a standard published by DAF. It would be impractical to include the details of installation of equipment in legislation to the degree required to ensure enforceability. It would also be overly burdensome on Parliament's time to consider changes to a vessel tracking standard each time they occur. It is therefore more practical and timelier for DAF to make and amend vessel tracking standards based on DAF's expertise and knowledge.”

7. Looking forward

7.1 Consideration of the original problem

It has been a period of approximately 4 years since vessel tracking was introduced across the majority of Queensland's fisheries. Industry reports published by the department in this time have identified an industry with an overall decreased in gross value of production reported between the 2017/2018 financial year and the 2018/2019 financial year⁶⁸.

The impacts on fishing exports and domestic markets from COVID-19⁶⁹ highlights the vulnerability of commercial fishers, resulting from years of low profitability and a need to modernise access to fisheries resources and improve fishing efficiency. There is continued international concern about the

⁶⁷ Fisheries (General) Regulation 2019, Explanatory notes for SL 2019 No. 179
<<https://www.legislation.qld.gov.au/view/pdf/published.exp/sl-2019-0179>>

⁶⁸ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

⁶⁹ Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2019-20/resource/14a32b86-096d-4b17-ae5a-2cbc94a133a3>>

health of the Great Barrier Reef.^{70 71} Consequently, there is increased scrutiny of the management of fisheries that operate within the Great Barrier Reef World Heritage Area. These challenges were widely recognised by stakeholders that led to the introduction of the QSFS that set out actions aiming to move Queensland's wild harvest fisheries to a modern, responsive and consultative approach to fisheries management.

Further to this, it is widely acknowledged that negative consequences result if a public marine resource is not carefully managed.^{72 73} Specifically, it has been demonstrated that if fisheries are not carefully managed, the trophic structure and productivity of ecosystems may be impacted by long-term declines in populations of target and non-target species.⁷⁴ Further, degradation of habitats by commercial fishing can also result from poor management.⁷⁵

The effects of climate change are also introducing greater pressures on marine ecosystems with significant and lasting effects on the marine environment. The recent Intergovernmental Panel on Climate Change report⁷⁶ has shown that the world has a limited amount of time to drastically reduce emissions to avoid a global rise in temperature of at least 1.5 degrees Celsius or otherwise face widespread impacts to its marine ecosystems and environments. Various publications^{77 78 79 80 81} have illustrated the negative impact of climate change to the marine ecosystems, jeopardising the economic, social and cultural contributions that the fisheries resource provides to communities.

Given the pressures of climate change and global warming on Queensland's fisheries, fisheries which are already under significant stress may not have the resilience to deal with such a large-scale threat.⁵¹ While DAF and the broader commercial fishing industry is unable to directly manage the effects of climate change due to the large scale and widespread nature of these effects, any actions which can be made to enhance the sustainability of the fisheries could assist with preserving the fisheries. These actions lead back to effective management of the fisheries echoed in the actions set out in the QSFS that aims to build more sustainable fish stocks and provide greater resilience of fisheries into the future. This will assist to reduce the vulnerability of fisheries to climate change and enable more timely responses to projected changes in the dynamics of marine resources and ecosystems.

⁷⁰ Great Barrier Reef Marine Park Authority 2019, *Outlook report 2019*, <<https://www.gbrmpa.gov.au/our-work/outlook-report-2019>>

⁷¹ BBC News 2021, *Why is the Great Barrier Reef in trouble? A simple guide*, <<https://www.bbc.com/news/world-australia-57938858>>

⁷² Jackson et al. 2001, Historical overfishing and the recent collapse of coastal ecosystems, *Science*, vol. 293, pp.629-637.

⁷³ Halpern et al. 2009, Mapping cumulative human impacts to California Current marine ecosystems, *Conservation Letters*, vol. 2, pp. 138-148.

⁷⁴ Brodeur et al. 2017, New perspectives on the feeding ecology and trophic dynamics of fishes, *Environmental Biology of Fishes*, vol. 100, pp. 293-297.

⁷⁵ Jennings & Kaiser 1998, The effects of fishing on marine ecosystems, *Advances in Marine Biology*, vol. 34, pp. 201-212, 212e, 213-352.

⁷⁶ Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis*, <<https://www.ipcc.ch/report/ar6/wg1/>>

⁷⁷ Hoegh-Guldberg et al. 2007, Coral Reefs Under Rapid Climate Change and Ocean Acidification, *Science*; Duke et al. 2017, Mangrove Floristics and Biogeography Revisited: Further Deductions from Biodiversity Hot Spots, Ancestral Discontinuities, and Common Evolutionary Processes, *Mangrove Ecosystems: A Global Biogeographic Perspective*;

Hoegh-Guldberg et al. 2007, Coral Reefs Under Rapid Climate Change and Ocean Acidification, *Science*

⁷⁸ Sumaila et al., 2011 Climate Change Impacts on the Biophysics and Economics of World Fisheries, *Nature Climate Change*

⁷⁹ Hoegh-Guldberg et al. 2007, Coral Reefs Under Rapid Climate Change and Ocean Acidification, *Science*

⁸⁰ Steffen et al. 2017 Trajectories of the Earth System in the Anthropocene, *PNAS*

⁸¹ Holbrook & Johnson 2014, Climate change impacts and adaptation of commercial marine fisheries in Australia: A review of the science, *Climatic Change*

Challenges aside, well-managed and sustainable fisheries present opportunities to the commercial fishing industry as demand for sustainable wild harvest seafood continues to grow due to increasing awareness regarding sustainable seafood.^{82 83} Consumers will increasingly make choices based on the traceability and environmental impact of their seafood. Moreover, the news of Brisbane being awarded hosting rights for the 2032 Olympic and Paralympic Games has further created opportunities for the State to showcase sustainable seafood sourced locally. This is in line with the International Olympic Committee's sustainable sourcing requirements and move towards a more consistent and sustainable approach to sourcing goods and services for the Games.⁸⁴

The Queensland government has allocated rights to our public fisheries resources for commercial purposes in accordance with the current legislative framework. Given the public nature of the fisheries and the broad benefit the fisheries provide to Queenslanders, there is a valid community expectation to ensure the sustainability of the fisheries with a focus on transparency and effective management and use of the resource. Vessel tracking is a means to provide improved management of the fisheries. In doing so, it can increase the social licence for fishers based on the improved management and in turn sustainability benefits vessel tracking has been shown to deliver through broader research and studies (as per Section 4.3).

When considering the historical and recent pressures, as well as opportunities that exist for the Queensland commercial fisheries and more broadly the natural resource, effective management of the resource is required now more than ever. Therefore, when considering whether the problem still exists for which the vessel tracking regulation was originally brought into address, it is reasonable to conclude that this problem still exists today. For clarity, the problem that still exists today is that the requirement for strategies that deliver good management of the fisheries is still a requirement for Queensland's fisheries. Broadly speaking, a reduction in effective management strategies is not an option going forward as it will not ensure the presenting problems and ensure the future sustainability of the resource.

⁸² Marine Stewardship Council 2020, *Understanding seafood consumers*, <<https://www.msc.org/understanding-seafood-consumers>>

⁸³ MarketWatch 2022, *Sustainable seafood market growth size 2022: Competitive landscape, leading players analysis, key dynamics, business strategies, statistics and developments forecast to 2028*, <<https://www.marketwatch.com/press-release/sustainable-seafood-market-growth-size-2022-competitive-landscape-leading-players-analysis-key-dynamics-business-strategies-statistics-and-developments-forecast-to-2028-2022-08-01>>

⁸⁴ Olympic World Library 2019, *Olympic Games guide on sustainable sourcing*, <<https://library.olympics.com/Default/doc/SYRACUSE/186083/olympic-games-guide-on-sustainable-sourcing-international-olympic-committee?lg=en-GB>>

8. Recommendations

A number of options are considered as part of the recommendations section of this report. Table 26 outlines the options considered as part of the recommendations.

Table 26 Options considered

Option A	Legislation repealed (base case reinstated)
Option B	Alternative options (e.g. smartphone app, drones, etc)
Option C	Regulation remains without/with amendment (e.g. improvements to address impacts)

8.1 Option A – Should the legislation be repealed?

The vessel tracking regulation was initially introduced in order to provide more valuable data (higher resolution, independent and real-time) which could be used for monitoring and research and compliance activities, which in turn informed the management of the fisheries and sought to ensure the overall sustainability of the fisheries. It must be noted that there have been no alternative means for gathering more valuable fishing locational data which could be used for monitoring and research, and compliance activities since the introduction of the vessel tracking regulation (i.e. no other means for solving the problem have been introduced either directly or indirectly).

As highlighted in Section 7 it is evident that the original problem for which the regulation was otherwise introduced has only become more apparent. That is, it is more apparent than ever that improved management practices are required to ensure sustainable fisheries (i.e. improved management strategies that improve the ability to ensure efficient and effective monitoring and research and compliance activities for the fisheries).

If the regulation were to be repealed, the data which is currently collected would be lost. As this data is used for a myriad of different reasons (described in Section 6), the benefits derived by the use of this data would also be lost if the regulation were to be repealed.

If the regulation were to be repealed it is also expected that access to GBRMP may be difficult to maintain by GBRMPA. Around two thirds of the 344 400 square kilometre GBRMP is open to some form of commercial fishing. Fisheries operating in the GBRMP derived approximately \$66.7 million, or approximately 63% of their total annual gross value of production, from catch harvested within the GBRMP. This equates to \$11.66 million in adjusted net economic return.

Finally, if the regulation were to be repealed, there would be an additional loss in the export value from outside the GBRMP. For vessels that only required vessel tracking from 2019, most of the export value came from within the GBRMP. However, there is a upper limit adjusted net economic return of \$5.1 million from outside the GBRMP as well.



Figure 2 Great Barrier Reef catchment areas and general reference map (photo courtesy of GBRMPA). *Notes: Around two thirds of the 344 400 square kilometre GBRMP is open to some form of commercial fishing.*

It is expected that, if not all, a vast majority of industry will not continue to voluntarily implement vessel tracking and provide this data to DAF. This is based on feedback received from phase 1 targeted consultation with the vessel tracking working group industry members where 100% of participants have indicated that they would not voluntarily adopt vessel tracking. Regardless, if any fishers were to continue with vessel tracking in a voluntary capacity, data collected would only represent a small portion of the industry resulting in incomplete and non-representative data sets. It is not recommended that an incomplete approach to gathering data of this nature be adopted given this would be unlikely to correctly inform management decisions (i.e. calculation of industry effort when only part of the picture is available).

The vessel tracking regulation has delivered against its objective, providing an improved approach to both monitoring and research activities, and compliance activities that have in turn contributed to a more effective management of the fisheries. Further, the quantified benefits delivered by the regulation (as identified in Section 6) clearly outweigh the costs (also Section 6). The net benefits based on average annual values over 2018-19 to 2020-21 are provided in Table 27 below.

Table 27 Net Benefit Analysis based on average annual values (FY2018-19 to 2020-21)

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 3,007,806	\$ 1,109,409	
Quantified Rebate		\$ 235,316	\$ 4,587,848
Benefits			
Compliance saving		\$ 1,451,400	
Relaxation of regulation (wage saving)	\$ 193,097		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP)	\$ 12,103,905		\$ 13,748,402
Net Benefit (average annual values (FY2018-19 to 2020-FY21))	\$ 9,289,196	\$ 106,675	\$ 9,395,870

Effective management of the fisheries was (as identified by the original problem) and continues to be a critical pillar which ensures the long-term sustainability of Queensland's fisheries which are estimated to be worth \$770 million annually^{85 86 68}. A contribution to the overall sustainability of the fisheries is a benefit that far outweighs the identified costs of the vessel tracking regulation.

When further considering the benefits with respect to the costs, a proportion of net and ongoing costs reside with the fishers. Despite this, it has not been identified through the consultation process to date that these costs are materially impacting the commercial fishing operations carried out. Regardless, a consideration of the costs of vessel tracking against the individual benefits received by the fishers is also relevant.

Commercial fishers require a sustainable resource in order to continue to maintain their current business's economic value (i.e., maintain catch rates that derive income). It is appropriate to consider the vessel tracking regulation as a single contributing factor (among many) that results in a sustainable fishery. This, in turn, delivers continued sustainability to the fishing businesses which operate within these waters. A recent report commissioned by DAF has calculated the average gross income for business activity in Queensland's commercial fisheries to be \$219 000 in 2018/19⁸⁷. Accordingly, the vessel tracking regulation can be considered a contributing factor (among many) to ensuring the average business value of \$219 000 per annum. This value is significantly higher than the cost of the vessel tracking regulation reported and incurred by fishers (as reported in Section 6.2.1) which would lead to support for a recommendation that stipulates that the vessel tracking regulation should remain.

There is inherent complexity in repealing the current vessel tracking regulation due to the incorporation of earlier vessel tracking regulations already in existence across some fisheries prior to

⁸⁵ Department of Agriculture and Fisheries 2020, *Economic and social indicators of the Queensland charter fishery, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/7ac87916-a5f8-44e5-9d0a-9d422a0a44d2>>

⁸⁶ Department of Agriculture and Fisheries 2021, *Economic contribution of recreational fishing by Queenslanders to Queensland*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-contribution-of-recreational-fishing>>

⁸⁷ Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*, <https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

the introduction of the current vessel tracking regulation. Repealing the current vessel tracking regulation would not only remove the vessel tracking requirements from the additional fisheries that were required to implement vessel tracking under the current vessel tracking regulation, but also remove vessel tracking requirements from a broader subset of fisheries that were required to operate vessel tracking prior to the introduction of the current legislation, and fisheries that derive their commercial catches from quota amounts reported through vessel tracking data. Repealing the regulation would effectively repeal the current situation back, not to the base case, but to a situation circa 2008. For this reason, if the regulation were to be repealed, the vessel tracking legislation in place prior to this regulation (as described in Section 3.3) would need to be reinstated in order to return the legislation to its prior state (pre-2019).

A regulatory approach to the management of Queensland's fisheries is consistent with that used in other jurisdictions both nationally and internationally and remains the most appropriate means for ensuring the long-term sustainability of Queensland's fisheries resources. Further, the vessel tracking regulation is consistent with regulations in other states and territories in Australia, the Commonwealth and internationally.

Vessel tracking in national and international jurisdictions

Given the island nature of Australia, vessel tracking requirements (as implemented in Queensland Fisheries, i.e. real-time, independent data) are common across almost all of Australia's eight states and territories and at the federal government level to improve the management and sustainability of their fisheries. While the adoption and implementation of vessel tracking across Australia's individual fisheries is varied with respect to the breadth of its application, vessel tracking unit and subsequent data collection is present in all jurisdictions except for NSW.

Vessel tracking on commercial vessels is also common practice for other seafaring nations with fisheries management organisations introducing similar requirements to those in Australia. A small list of examples can be shown in Table 28 below.

Table 28 International examples of vessel tracking implementation

Jurisdiction	Vessel tracking requirements	Reasons
The Pacific Islands Forum Fisheries Association ⁸⁸	Vessel tracking is required on every fishing vessel operating in Forum Fisheries Association territory	Control of illegal, unreported and unregulated fishing activities
Norway ⁸⁹	Vessel tracking is required on all vessel greater than 15m (12m in some areas)	Increase transparency of fishing industry, reduce the risk of illegal fisheries and for improved compliance
The European Union ⁹⁰	Vessel tracking is required on all vessels greater than 12m	Protection of fish stocks and access rights of fishers, and monitoring for possible illegal activities

⁸⁸ Pacific Islands Forum Fisheries Agency (FFA) 2008, *FFA vessel monitoring system*, <https://www.ffa.int/vessel_registration>

⁸⁹ Directorate of Fisheries Norway 2015, *Electronic reporting systems*, <<https://www.fiskeridir.no/English/Fisheries/Electronic-Reporting-Systems>>

⁹⁰ European Commission, *Inspections, monitoring and surveillance*, <https://ec.europa.eu/oceans-and-fisheries/fisheries/rules/enforcing-rules/inspections-monitoring-and-surveillance_en>

Indonesia ⁹¹	Vessel tracking required on all vessels exceeding 30 gross tonnage	Increase transparency of fishing industry and to reduce risk of illegal activities
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Demonstrated benefits of vessel tracking

In addition to the benefits discussed in Section 4.3, research studies and published literature identifies a number of benefits from the use of vessel tracking. These also confirm that vessel tracking delivers a critical element under the ongoing effective management of the fisheries (i.e. continues to deliver a solution to the ongoing problem of effective fisheries management).

Similar to the findings of the local FRDC project discussed, other studies have also demonstrated benefits from the use of vessel tracking systems to fisheries management and commercial fishers. The benefits demonstrated are across both the monitoring and research, and compliance aspects of fisheries management. A brief summary of reported benefits from published studies is provided below.

Study	Reported benefits
Gonzalez-Mirelis et al., 2014, Using Vessel Monitoring System Data to Improve Systematic Conservation Planning of a Multiple-Use Marine Protected Area, the Kosterhavet National Park (Sweden) ⁹²	When considered in a conservation setting, the study found that the use of vessel tracking data could warrant an almost 10% gain of fishing grounds for a fishery while still achieving the required conservation targets (when compared to a scenario that did not utilise vessel tracking data). Vessel tracking data was being used to improve the monitoring and research capabilities of the fisheries management.
Thoya et al., 2019, Trawling effort distribution and influence of vessel monitoring system (vessel tracking in Malindi-Ungwana Bay: Implications for resource management and marine spatial planning in Kenya ⁹³	When considered in a compliance setting, the introduction of vessel tracking in the trawl fleet was found to significantly reduce fishing effort in a no-trawl area by about 90% within 1 year. The study identified the important marine spatial planning and technology (vessel tracking) on enhancing compliance with fishing area regulations, reducing resource use conflicts, and promoting sustainable fisheries.
Watson et al., 2018, Vessel monitoring systems (vessel tracking reveal an increase in fishing efficiency following regulatory changes in a demersal longline fishery ⁹⁴	The study demonstrated how vessel tracking data can provide a suite of metrics (such as effort) for improving inputs to stock assessments, dynamic delineation of fishing grounds, and evaluation of regulatory or other (e.g. climatic) impacts on fisher performance.
Emery et al. 2019, Changes in logbook reporting by commercial fishers following the implementation of electronic monitoring (EM) in	The study discovered that following the implementation of vessel tracking within a suite of EM requirements in southern Australia, fishers more accurately reported their actions on the water leading to a higher rate of compliance

⁹¹ Global Fishing Watch 2017, *Indonesia VMS joint statement*, <<https://globalfishingwatch.org/news-views/republic-of-indonesia--joint-statement/#:~:text=Indonesia%20requires%20%20on%20all,trackable%20by%20any%20other%20means>>

⁹² Gonzalez-Mireli et al. 2014, Using vessel monitoring system data to improve systematic conservation planning of a multiple-use marine protected area, the Kosterhavet National Park (Sweden), *PMC*

⁹³ Thoya et al. 2019, Trawling effort distribution and influence of vessel monitoring system (VMS) in Malindi-Ungwana Bay: Implications for resource management and marine spatial planning in Kenya, *Marine Policy*

⁹⁴ Watson et al. 2018, Vessel monitoring systems (VMS) reveal an increase in fishing efficiency following regulatory changes in a demersal longline fishery, *Fisheries Research*

Australian Commonwealth fisheries ⁹⁵	with required logbook reporting.
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The vessel tracking requirements provide additional certainty surrounding the protection of an important Queensland public resource. A number of stakeholders consulted appreciated that vessel tracking provides benefits to the broader industry and agreed on its continued use in some form.

8.2 Option B – Alternative options

For completeness, it is important to consider if other options are available which could provide similar data to inform management decisions and contribute to the sustainability of the fisheries.

Table 29 identifies alternative options as well as an analysis of the expected outcomes from these options. The options have been analysed in line with the key features of the data currently produced by vessel tracking systems, specifically real-time, independent and richness of information (i.e. ability to provide fishing location at regular intervals) however, include other pertinent considerations that could present from a given option. The cost of the proposed options has also been considered.

Table 29 An analysis of alternative options to vessel tracking

Option	Analysis of option
<p>1. Observers on boats</p> <p>Historically, observer programs have been used across the fishing industry to carry out specific programs of work and research activities. In these instances, an independent observer (often from DAF or similar) is engaged to alight a boat with the industry fisher and shadow that fisher on a given fishing trip. Information is collected by the observer during the fishing trip and reported back typically at the end of the fishing trip (i.e. when technology facilitates this).</p>	<p>Quality of data produced: The use of observers can provide detailed information on the details of a fishing trip, specifically, the location and actions of a boat. Accordingly, if set up appropriately, observers could provide a high resolution of information as currently provided by vessel tracking and potentially at an increased rate if data points such as fishing activities were recorded.</p> <p>Independent nature of the data produced: The data collected could be done so independently so long as the structure of such an approach was set up to accommodate this (i.e. observers were independent to the fishers which they work alongside).</p> <p>Real-time nature of the data: It is unlikely that this type of approach could provide real-time information given the challenges reported by fishers with respect to reception and the ability to communicate in real time outside of established satellite systems (the systems on which vessel tracking technology operate). It is likely that this information is only collected at sea and provided post trip as access to reception is reinstated.</p> <p>Likely costs: Given this method requires a person to be on board a vessel for all trips taken by industry (and for the duration of the trip), the workforce required to execute such an approach across the entire fishing industry would be aligned to the number of vessels operating across the industry (this would include tender boats as well as primary vessels). The cost of an onboard observer is approximately \$1 100 to \$1 500 per day. There would be inherent challenges with respect to the availability of onboard observers, logistics, availability of space on a vessel for an additional person or replacing a crew member, possible “observer effect” and workplace health and safety.</p>

⁹⁵ Emery et al. 2019, Changes in logbook reporting by commercial fishers following the implementation of electronic monitoring (EM) in Australian Commonwealth fisheries, *Marine Policy*

Option	Analysis of option
	<p>Analysis: Observers on boats may have the potential to provide a similar or higher resolution of relevant data akin to the data produced by vessel tracking systems. However, it is unlikely to deliver real-time data or the breadth of data at a reduced cost to stakeholders than current vessel tracking systems. As such, while this approach might provide additional benefits for the purposes of monitoring and research activities (i.e. a richer data set that could potentially further improve stock assessment models), it is unlikely that such an approach would provide the suite of benefits observed with respect to compliance activities given the lack of real-time information generated by such an approach. It is also likely that these outcomes would be realised at a significantly higher cost than alternative options, including the current vessel tracking approach.</p>
<p>2. Smartphone applications</p> <p>A solution that has been identified by both Fisheries Queensland and the fishers for the purpose of collecting information on fishing trips is the use of a mobile application operated from a fisher's smartphone. A mobile application has been developed and released by DAF that links into the existing smartphone functionality (i.e. GPS) to report specific information about a fishing trip.</p>	<p>Quality of data produced: The use of a mobile application could provide detailed information on the details of a fishing trip, specifically, the location of a boat. However, the polling frequency of 5 or 15 minutes may not be feasible due to the amount of phone battery it will consume.</p> <p>Independent nature of the data produced: The data collected would be independent given the app would be pulling from GPS functionality on the phone.</p> <p>Real-time nature of the data: It is unlikely that this type of approach could provide real-time information given the challenges reported by fishers with respect to reception and the ability to communicate in real-time using traditional mobile reception. It is likely that this information is only collected at sea and provided post trip as access to reception is reinstated.</p> <p>Likely costs: An application that is capable of recording the location of a boat has been developed and released by Fisheries Queensland. The application also performs other functions (i.e. electronic reporting of logbook information and quota activity notices) outside of collecting information on boat location. The cost for the development and maintenance support of the commercial fishing app over 3 years is approximately \$900 000.</p> <p>This application is provided to fishers free of charge and thus the only cost to fishers for being able to access this type of technology would be the cost of a smartphone and the monthly connection costs. It is acknowledged that for most fishers these costs are already incurred under their typical course of business and thus would provide no additional cost to access this solution. However, as the consultation process has discussed this option for various reasons, it has confirmed that there is a population of fishers that do not already have access to a smartphone (and are simply relying on more traditional means of mobile phone technology). For these fishers, there would be an initial outlay cost in the order of \$150-2000⁹⁶ and likely additional monthly connection costs to cover data.</p> <p>Analysis: A mobile application may have the potential to provide a similar resolution of relevant data akin to the data produced by vessel tracking systems. However, it is unlikely to deliver real-time data. As such, this approach might provide similar benefits to those identified from vessel tracking for the</p>

⁹⁶ JB Hifi, *Mobile Phones*, <<https://www.jbhifi.com.au/collections/mobile-phones>>

Option	Analysis of option
	<p>purposes of monitoring and research activities (i.e. a richer data set that could potentially further improve stock assessment models), it is unlikely that such an approach would provide the full suite of benefits observed with respect to compliance activities given the lack of real-time information generated by such an approach. Moreover, without real-time vessel tracking data, relaxation, or removal of other regulations (i.e. removal of the requirement to give prior notice 1, 3, or 6 hours before landing) will need to be rolled back. Polling frequency of 5 minutes or 15 minutes may increase the phone battery consumption rate and may affect the performance of the phone, and the reliability and consistency of data. This option would likely be at a reduced or nil cost to industry, however a higher cost to fisheries management. Similar to other costs incurred for the management of the fisheries, there is the potential that fisheries management could pass these costs on to industry through an increase in licence fees (it is worth noting however that the DAF does not adopt a net cost model for managing the fisheries: this means that there is the potential that the costs remain with management and are not passed on to the fishers).</p>
<p>3. Logbook information</p> <p>Under the <i>Fisheries Act 1994</i>, fishers operating in Queensland must provide information on fishing trips through manually reported logbook information. While this approach is paper based in Queensland, other fisheries (for example Commonwealth fisheries) also utilised electronic logbook reporting.</p>	<p>Quality of data produced: The logbook information currently provided only reports a single location for any given fishing trip. The location is reported as a grid location (i.e., an area rather than a single accurate location) with only the grid where the most time spent fishing is reported (i.e., lesser time spent in other locations is not provided). For clarity, the current information collected by logbook information does not provide exact boat location at frequent intervals for the duration of a fishing trip. This was recognised as a limitation by the initial review of the fisheries and an item which flagged richer information was required for the purpose of effective fisheries management.</p> <p>In order to address the previously identified limitation, information would need to be provided through logbook reporting which included the location of the vessel at the desired frequency (i.e., every 5 or 15 minutes of the trip). This would require someone on board the vessel to report this information either through the paper logbook or through an electronic means throughout the duration of the fishing trip.</p> <p>Independent nature of the data produced: The data collected by logbooks is not independent. Data is reported by the fisher rather than an independent source.</p> <p>Real-time nature of the data: It is unlikely that this type of approach could provide real-time data. Paper logbook records are traditionally submitted after a fishing trip and with electronic information stored in the electronic portal during the fishing trip and reported at the end or near the end of a fishing trip. Electronic logbooks would also encounter the same challenges of only being able to be sent when reception is available.</p> <p>Likely costs: Reporting through manual means by someone on board the vessel at the frequency required of current rates (as frequent as every 5 minutes) would bear similar costs to that of the observer approach. Given the frequency of the reporting that would be required, it is likely that in order to meet this, a dedicated person would be required to be on board in order to meet the reporting requirements. Accordingly, the cost of such an approach, if</p>

Option	Analysis of option
	<p>referencing the minimum wage for workers in Australia⁹⁷, would be \$21.38 an hour. If for example, a fisher went on a daily fishing trip for an 8-hour period the cost of employing the observer for the period of the trip would be \$171.04 (\$21.38 multiplied by 8). There would also be inherent challenges with respect to meeting workers' rights and entitlements for longer fishing trips (given the manually intensive nature of such an approach) which could see this cost escalate in a non-linear manner.</p> <p>Analysis: Logbook data is currently used in areas of fisheries management. However, for the purposes of providing the resolution, real-time and independent data sought for the purpose of informing/driving intelligent compliance activities and more accurate monitoring and research activities, its application is limited (as demonstrated by its historical use). Further, it is expected that significant costs would be incurred by fishers in order to improve the current limitations of logbook data which would otherwise be onerous to fishers.</p>
<p>4. Other Technologies – Drones</p> <p>Drones have been used for the purpose of compliance activities in order to improve the ability to target and meet vessels out on the water.</p>	<p>Quality of Data produced: Information collected by drones would only relate to information on vessels within the 'view' of the drone during a given flight path. For various reasons (over a water body, vastness of the area, etc) it would be impossible to develop a network of drones which covers the entire Queensland fishery meaning the data produced from drones would only ever cover a small area and thus represent an incomplete data set. The data would also not be reporting down to the level of an individual boat (i.e., identify the specific boat by licence owner).</p> <p>Independent nature of the data produced: Drones are currently operated by DAF for the purpose of fisheries management⁹⁸. It would be reasonable to expect that DAF would undertake additional drone-based operations meaning the data collected would be from an independent source. The same could be said for GBRMPA should they be involved in drone operations.</p> <p>Real-time nature of the data: Such an approach can provide real-time information so long as technology was used to collate and report to end users the data received by the drone.</p> <p>Likely costs: It is hard to estimate the cost of such an approach given it is unlikely that such an approach can be all encompassing. In order to develop suitable strategies for using drones to collect information on boat location, the number of drones and thus size of the support workforce to facilitate these operations would need to be developed. The cost of drones is highly variable depending on size and capability, with costs per drone ranging from thousands to hundreds of thousands of dollars⁹⁹. The drones would also have to be controlled by trained operators, which would add to the cost of this approach. Given the drone operations would be carried out by either fisheries management or other delegated authorities (e.g., GBRMPA), this would be a cost to the fisheries management. Similar to other costs</p>

⁹⁷ Minimum wages as of 1 July 2022 – Fair Work Ombudsman <<https://www.fairwork.gov.au/pay-and-wages/minimum-wages>>

⁹⁸ The Queensland Cabinet and Ministerial Directory, *Taking to the skies to protect our fisheries*, <<https://statements.qld.gov.au/statements/87673>>

⁹⁹ Drone Life 2017, *How Much Should I Spend on a Professional Drone?*, <<https://dronelife.com/2017/04/04/much-spend-professional-drone/>>

Option	Analysis of option
	<p>incurred for the management of the fisheries, there is the potential that fisheries management could pass these costs on to industry through an increase in licence fees (it is worth noting however that DAF do not adopt a net cost model for managing the fisheries: this means that there is the potential that the costs remain with management and are not passed on to the fishers).</p> <p>Analysis: The use of a drone to collect vessel location information could easily provide independent data on boat location. However, the incomplete nature of the data set is likely to reduce the benefit of such an approach. Specifically, given the information would be incomplete (not all boats) and of a lower resolution (i.e., only provide the position of a boat while it is in the view of the drone rather than for the entire trip and for a specific individual boat) it is unlikely that this information could provide similar benefits under the monitoring and research stream that more consistent and higher resolution data could provide. Further, despite the real-time nature of the information, its lack of accuracy, completeness, and inability to identify specific boats would also offer limited compliance benefits. This is consistent with the reported challenges already experienced by the authorities that use such techniques for compliance purposes.</p>

A summary of analysis provided in the table above for each explored option is provided in Table 30.

Table 30 Summary of options considered against the existing vessel tracking regulation

Option	Consideration with reference to existing vessel tracking regulation				
	Quality of data (including data frequency, accuracy of location and coverage)	Independent nature of data	Real-time nature of data	Cost	Overall
Observers on boats	↓ / ↔	↔	↓	↑↑	↓
Smartphone applications	↓ / ↔	↔	↓	↓ / ↔	↓
Logbook information*	↓ / ↔	↓	↓	↑↑	↓
Other Technologies — Drones	↓↓	↔	↔	↑	↓

Notes:

↑ more than existing vessel tracking regulation

↓ less than existing vessel tracking regulation

↔ on par with existing vessel tracking regulation

* manual recording of boat coordinates every 5 or 15 minutes

With respect to the identification of other alternative options, this has been a discussion point at the vessel tracking working group meetings from July to December 2021 (6 monthly meetings). Similar to the analysis conducted above, these discussions have not identified a 'silver bullet' that could provide similar benefits to that provided by vessel tracking but at reduced costs to stakeholders.

If the vessel tracking regulation was to be repealed, it is unlikely that there is an alternative solution that could be transitioned to and which provides similar benefits at reduced costs.

8.3 Option C – Can the legislation be improved?

Through consultation, a number of options for changing the regulation were identified that have the potential to address impacts observed since the regulation was introduced and improve the regulation. Alongside this, other considerations and options for improving the regulation are discussed in the sections below.

8.3.1 Should the regulation be expanded?

Currently, the regulation includes a list of commercial fishery symbols (representing specific fisheries) that are required to implement vessel tracking. As mentioned throughout this Decision PI-IAS, some of these fisheries were already required to operate vessel tracking prior to the introduction of this regulation.

The commercial fisheries that are currently not required to implement vessel tracking are considered to be low risk fisheries for several reasons. For example, some of these fisheries are shore fisheries that do not run boats for fishing purposes. Therefore, a recommendation to expand the regulation to additional commercial fisheries would add an increased cost burden to all stakeholders with little or no benefit realised.

Feedback from stakeholders to date did not identify any material gaps in the regulation such that changing the scope of the regulation should be considered with merit.

Feedback was received from industry members in the vessel tracking working group, as well as several commercial fishers, suggesting that vessel tracking should be applied to the charter and recreational fishing sectors. However, this is out of scope of this PI-IAS. The outcome of this PI-IAS may inform future decisions regarding the implementation of vessel tracking in the charter fishery, but any such decision will be subject to an appropriate assessment and decision from the Queensland Government.

8.3.2 Should the regulation be amended?

This section discusses options for addressing some of the unintended impacts of the regulation, specifically regarding costs, unit reliability and malfunctions, and data security.

In response to concerns about costs and unit malfunctions, the vessel tracking working group has suggested that DAF consider key information and learnings from other jurisdictions that have implemented similar programs to help inform their approach. This information is described in the subsection below.

8.3.2.1 Vessel tracking in other national jurisdictions

As part of the consultation process, authorities across other domestic jurisdictions at the Commonwealth and state/territory level were interviewed to understand their approaches to vessel tracking. Specifically, representatives answered questions on the following topics:

- User requirements (i.e. who must use the vessel tracking)
- Approach to payment (i.e. who pays for the units, installation, and polling costs)
- Arrangements with polling providers
- Equipment failure

While the adoption and implementation of vessel tracking across Australia's individual fisheries is varied with respect to the breadth of its application, vessel tracking unit and subsequent data collection is present in all jurisdictions except for NSW.

The key summary points can be found in Table 31. Summary of vessel tracking policies within different jurisdictions in Australia and details are provided below.

In summary, this analysis highlighted that:

- Each state and territory in Australia has vessel tracking with the exception of NSW.
- Requirements for vessel tracking vary across states and territories. Participants indicated that vessel tracking has generally been successful in terms of its monitoring and compliance objective. In cases where a risk-based approach has been applied to determine requirements, participants indicated that there was a broad intent toward increasing the cohort requirement for vessel tracking.
- All participating states/territories aligned with AFMA's accredited list in terms of approved devices and most reported that malfunctions are rare.

AFMA – The Australian Fisheries Management Authority (AFMA) is the national authority responsible for the vessel tracking rollout within the Commonwealth fisheries. Currently, vessel tracking is required on all vessels with a Commonwealth fishing licence and is in line with the international standards from the Pacific Islands Forum Fishing Agency. AFMA holds the commercial contract between most state and territory jurisdictions with regard to management and monitoring of vessels, the airtime or polling fees, and sets out the approved units for use in the Commonwealth fisheries and participating jurisdictions. AFMA and most of the participating jurisdictions are part of the airtime arrangement established under the national vessel tracking program. Under this airtime arrangement, the jurisdictions will cover the airtime costs for fishers, however this is then recouped in the form of levies. This national airtime arrangement helps ensure economies of scale, and a reduced total cost to fishers and fisheries. As a result, all AFMA approved units are unable to be moved from vessel to vessel and must always be switched on.

Although Queensland is part of the national vessel tracking program, it did not participate in the airtime arrangement component of the program. This was due to several limitations, including the inability to move units from vessels to vessels, restricted options for units that suit the varying vessel sizes and types of operations in Queensland, and challenges in recovering costs fairly through licence fees, given the differences in fishing operations and number of vessels used by fishers.

The following vessel tracking units are AFMA approved: Skywave IDP, CLS Triton Advanced, and Iridium Edge Solar. The costs of these units are approximately \$1200 to \$2500 and must be paid by each individual fisher.

AFMA has found that malfunctions are rare with these approved units. If malfunctions occur whilst at sea, there are provisions that allow the fisher to manually report until they return. Once back on land, fishers in general must rectify the malfunction via service technicians before going out to sea. It is noted that contacting these AFMA approved unit suppliers and arranging for service technicians is generally quite easy with issues fixed within a week.

Western Australia – In Western Australia (WA), the Department of Primary Industries and Regional Development manages the state vessel tracking policy. Requirements for fisheries to adopt vessel tracking are determined on a risk-basis, given the size of the coastline. The following fisheries are required to have units: northern trawl, prawn, south coast, shark, gill net and line, and mackerel, equating to approximately 50% of the total state fishery. In terms of polling, WA falls under the national vessel tracking program which is managed by AFMA. Specifically, AFMA maintains contractual arrangements with polling providers and then provides a polling service to other states and territories.

Approved devices – In terms of devices, WA has approved devices which are based on AFMA requirements; notably the CLS Triton Advanced is the only approved unit.

- The units are allocated to a vessel under licence arrangements and cannot be transferred to another boat
- The devices must be operational at all times.

Polling fees are covered by the department and incorporated into levies.

Unit purchase and installation costs were approximately \$2200 per unit with the cost borne by the individual fisher.

Arrangements in the event of malfunction – The department indicated that instances of unit malfunction were not common, since the CSL device was broadly considered to be very reliable. When malfunction occurs, there is scope for fishers to contact authorities and for case-by-case arrangements to be made to facilitate an interim resolution.

Tasmania – The Department of Primary Industries, Parks, Water, and Environment manages vessel tracking policy for Tasmania. Vessel tracking units are required for most fisheries, dependent on proximity, complex spatial arrangements and fisheries with their own regulations, in particular the rock lobster, giant crab, scallop and abalone mother-boat fisheries require vessel tracking units. Approximately 30% of the entire fleet has vessel tracking units installed. Previously, vessel tracking was only required on the giant crab, abalone, and scallop fisheries.¹⁰⁰

Approved devices – Tasmania's approved units are aligned with the national AFMA's approved list and are unable to be turned off and moved between vessels. The start-up (the unit itself and installation) and running costs (polling costs), have been covered by the department via a federal grant that is expected to finalise by June 2024.

Arrangements in the event of malfunction – Instances of unit malfunction were rare in Tasmania. When the event occurs, fishers are able to contact the department in real-time to resolve the issue and they are unable to go back out to sea without rectifying the issue.

Northern Territory (NT) – The Department of Primary Industries and Resources is the authority responsible for the territory's vessel tracking policy. NT takes a risk-based approach on whether a commercial fisher will need to install vessel tracking units onto their vessels. This is dependent on the

¹⁰⁰ Department of Natural Resources and Environment Tasmania, *Vessel monitoring systems*, <<https://nre.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/commercial-fishing-licences-and-seasons/compliance-and-vessel-tracking>>

location of the specific fishery, and if those are targeting coral areas or specific exporting goods. Approximately 90% of all vessels within NT have vessel tracking units installed, split between legislative and licensing requirements. NT has a fleet of around 100 vessels.

Approved devices – NT has approved three AFMA accredited units for vessel tracking and in most cases, units cannot be switched between vessels. The costs of these units are covered by the fisher with polling costs recouped via levies.

Arrangements in the event of malfunction – NT indicates that instances of malfunction are not common, and instances are managed on a case-by-case basis when malfunctions occur at sea. Once back at land, vessel tracking units must be operational at all times and fishers are not allowed to return to sea if the device is not functioning.

Victoria – The Victorian Fisheries Authority (VFA) is the state body that is responsible for the state's vessel tracking policy. Currently a significant majority of the commercial fisheries in Victoria have vessel tracking requirements.

Approved devices – Victoria currently has approved the Orbcomm 6100 devices by Device9 Pty Ltd for all fisheries, with a few exceptions. AFMA approved units on previously grandfathered vessels, the Succorfish units for the abalone fishery, and the Rockstar handheld unit by Pivotel for the pipi fishery are also approved for use by VFA.

For the first unit bought by each fisher, the state government has covered the cost of the unit and installation. If another unit is required for another vessel, the cost has been covered by the fisher. These units cost approximately \$700 to \$1,000. VFA is also part of the national vessel tracking program. VFA does not require recoupment of airtime (polling) fees by fishers at this time.

Arrangements in the event of malfunction – In case of breakdowns, arrangements are in place to enable fishers to contact authorities to discuss interim arrangements. Once returned, the fisher must engage with a service technician to rectify the issue before going out to sea again. Examples of malfunctions are not common (with the exception of the Succorfish device).

South Australia (SA) – The Department of Primary Industries and Regions is the authority that manages the South Australian vessel tracking policy. Three fisheries are monitored by vessel tracking: the southern zone abalone, northern zone rock lobster and sardines. Of the three, the abalone industry self-nominated the implementation of vessel tracking due to the spatial arrangements and volume within specific fishing areas. Both the rock lobster and sardine fisheries were mandated due to the very specific operational area and for quota integrity. SA has a fleet of around 600 vessels and around 70 are managed under their vessel tracking program.

Approved devices – Approved devices are based on the AFMA approved list. Fishers must pay for the unit and installation, with polling costs recouped by licensing fees. SA is part of the national vessel tracking program. In terms of polling, SA contracts with AFMA under the national polling arrangements and polling costs are recouped via fisher licence costs.

As the majority of the SA fleet are small boats of approximately 4-6m long, there is no requirement for vessel tracking due to the lack of suitable devices for smaller vessels.

Summary

This analysis points to emerging themes regarding operation and management of vessel tracking across Australian jurisdictions:

- There is a trend toward a user-pays system for vessel tracking; in most cases, the costs to the government are recouped through fishery licences.
- Other states and territories contract AFMA to manage vessel tracking arrangements and operations including contractual arrangements with polling providers. There is anecdotal evidence this delivers cost efficiency savings. However, information gathered indicates that their airtime cost under this arrangement is comparable to what Queensland commercial fishers are currently paying. The cost efficiency of bulk buying in comparison to alternative purchasing options may not be as significant in this context.
- In other jurisdictions, units are generally allocated to the fishing licence and cannot easily be transferred between vessels.
- Other jurisdictions have arrangements in the case of unit malfunction, although cases of malfunction have been relatively rare with some exceptions (the majority of jurisdictions require higher quality units (i.e. CLS). In a number of cases, fishers are not able to go to sea with a faulty device.
- Some jurisdictions require the vessel tracking unit to be polling at all times.

Table 31 Summary of vessel tracking programs within different jurisdictions in Australia

Jurisdiction	Authority	Requirements	Approved devices	Device cost including installation	Polling cost, and polling cost recouped	Malfunction arrangements to go to sea with device not operational
Federal	Australian Fisheries Management Authority (AFMA)	All commercial licensed vessels are required to have vessel tracking	AFMA approved units: Skywave IDP CLS Triton Advanced Iridium Edge Solar	Unit cost and installation borne by fisher. Units range from approx. \$1,200 to \$2,500	Polling costs are paid for by the department and recouped from fisheries via levies	Faulty units are rare, fast troubleshooting process. If currently at sea, manual reporting is allowed. Unable to fish again if the vessel tracking unit is non-functional.
WA	Department of Primary Industries and Regional Development	Risk based approach: based on distance from populous— required on most commercial fisheries.	WA uses AFMA approved units: CLS Triton Advanced	Unit cost and installation borne by fisher. Unit is approx. \$2,200	Part of the airtime arrangement under the national vessel tracking program led by AFMA: Polling costs are paid for by the department and recouped from fisheries via levies	Faulty units are rare, fast troubleshooting process. Approved breakdown methods if units are non-functional. Unable to go back to sea without fixing.
Tas	Department of Primary Industries, Parks, Water and Environment	In the process of rolling out vessel tracking to all commercial fisheries.	No official approved list: CLS Triton Advanced Skywave IDP	Unit cost and installation covered by the Tas Dept via grant— subject to change. Units range from approx. \$1,200 to \$2,500	Polling cost covered by the department via grant— subject to change June 2024.	Faulty units are rare, fast troubleshooting process. There is a person on-call at all times. Unable to fish if the vessel tracking unit is non-functional.
NT	Department of Primary Industries and Resources	Risk-based approach: proximity to exported coral, approx. 90% of all vessels are on vessel tracking	NT uses the AFMA approved units: Skywave IDP CLS Triton Advanced Iridium Edge Solar	Unit cost and installation borne by fisher. Units range from approx. \$1,200 to \$2,500	Part of the airtime arrangement under the national vessel tracking program led by AFMA: Polling costs are paid for by the department and recouped from fisheries via levies	Faulty units are rare, fast troubleshooting process. Unable to fish if the vessel tracking unit is non-functional. Case-by-case manual polling is allowed.
Vic	Victorian Fisheries Authority	Large majority of commercial fisheries have vessel tracking, in the process of rolling out to all.	Orbcomm 6100 primarily, but also allows for AFMA approved units. Abalone fishery is currently using grandfathered Succorfish.	Initial unit cost and installation is covered by the Vic Dept. The Orbcomm unit is approx. \$850	Part of the airtime arrangement under the national vessel tracking program led by AFMA: Polling costs are currently paid for by the department and not recouped, this is subject to change in the near future.	Faulty units are rare, fast troubleshooting process. There is a 24-hour duty officer on call to get authorisation to fish, hourly manual reporting allowed.
SA	Department of Primary Industries and Regions	Risk-based approach: based on spatial arrangements and quotas approx. 10% of vessels use vessel tracking.	SA uses the AFMA approved units: Skywave IDP CLS Triton Advanced Iridium Edge Solar	Unit cost and installation borne by fisher. Units range from approx. \$1,200 to \$2,500	Part of the airtime arrangement under the national vessel tracking program led by AFMA: Polling costs are paid for by the department and recouped from fisheries via licensing fees	Faulty units are rare, fast troubleshooting process. Approved breakdown methods if units are non-functional. Unable to go back to sea without fixing.
NSW	Department of Primary Industries	N/A	N/A	N/A	N/A	N/A

8.3.2.2 Malfunction exemption process to address opportunity costs

The following are the current legislative requirements when a vessel tracking unit malfunctions.

- Commercial fishers must ensure that their vessel tracking units are operational before commencing a trip.
- If a vessel tracking unit on the primary boat malfunctions during a trip, the fisher in control of the operation must manually report the position of the primary boat:
 - every hour if the boat is being used in the east coast trawl fishery
 - every 4 hours for all other fisheries.
- The fisher must ensure the boat travels to a landing place within 5 days, or longer if permitted by the chief executive, from the day the malfunction is identified.
- For trawl operators in the M1, T1 or T2 fisheries within the major scallop area, the fisher in control of the operation must ensure the boat travels to a landing place as soon as practicable.
- If the vessel tracking unit on a tender boat malfunctions during a trip, the tender boat must remain attached to the primary boat and must not be used to take any fish for the remainder of the trip.
- If a vessel tracking unit starts operating again on a primary or tender boat, and the person in control of the operation receives a confirmation that the unit is working properly, normal fishing operations may resume. If the unit is on a primary boat, the requirement to return to port no longer applies.
- Vessel tracking units may be moved between primary and tender boats, as well as between primary commercial fishing licences held by the same licence holder.

As previously stated, the fishing industry operates 24 hours, 365 days a year, meaning a fisher could be forced to 'stop fishing' at any time on any given day due to vessel tracking unit malfunctions. As outlined in Table 14, a malfunctioning unit results in an opportunity cost (due to fishers' lost income), calculated on an industry-wide basis as 7 lost days per year (\$2,250/day).

However as outlined in Table 27, vessel tracking nevertheless delivers a net benefit when all costs and benefits are considered, which reflects significant benefit associated with monitoring and compliance activities.

Keeping a backup and transferring over to this when a primary vessel tracking unit malfunctions is not as straightforward or cost effective as it might seem due to:

- The administration requirements of transferring one vessel tracking unit over to another which can only be done during standard working hours (8:30pm-5pm); and
- In some instances, additional costs may be incurred by fishers for keeping a backup registered with the airtime provider and 'ready to go'.

In order to address the identified opportunity costs of not being able to fish when vessel tracking is malfunctioning, a potential improvement would be to amend the regulation to legislate an exemption system that could, under certain circumstances, allow fishers to fish if the vessel tracking unit is malfunctioning.

Given the technology issues experienced to date, the concept of an exemption system has been identified as a potential solution that could enable fishers to fish while the technology issues are resolved. The merit of an exemption process is more beneficial when a high incidence of technology issues outside of the fishers' control continue to be present versus when these technology issues are largely resolved. However, it could also be seen to contribute to resolving the current misalignment between the operational hours of the fisheries (24/7) versus the operational support provided by vessel tracking providers and DAF (which is largely standard business hours).

Typically, the vessel tracking providers are required to assist fishers in the event of equipment malfunction or equipment needs to be transferred out and a new one initiated. Accordingly, there is little that can be done in order to change the service offering provided by the providers and thus achieve a 24/7 support approach in this respect. Given the reliance on the providers to bring fishers back online and reinstate functional vessel tracking unit, there is little benefit from proposing a 24/7 hotline offered by DAF.

Instead, a possible approach which could be adopted, and which could seek to 'get fishers back out on the water', is the introduction of a risk-based exemption process. Such a process would enable fishers to fish for the given period of time in the event of a malfunction, so long as a set of predefined criteria are met. It is recommended that an exemption process utilises an alternative method of reporting similar to the manual reporting requirements employed for boats where the equipment malfunctions while at sea (every hour for east coast trawl, and every 4 hours for all other fisheries). A more stringent and independent reporting process could be utilised with the Commercial Fishing Smart Phone Application¹⁰¹ which is capable of recording locations using the phone's GPS systems and storing this information for release once mobile phone reception is regained (or at regular intervals where reception is not interrupted).

While an exemption system would go some way to providing a means for fishers to fish when their vessel tracking systems are not working (thus overcoming one of the key costs identified in this Consultation PIR), this approach presents several critical risks:

1. **Requirements of such a system** – To align with the 24/7 nature of the industry and the high likelihood that fishers would require an exemption outside of traditional office hours (i.e. up at dawn to start the day, find out the vessel tracking is not working), an exemption system would need to acknowledge this. Without such an approach, the proposed improvement does not resolve the current misalignment with operating times and the missed fishing days due to the inability to resolve vessel tracking unit issues when they need to be resolved.
2. **Potential for higher incidence of non-compliant fishing activities** – By providing an opportunity to fish without vessel tracking, there is a legitimate concern that non-compliant acts of fishing could be introduced given the lack of transparency of fishing location and fishing effort. While this could potentially be managed by an exemption-based system which identifies those fisheries that would benefit from such an exemption, but which would not impose serious concern to the legitimacy of fishing operations carried out by the fishers, it is likely that such an approach could provide an uneven playing field for some across the broader industry.
3. **Incomplete and post event data** – the objective of the regulation was to provide real-time, independent data which, with certainty, provides essential insight into the actions of commercial fishers for the purposes of effectively managing the fisheries. An approach that provides a method of post event and/or unverified data to be provided in place of the current real-time, independent data that is delivered by the regulation potentially compromises the

¹⁰¹ The Queensland Commercial Fishing Smart Phone Application was released in December 2021. It currently applies to the net, line, crab, trawl and coral fisheries. More fisheries will be included in subsequent app releases.

integrity of the broader data set and has flow on impacts to compliance activities. Given there is no current legislated exemption system and there is a lack of quantifiable data to understand and appreciate the broader impact of lost fishing days, it is difficult to quantify this impact and whether it would be significant enough to impact data integrity or compliance activity could be compromised.

Through consultation at the working group meetings, in December 2021, DAF released an interim exemption process (provided at Appendix C) to allow fishers to fish when experiencing technology malfunctions. The exemption system aims to provide leniency to fishers while the technology issues are resolved, balancing their needs and those of other stakeholders. Separately, in response to recent global raw material shortage affecting some units, DAF has also used this process to allow fishers to operate. As of April 2023, the temporary exemption has been granted to 27 fishers who requested it due to equipment malfunctions or unit unavailability.

The feedback received from stakeholders during the public consultation has demonstrated a positive response towards the interim exemption process.

During the public consultation, alternative suggestions were also proposed to address the challenges associated with unit malfunctions and the resulting opportunity costs under the existing legislation. One suggestion put forth was to establish a library of spare units across different locations in Queensland for commercial fishers to use in case of unit malfunctions. However, this approach may not effectively resolve the issue due to its dependence on airtime providers, as not all providers offer round-the-clock service. Moreover, this approach raises additional operational concerns, including liability issues and alignment with DAF's role and objectives.

Taking into account stakeholder feedback and the challenges associated with unit malfunctions, it is a recommendation of the Decision PI-IAS that an ongoing exemption process be established to allow fishers to fish in the event of a malfunctioning unit or other circumstances (e.g. units are unavailable). This can be achieved via an administrative procedure implemented through a head of power in the fisheries legislation.

8.3.2.3 Alternative approaches to the vessel tracking unit and provider arrangement

A large proportion of the problems that have been experienced since the introduction of vessel tracking have been the result of technology issues with the approved vessel tracking units.

Vessel tracking costs and provider arrangements relating to units and polling requirements has also been consistently identified by industry members in the vessel tracking working group as a priority issue and discussed at various working group meetings. This section explores the alternative vessel tracking unit and provider arrangements to address these concerns. Analysis of these options are outlined in Table 32 below.

Table 32 Analysis of various vessel tracking unit and provider arrangements

Options	Pros	Cons	Estimated annual cost
<p>1. Current vessel tracking unit and provider arrangement (status quo arrangement)</p> <ul style="list-style-type: none"> ● DAF to determine list of approved vessel tracking units and associated airtime provider ● Fishers to choose a vessel tracking unit and provider from the approved list and establish a contract with the airtime provider ● Fishers pay for their own polling. ● DAF to conduct ongoing review of the current approved list and update the list accordingly ● Any potential vessel tracking providers can approach DAF to have a vessel tracking unit and airtime service assessed 	<ul style="list-style-type: none"> ● Fishers to select a unit suitable for their operation from a selected range in the approved list ● Flexibility for fishers to control data usage and save cost (e.g. standby option if not fishing for an extended period) ● Potential for list of approved units and providers to be expanded ● New units can be assessed anytime 	<ul style="list-style-type: none"> ● Approved list of units and providers may be too restrictive ● If a unit is phased out (e.g. due to outdated technology), fishers will need to purchase another unit 	<p>Cost to industry:</p> <ul style="list-style-type: none"> ● \$2223 per commercial fishing boat <p>Cost to state government:</p> <ul style="list-style-type: none"> ● \$1 344 725
<p>2. Standards-based approach</p> <ul style="list-style-type: none"> ● DAF to provide a set of minimum requirements for vessel tracking units and provider that would include – polling frequency of 5 or 15 minutes depending on fisheries and ability for polling 	<ul style="list-style-type: none"> ● Provides fisher with greater choice of units and providers suitable to their individual business ● Flexibility for fishers to control data usage and save cost (e.g. standby option if not fishing for 	<ul style="list-style-type: none"> ● Fisher has to research unit and provider packages to identify which one is most suitable for their circumstances 	<p>Cost to industry:</p> <ul style="list-style-type: none"> ● Varies depending on the choice of units selected by fishers. Dependent on market price ● Estimated to be similar to status quo arrangement if fishers keep

Options	Pros	Cons	Estimated annual cost
<p>data to be integrated to DAF platform (Trackwell)</p> <ul style="list-style-type: none"> • Fishers can purchase any units available on the market. Under this option DAF would not maintain a list of approved units and airtime providers 	<p>an extended period)</p> <ul style="list-style-type: none"> • No need for Fisheries Queensland to maintain/update approved units list 		<p>using existing units (i.e. \$2223 per commercial fishing boat)</p> <p>Cost to state government:</p> <ul style="list-style-type: none"> • Estimated to be similar to status quo arrangement as DAF will continue maintaining current system (i.e. \$1 344 725)
<p>3. Airtime contract between DAF and an airtime provider and cost recovery via licence fees</p> <ul style="list-style-type: none"> • DAF to establish a contract with an airtime provider via a tender process • DAF to determine a list of approved units that can be hosted by the airtime provider • The cost of establishing and administering the contract will be recouped from fishers • DAF will pay for airtime and recover cost from fishers via licence fees • Will require a legislative and fee review process 	<ul style="list-style-type: none"> • Fishers do not need an airtime provider contract • Less administratively burdensome for fishers • Fishers to select a unit suitable for their operation from a selected range in the approved list • Potential to monitor/manage pricing 	<ul style="list-style-type: none"> • Complexity in administering cost recovery due to variations between fishing operations (e.g. number of boats used, periods of active fishing) • Compared to the status quo, there will be limited choice of units that the airtime provider supplies. As a result, many fishers may be required to change units. The new units may be more expensive. • If a unit is phased out (e.g. due to outdated technology), fishers will need to purchase another unit 	<p>Cost to industry:</p> <ul style="list-style-type: none"> • If fully cost recovered via licence fees, cost is estimated to be higher than status quo arrangement after taking into consideration recovering cost of establishing and administering the contract between DAF and provider (i.e. more than \$2223 per commercial fishing boat) • It may be unequitable for fishers due to variations between fishing operations (some pay more; some pay less) <p>Cost to state government:</p> <ul style="list-style-type: none"> • Estimated to be similar to status quo arrangement as DAF will continue maintaining current system (i.e. \$1 344 725)

Options	Pros	Cons	Estimated annual cost
<p>4. Service level agreement between DAF and providers</p> <ul style="list-style-type: none"> • DAF to determine list of approved units and associated airtime providers through a tender process • DAF to establish a service level agreement with providers to ensure an appropriate level of service is provided to program participants and that the fees for services are approved by DAF • Fishers to choose a unit and provider from the approved list and establish a contract with the airtime provider • Fishers pay for their own polling directly with providers • May require legislative amendment 	<ul style="list-style-type: none"> • Fishers to select a unit suitable for their operation from a selected range in the approved list • Flexibility for fishers to control data usage and save cost (e.g. standby option if not fishing for an extended period) • Potential for list of approved units and providers to be expanded • New units can be assessed anytime • Service level agreement between DAF and providers can assist to ensure appropriate level of service is given by providers to fishers and that fees for services are approved by DAF 	<ul style="list-style-type: none"> • Approved list of units and providers may be too restrictive • If a unit is phased out (e.g. due to outdated technology), fishers will need to purchase another unit 	<p>Cost to industry:</p> <ul style="list-style-type: none"> • Estimated to be similar to status quo arrangement if fishers keep using existing units (i.e. \$2223) per commercial fishing boat) <p>Cost to state government:</p> <ul style="list-style-type: none"> • Estimated to be higher than status quo arrangement taking into consideration additional administrative costs to establish and maintain service level agreement with providers (i.e. more than \$1 344 725)

In the status quo arrangement, DAF determines a list of approved vessel tracking units and airtime providers based on an assessment of units against a list of criteria and a trial. The approved list is listed in the Vessel Tracking Installation and Maintenance Standard. Fishers will need to purchase a unit from the approved list and establish an airtime contract with the provider. Fishers will pay for their own polling directly to the providers. DAF conducts ongoing review of the approved units and providers. Potential vessel tracking providers can also approach DAF anytime to request to assess their units to add to the approved list. In this approach, fishers have reported dissatisfaction with the approved units (performance, reliability, cost concerns) as described in Section 6.2.1 and 6.4 above.

To overcome the inherent issues with an approved equipment approach, an alternate approach to ensure fishers have compliant vessel tracking units is to introduce a standards-based approach (option 2 in Table 32). Instead of DAF approving specific equipment, the basic requirements or specific standards that must be met by vessel tracking units could be used to guide industry. Examples of basic requirements or specific standards for the equipment include the ability to poll every 5 or 15 minutes, accuracy of GPS positions and the ability to integrate the polling data with DAF's system. In this approach, a fisher has the flexibility to choose a vessel tracking unit that suits their operation as long as it meets these basic requirements or standards. While a standards-based approach to enabling fishers to adopt suitable vessel tracking units seems appropriate, feedback from the vessel tracking working group industry members has vehemently opposed such an approach on the basis that this only transfers the problem to the fishers and delegates a decision to someone who is an 'expert in fishing, not an expert in technology'.

Option 3 in Table 32 involves DAF establishing a contract with an airtime provider via a tender process and cost recovery from industry via licence fees. In this approach, DAF will determine a list of vessel tracking units compatible with the airtime provider selected. Fishers will need to purchase one of these units suitable for their operation but will not be paying polling costs directly to the airtime provider. DAF will pay for the airtime and recover cost from fishers via licence fees. This removes some administrative burden from fishers. On the other hand, the unit selection may be restricted to those that are compatible with the airtime provider only, limiting choices to fishers. This option may be difficult to implement because of the complexity in administering cost recovery due to variations among fishing operations. Some fishers operate more boats than the others; some are more active in fishing than the others. It is challenging to achieve a level of equity in establishing the appropriate amount of fee increase. Feedback from the consultation process indicates that this option as being cost shifting and not of benefit to fishers.

Option 4 in Table 32 involves DAF determining a list of approved vessel tracking units and airtime providers via a tender process and establishing a service level agreement with the providers. This will assist to ensure appropriate levels of service are provided to fishers and that the fees for provided services are as approved by DAF. Fishers will need to purchase a unit from the approved list and establish an airtime contract with the provider. Fishers will pay for their own polling directly to the providers. This approach is similar to the status quo arrangement, with the addition of a service level agreement between DAF and the providers. This would be a new role that DAF is not currently involved in.

Feedback from consultation with the vessel tracking working group members has not indicated any preference to any of these options. Costs and reliability of vessel tracking units could be summarised as the two key criteria from a business perspective. It was also suggested that any new units should be rigorously tested before being approved.

The problem is not in itself the approach to how vessel tracking units that meet the requirements are identified but rather a lack of suitable and inexpensive options available which cater to a broader cross section of fisheries. Therefore, the alternative options described above may go some way to

solving the problem of vessel tracking technology issues, however, are unlikely to solve the overarching problem.

It is a recommendation of this document that continuous market scanning is undertaken to identify new vessel tracking units that are found to meet the requirements of Queensland fisheries, particularly as technology evolves overtime. Commercial fishers and vessel tracking providers can also approach DAF to request an evaluation of new vessel tracking units for use in Queensland fisheries.¹⁰² Overall, other Australian jurisdictions experience less examples of unit malfunction however they are using predominantly higher value units (i.e., CLS). Under the current arrangements, Queensland fishers have greater flexibility in choosing a unit from an approved list and units can also be transferred between boats, which does not occur in other jurisdictions.

It is noted, there is value in exploring opportunities where cost savings may be achieved by a single entity (i.e. the state) managing purchase of vessel tracking units and polling as opposed to the current arrangement where purchase and polling is managed at the enterprise level (i.e. between individual commercial fishers and the polling providers). Evidence obtained from other jurisdictions indicates that there may be savings to be obtained under such arrangements. However any option in Queensland would need to consider factors that are specific to the state fishery, for example, securing an arrangement that was suitable for a variety of commercial fisher business sizes (noting the comparatively high number of micro and small businesses in the Queensland fishery), meeting flexibility requirements for fishers (i.e. the ability to transfer units between vessels), enabling costs to be recouped by government as applicable (i.e. via levies as is the case in other domestic jurisdictions), and noting alignment with any future requirements for mandatory vessel tracking by Parks Australia. This issue can be considered as applicable alongside the continuous market scanning activities noted above.

While this is a recommended improvement to the current regulation, it does not require changes to the regulation in order to enact the recommendation given the vehicle for delivery is the Vessel Tracking Installation and Maintenance Standard rather than the regulation.

8.3.2.4 Alternative cost approaches

Vessel tracking cost was a major concern highlighted by many commercial fishers. Some stakeholders suggested that the government should establish an airtime contract with the providers or pay for the cost themselves. This sentiment is consistent with feedback received during phase 1 targeted consultation with the vessel tracking working group. The targeted consultation revealed that newly impacted fisheries would like the same arrangement offered to earlier adopters of vessel tracking prior to 2019, for which DAF was paying the polling costs.

Under the prior regulation where vessel tracking was only required for boats in a small subset of fisheries (as outlined in Section 3.3), DAF paid for the polling costs. When first introduced, this arrangement was recommended to only be provided for a short-term period (approximately 2 years) to aid the transition for impacted fisheries. Regardless of the original intent, the transition of polling costs from DAF to the fishers was never successfully completed as per the original intent. When the old regulation was repealed and incorporated into the current vessel tracking regulation, this process effectively transitioned the polling costs to the fishers and executed on the original intent.

Although precedent may be influential, it is not recommended in this situation as the original intention of the earlier vessel tracking implementation was to transfer the cost of polling to the fishers following a short transition phase. It is worth noting that the government is currently bearing the ongoing

¹⁰² DAF questionnaire for initial assessment of new vessel tracking units
<<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/473e3a62-6bb2-4733-8936-47154b30757f>>

administrative costs associated with the vessel tracking program. While some stakeholders have suggested that the government should also cover the costs of vessel tracking equipment and airtime to alleviate the burden on fishers, it is important to recognise that fisheries are a public resource, and those who commercially benefit from them should bear the costs of managing them as well. If DAF were to pay the polling costs on behalf of the industry, it would likely need to pass on the cost to fishers through another mechanism such as license fees or levies, which is unnecessary and inefficient.

Additionally, as noted in Section 6.2.1.2 above, given the profitability concerns within the industry, a vessel tracking subsidy may have limited or no long-term impact on survivability rates.

Therefore, no recommendation is provided to change the current cost structure associated with costs incurred by fishers to meet their obligations under the vessel tracking regulation.

8.3.2.5 Reduced polling frequency to address industry operating costs

The following are the current legislative vessel tracking polling requirements:

- 5 minutes for net, line, crab and trawl (T5, T6, T7, T8 and T9) fisheries
- 15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest fisheries

Fishers have enquired whether the 5-minute polling frequency can be decreased to reduce ongoing polling cost. The cost and benefit analysis of this option is described below. For this analysis, the hypothetical alternative polling requirement of 15 minutes for all fisheries is explored using the current pricing structure available from vessel tracking providers in Table 33 below.

Table 33 Monthly polling costs of vessel tracking units

Unit	Airtime provider	5-minute polling	15-min polling
Spot Trace	Pivotel	\$33	Not available
Rockfleet	Pivotel	\$55	\$55
Rockfleet	Pole Star	\$60.50 (increased to \$71.50 in Apr 2023)	\$60.50 (increased to \$71.50 in Apr 2023)
IDP690/ST6100/IDP800	Pole Star	\$53.90 (increasing to \$73.70 in 2023)	\$46.20 (increasing to \$66 in 2023)
CLS Triton	CLS Oceania	\$99	\$99

The Spot Trace units are currently used for 5-minute polling and no pricing information is available for 15-minute polling. There is no difference in cost for 5-minute or 15-minute polling for the Rockfleet and CLS Triton units. Specific to the IDP690/ST6100/IDP800 units, the cost difference between 5-minute and 15-minute polling is \$7.70/month (10% saving).

Under the current legislative polling requirement, as described earlier in Section 6.2.1 and Table 14, the annual overall cost of vessel tracking (unit and polling costs) on a commercial fishing boat is estimated to be \$2223. Specific to polling, the average annual polling cost to industry is estimated to be \$974 341.

Under the hypothetical polling requirement of 15 minutes for all fisheries, the annual overall cost of vessel tracking (unit and polling costs) on a commercial fishing boat is estimated to be \$2196. Specific to polling, the average annual polling cost to industry is estimated to be \$936 457. The calculation is shown in Table 34 below.

Table 34 Calculation of estimated costs to industry for 15-minute polling for all fisheries

Unit type	Item	Annual cost/unit (\$)	Estimated annual cost by unit type (\$)										Net present value in 2019 (\$)	
			FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28		
Spot Trace	Initial unit cost (\$169)	169	51038	0	0	0	0	0	0	0	0	0	0	51038
	Replacement unit cost (\$300)	300	0	0	90600	0	90600	0	90600	0	90600	0	90600	261352
	Annual polling fee (\$33.30/month)	399.6	120679	120679	120679	120679	120679	120679	120679	120679	120679	120679	120679	906931
	Opportunity cost (assume 7 loss days/year; \$2250/day)	15750	285390	285390	285390	285390	285390	285390	285390	285390	285390	285390	285390	2144772
Rockfleet	Initial unit cost (Option Audio \$507)	507	310284	0	0	0	0	0	0	0	0	0	0	310284
	Initial one-off fee (Option Audio activation \$20)	20	12240	0	0	0	0	0	0	0	0	0	0	12240
	Installation cost	300	91800	0	0	0	0	0	0	0	0	0	0	91800
	Replacement unit (Pivotel \$1249-- new price end 2023)	1249	0	0	0	0	0	696942	0	0	0	0	0	496910
	Replacement unit (Pole Star \$1476.20-- Apr 2023 onwards)	1476.2	0	0	0	0	0	79715	0	0	0	0	0	56836
	Replacement unit installation cost	300	0	0	0	0	0	91800	0	0	0	0	0	65452
	Annual polling fee (Option Audio \$44/month)	528	323136	0	0	0	0	0	0	0	0	0	0	323136
	Annual polling fee (Pivotel \$55/month)	660	0	368280	368280	368280	368280	368280	368280	368280	368280	368280	368280	2399430
	Annual polling fee (Pole Star \$60.50/month-- until Mar 2023)	726	0	39204	39204	39204	9801	0	0	0	0	0	0	110361
	Annual polling fee (Pole Star \$71.50/month-- Apr 2023 onwards)	858	0	0	0	0	34749	46332	46332	46332	46332	46332	46332	171437
Opportunity cost (assume 7 loss days/year; \$2250/day)	15750	1542240	1542240	1542240	1542240	1542240	1542240	1542240	1542240	1542240	1542240	1542240	11590292	
IDP690/ST6100/IDP800	Initial unit cost	825	338250	0	0	0	0	0	0	0	0	0	0	338250
	One-off fees (activation \$36.30 + freight \$55)	91.3	37433	0	0	0	0	0	0	0	0	0	0	37433
	Installation cost	300	61500	0	0	0	0	0	0	0	0	0	0	61500
	Replacement unit cost (\$1094.50-- Apr 2023 onwards)	1094.5	0	0	0	0	0	448745	0	0	0	0	0	319949
	Replacement unit one-off fees (activation \$44 + freight \$55)	99	0	0	0	0	0	40590	0	0	0	0	0	28940
	Replacement unit installation cost	300	0	0	0	0	0	61500	0	0	0	0	0	43849
	Annual polling fee (\$53.90/month-- until Mar 2023)	646.8	265188	265188	265188	265188	66297	0	0	0	0	0	0	1011703
	Annual polling fee (15 min \$46.20/month-- until Mar 2023)	554.4	227304	227304	227304	227304	56826	0	0	0	0	0	0	867174
Annual polling fee (15 min \$66/month-- Apr 2023 onwards)	792	0	0	0	0	243540	324720	324720	324720	324720	324720	324720	1201526	
Inmarsat C	Unit cost (units already on boats pre 2019)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Replacement unit cost (assume IDP/ST)	1094.5	0	0	0	0	0	94127	0	0	0	0	0	67111
	Replacement unit one-off fees (activation \$44 + freight \$55)	99	0	0	0	0	0	8514	0	0	0	0	0	6070
	Replacement unit installation cost	300	0	0	0	0	0	12900	0	0	0	0	0	9198
	Annual polling fee (Sat C \$180/month)	2160	185760	185760	185760	185760	185760	0	0	0	0	0	0	814968
	Annual polling fee (IDP/ST - \$73.70/month-- Apr 2023 onwards)	884.4	0	0	0	0	0	68112	68112	68112	68112	68112	68112	213056
CLS Triton	Unit and replacement unit cost	2420	4840	0	0	0	0	4840	0	0	0	0	0	8291
	One-off fees (activation \$33 + freight \$132)	165	330	0	0	0	0	330	0	0	0	0	0	565
	Installation cost	300	600	0	0	0	0	600	0	0	0	0	0	1028
	Annual polling fee (\$99/month)	1188	2376	2376	2376	2376	2376	2376	2376	2376	2376	2376	2376	17856
Estimated annual cost to industry			3724350	2900383	2990983	2900383	3069391	4427882	2977879	2887279	2977879	2887279	23999627	
Actual vessel tracking rebate claimed as at 30/6/2022			730214										730214	
Estimated annual cost to industry less rebate			2994136	2900383	2990983	2900383	3069391	4427882	2977879	2887279	2977879	2887279	23269413	
Estimated average annual cost			3101348											
Estimated average annual cost/unit			2196											

Note: 15-min polling costs were used to calculate the hypothetical costs as if all units were only required to poll every 15 minutes since year 1. All other assumptions made in the calculation above are similar to those provided in Table 14. The discount rate in net present value calculation is 7 per cent annually (central case), based on Queensland Government's Cost Benefit Analysis Guide Release 3.

*Note that raw data is drawn from values that reflect the total over a calendar year (Jan – Dec) period. The value as a reflection of the financial year period is therefore an estimate over that specific timeframe (Jul – June).

The 10-year NPV of various aggregated costs (polling costs, capital costs and opportunity costs) are outlined below:

- polling costs: \$8,037,578
- capital costs (initial outlay and replacement cost): \$2,268,096.
- opportunity costs: \$13,735,064

The opportunity cost of 'not fishing' due to malfunction is the highest reflected NPV cost in this analysis, which is also reflected in fishers' voiced concerns that were outlined during the stakeholder consultations.

Table 35 below shows the cost-benefit/impact comparison between the current legislative polling requirements and the hypothetical requirement of 15-minute polling for all fisheries.

Table 35 Cost-benefit comparison between current polling requirements and 15-min requirement for all fisheries.

Polling frequency	Estimated annual polling costs	Estimated annual cost of vessel tracking per boat	Benefits / other impacts
<p>Current legislative requirements:</p> <p>5 minutes for net, line, crab and trawl (T5, T6, T7, T8 and T9) fisheries</p> <p>15 minutes for trawl (T1, T2, T4, M1 and M2) and harvest fisheries</p>	\$974 341	\$2223	<ul style="list-style-type: none"> • 5-minute polling provides the ability to identify and distinguish types of fishing activity (searching / traversing / active fishing), especially for high-speed vessels. • It enables effective validation of fishing effort and consequently, improves the evidence base available to inform management strategies with respect to harvest/access controls. • It also assists compliance to monitor vessel positions and movement, especially small vessels that can move on average between 20kn to 25kn (37km/h to 46km/h).
<p>Hypothetical polling requirement:</p> <p>15 minutes for all fisheries</p>	\$936 457 (saving of 3.9%)	\$2196 (saving of 1.2%)	<ul style="list-style-type: none"> • Changing the polling frequency from 5 minutes to 15 minutes may reduce the ability to distinguish different types of fishing activity (searching / traversing / active fishing), especially for high-speed vessels. • This may result in reduced ability to validate fishing effort that may then impact on the evidence base available to inform management strategies. • This may also affect compliance ability to monitor high-speed vessels. High-speed vessels can cover a significant distance in 15

			minutes and any changes in course or landing locations are not easily detected. For example, for boats moving at 20kn (37km/h), the distance covered under 15-minute polling is 5nm (9km) in comparison to 1.6nm (3km) under 5-minute polling.
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The polling frequency was determined based on the nature of the fishery, size of boats used, monitoring and compliance needs. Changing the polling frequency from the current legislative requirements to 15 minutes for all fisheries may result in an estimated aggregated annual cost saving of 1.2% to industry (estimated annual cost saving of \$27 per commercial fishing boat). Based on the current polling pricing structure from vessel tracking providers shown in Table 33, cost saving under this option is only applicable to the IDP690/ST6100/IDP800 units that constitutes 29.1% of vessel tracking units currently used by industry. On the other hand, changing the polling frequency to 15 minutes for all fisheries may reduce the effectiveness of validating fishing effort to inform management strategies, as well as compliance ability to monitor vessel positions and movement, especially for high-speed vessels. Although this option may reduce ongoing polling costs for users of the IDP690/ST6100/IDP800 units, the overall cost saving is relatively minor. In comparison to the potential negative impact and risks to achieving the objectives of vessel tracking, this option is not considered feasible.

8.3.2.6 Data security

Feedback from the consultation process to date has identified that data privacy is a concern for the fishers. Largely this has been due to the increase in competition in favourable fishing areas, however the underlying reason for causing this outcome has not been proven and it is speculated that other factors may be at play beyond the misuse of vessel tracking data (for example, wider and cheaper access to deep sea fishing equipment and use of radar by fishers to identify fishing spots). Regardless, there is merit in further investigating the current data access and management arrangements in order to arrive at an appropriate recommendation.

The vessel tracking data which is produced by fishers in the course of meeting their obligations under the vessel tracking regulations is currently subject to the following information flow and governance arrangements:

Vessel tracking data flow

- Vessel tracking data is generated by the fishers
- Vessel tracking data generated by the fishers is shared at the time it is captured with the vessel tracking airtime providers. This is enabled through the contractual arrangements between the fishers and the providers.
- Vessel tracking data is collected by DAF under the *Fisheries Act 1994*. The contractual arrangement between the fishers and service providers enables (through a declaration provided by the fishers) the service providers to share a copy of the vessel tracking data with DAF.
- DAF has information sharing agreements in place with GBRMPA, the Queensland Police Service, the Department of Environment and Science, the Australian Maritime Safety Authority and Parks Australia. Under these arrangements, vessel tracking data is primarily shared for compliance purposes and search and rescue (specific to Queensland Police Service and the Australian Maritime Safety Authority).

Governance of use

- The vessel tracking data that is being used by DAF is protected by the *Information Privacy Act 2009 (Qld)* and the *Fisheries Act 1994 (Qld)*. Appropriate safeguards have been established to protect fishers from misuse of their information. In particular, section 217B of the *Fisheries Act 2014* provides an offence for disclosing confidential information obtained in the administration or performance of a function under that Act, unless the performance of a function or exercise of a power under the Act is with the consent of the person to whom the information relates, or otherwise required or permitted by law. These are safeguards in addition to the protections against the use of personal information provided for in the *Information Privacy Act 2009 (Qld)*.
- Management of data security by the vessel tracking airtime providers is governed by the *Privacy Act 1988 (Cth)* and the *Telecommunication Act 1997 (Cth)*. DAF has also established a deed of confidentiality and privacy with the providers that specify requirements to keep data secure and confidential and ensure it is not used for personal gain. Under the deed of confidentiality and privacy, personal information handled by the providers is subject to the terms of the *Information Privacy Act 2009 (Qld)*, as if the provider were DAF (this includes personal information and the polling locations as collected against an individual fisher).
- Section 217A of the *Fisheries Act 1994* provides that the chief executive may enter into an information-sharing arrangement with a prescribed government entity for the purpose of sharing or exchanging information. Section 217A(2) of the *Fisheries Act 1994* provides that the information sharing arrangement may only relate to information that helps the chief executive or an inspector perform functions under the Act; or the prescribed government entity or an employee of the entity to perform functions under their legislation. Information shared with either external state agencies or external federal agencies, is governed by the relevant State's privacy act, the *Privacy Act 1988 (Cth)* and information sharing agreements that are in place with each entity.

The vessel tracking data flow and the relevant data security governance mechanisms are depicted in Figure 3 below.

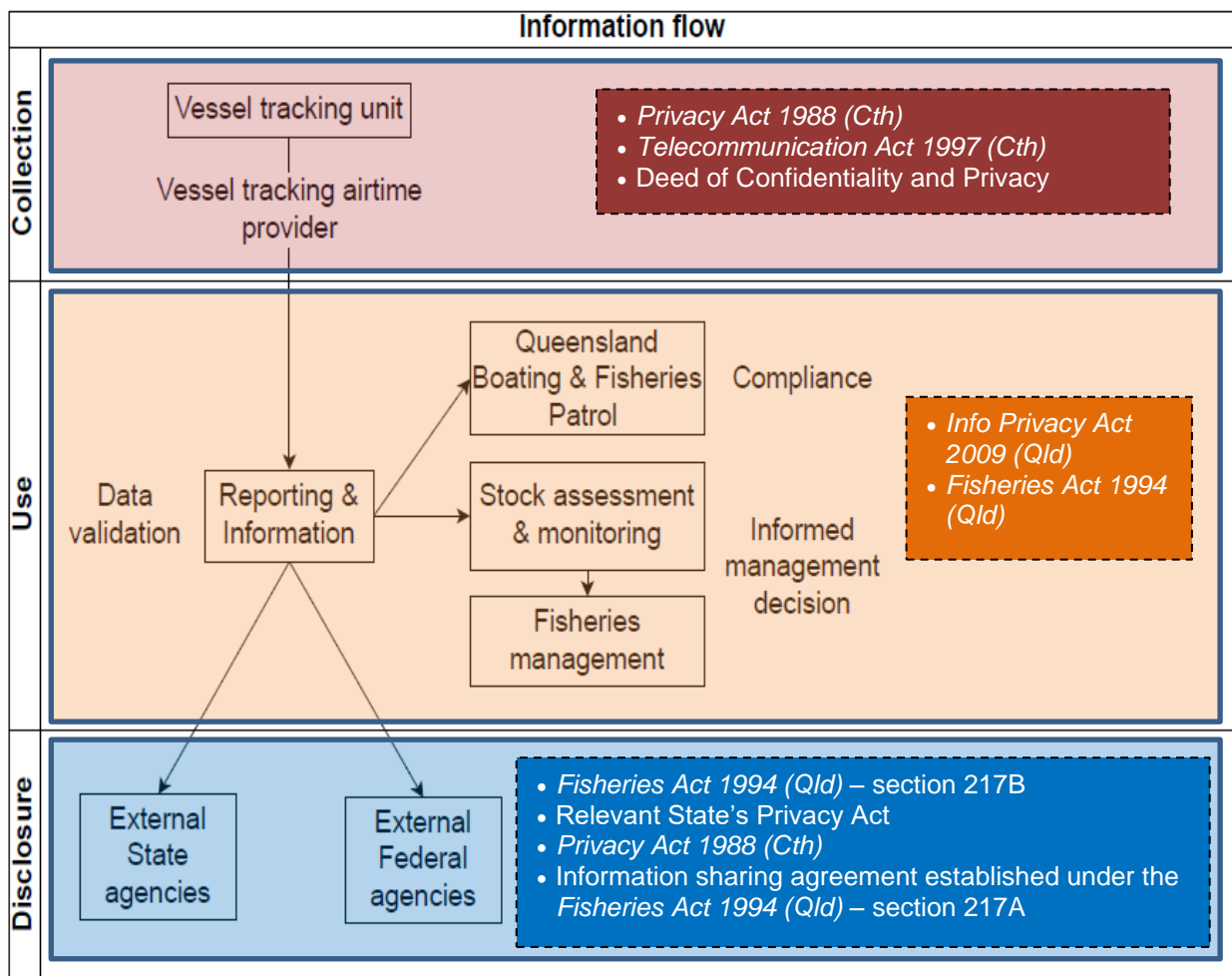


Figure 3 Vessel tracking information flow and governance of data security

The above information flow and governance mechanisms in place to protect the vessel tracking data has been shared with the vessel tracking working group to address initial concerns relating to data privacy. DAF has implemented controls to manage data security, confidentiality and privacy of vessel tracking. These controls were implemented based on the recommendations in an internal audit conducted in 2018. A review report detailing the data security controls currently in place has been published on the vessel tracking engagement portal.¹⁰³

DAF has implemented and actively maintains an Information Security Management System (ISMS) based on the international security standard ISO 27001. This is in accordance with the requirements outlined in the Queensland Government Information Security Policy IS18:2018. The ISMS includes all information, system and technology assets identified in the department's information asset register and application asset register. The ISMS takes a systematic and repeatable risk-based approach to managing information, ensuring that steps are taken to minimise threats outside of the department's established risk appetite. This includes managing information security risks related to the confidentiality, integrity and availability of information entrusted to DAF.¹⁰⁴ In line with the ISMS, DAF conducts six-monthly risk assessment and monitoring of existing data security controls in the vessel tracking system as part of the Whole of Government Information and Communication Technology

¹⁰³ Vessel tracking engagement portal <<https://daf.engagementhub.com.au/vessel-tracking-review-engagement-portal>>

¹⁰⁴ DAF information security attestation <<https://www.daf.qld.gov.au/strategic-direction/information-security-attestation>>

planning process administered by the Queensland Government Customer and Digital Group. This enables risk mitigation activities to be identified and implemented. DAF also undertakes other regular ongoing improvement activities and assessments as part of its ISMS.

To ensure vessel tracking data safeguard is in place continuously and risks are reviewed periodically, it is recommended that DAF continue to implement and maintain the current ISMS based on the international standard ISO27001.

In addition, DAF is subject to mandatory data breach notification obligations through the information security incident reporting requirements under the Queensland Government Information Security Policy IS18:2018. Information security breach incidents reported to the Queensland Government Chief Information Office will be analysed and interpreted by the Office to identify trends or patterns, provide advice to agencies, determine the impact to the government and publish de-identified materials relating to the analysis of the incidents.¹⁰⁵

8.3.2.7 Installation safety review

Some industry members have expressed concerns about the installation safety of certain vessel tracking unit types, citing incidents such as units melting and causing fire hazards. These concerns were also raised in the Queensland Ombudsman's report, which proposed several action items. DAF will consider stakeholder feedback to develop an approach to conduct further review on installation safety. This will be progressed outside of the PI-IAS process along with other Ombudsman action items.¹⁰⁶

8.3.2.8 Review of vessel tracking confirmation text messaging system

To address the issue of delayed receipt of the daily vessel tracking confirmation SMS, which was also a matter raised in the Queensland Ombudsman's observation and proposed actions, DAF has implemented multiple confirmation methods over the years to provide options to fishers. The daily vessel tracking confirmation SMS is currently one of the four confirmation methods available.

A small number of respondents suggested that DAF send an SMS when the vessel tracking unit stops polling, rather than when it polls. A commercial fisher provided feedback that this change would reduce the excessive number of SMSs they receive. Another respondent suggested that this change could help manage potential maritime safety risks by alerting the vessel owner on land when a unit unexpectedly stops polling. Despite the possibility of multiple reasons for a unit to stop polling, such as malfunctioning equipment or a sunken vessel, this additional notification would provide valuable information to prompt investigation of potential maritime safety incidents.

DAF is currently reviewing the performance of the daily confirmation SMS system as part of the review undertaken in response to the Queensland Ombudsman's observation and proposed actions. DAF will consider stakeholder feedback to develop an approach to address the issue. This will be progressed outside of the PI-IAS process along with other Ombudsman action items.

8.3.2.9 Maritime safety

A number of commercial fishers indicated that there was potential for vessel tracking to have a more prominent role as a safety tool to support other mechanisms, for example approaches regulated

¹⁰⁵ Queensland Government Information Security Incident Reporting Standard
<<https://www.forgov.qld.gov.au/information-and-communication-technology/qgea-policies-standards-and-guidelines/information-security-incident-reporting-standard>>

¹⁰⁶ Progress of the vessel tracking review items outside of the PI-IAS scope can be viewed on the vessel tracking engagement hub <<https://daf.engagementhub.com.au/vessel-tracking-review-engagement-portal>>

under AMSA. Separately, a small number of respondents have expressed challenges in obtaining certain information from DAF about commercial fishing vessels that could pose navigational hazards.

DAF acknowledges these concerns and wants to clarify its role in this matter. While DAF administers certain legislation, it does not have jurisdiction over the legislation governing maritime safety.

Maritime Safety Queensland (MSQ) is the authority responsible for investigating reported maritime incidents and publishing notices to mariners when such incidents may pose a hazard to navigation. In DAF, appropriate policies and procedures are in place to govern the release of information. If other authorities approach DAF requesting information and it is assessed that the request is due to a threat to life or safety, DAF will provide the information as required.

As described in Section 6.3.7 of this report and reiterated here, DAF has always taken steps to ensure that timely vessel tracking data is made available to appropriate authorities such as AMSA by providing its last known positions of vessels and information on nearby vessels to assist with search and rescue operations in Queensland waters. DAF has entered into an information sharing agreement under section 217A of the *Fisheries Act 1994* with AMSA, which enables a faster response to search and rescue situations by allowing AMSA to quickly obtain vessel tracking data on a demand basis from DAF. AMSA has advised that EPI-IRBS remains the best and most reliable distress system, but that vessel tracking data will provide extremely valuable complementary information on the position of any vessel in distress as well as nearby vessels that can also assist in search and rescue efforts. The EPI-IRBS system is monitored at all times (24 hours per day and seven days per week) by AMSA and is actioned in a matter of minutes. Combined, it is hoped that these measures will significantly improve the effectiveness and efficiency of search and rescue efforts in a coordinated manner across agencies in Queensland.

8.3.2.10 Other feedback

DAF has received feedback that current public information on vessel tracking requirements is difficult to find and comprehend. It suggested that this information be more easily accessed and described in layman's terms. DAF will review the current published information to address this feedback. This is an operational improvement that will be conducted outside of the PI-IRBS process.

9. Conclusion – recommended policy option

Queensland's fisheries represent a unique resource: one which is common property. The Queensland Government has allocated commercial entitlements and is responsible for managing the fisheries on behalf of the broader community. Everyone has a part to play in the management of the fisheries to ensure the continued sustainability of the resource.

As introduced earlier in this Decision PI-IRBS, it is widely acknowledged that negative consequences result if a public marine resource is not carefully managed.^{45 46} Through the QSFS it was acknowledged that the most significant reform to the fisheries was required to improve the management of the fisheries and deliver world class fisheries management which centred on achieving a sustainable resource which optimised benefits to the community.

Largely, feedback from the consultation process to date has identified that the vessel tracking regulation has achieved the objectives it sought to achieve. In other words, it has been reported that the vessel tracking regulation has successfully provided meaningful data that is now used to improve the modelling and research, and compliance aspects of fisheries management. As per the QSFS, any improvements to the management of the fisheries are done so to improve the long-term sustainability of the Queensland Fisheries and in turn the sustainability of the individual fishing businesses (i.e., the businesses of the commercial fishers).

Commercial fishers have realised additional benefits beyond the original objectives of the project. These include the relaxation or repeal of other regulations, providing them with greater flexibility in their fishing operations. Improved data availability has also helped them to monitor their commercial fishing operations. Additionally, vessel tracking has assisted to maintain current fishery approvals under Part 13A of the EPBC Act, which enables fishers to sell their products in export markets. Vessel tracking also helps to maintain fishery approval under Part 13 of the EPBC Act that relates to interacting with threatened, endangered, and protected species. Without this approval, fishers who injure or kill these species would be committing an offence under the federal legislation. Finally, continued use of vessel tracking on commercial fishing vessels is expected to support ongoing access to the GBRMP for commercial fishing activities.

Table 36(a) Net Benefit Analysis based on average annual values (FY2018-19 to FY2020-21)

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 3,007,806	\$ 1,109,409	
Quantified Rebate		\$ 235,316	\$ 4,352,532
Benefits			
Compliance saving		\$ 1,451,400	
Relaxation of regulation (wage saving)	\$ 193,097		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP)	\$ 12,103,905		\$ 13,748,402
Net Benefit (average annual values (FY2018-19 to 2020-FY21))	\$ 9,289,196	\$ 106,675	\$ 9,395,870

Table 36 (a) provides an analysis of net benefit, factoring average annual values (costs and benefits) of vessel tracking over FY2018-19 to FY2020-21. The analysis outlines a net benefit of \$9.4 million, largely driven by the benefit attributed to maintaining access to GBRMP and meeting fisheries approvals under the EPBC Act, thereby enabling access to export markets.

Table 36 (b) Net Benefit – 10 —year analysis (FY2018-19 to FY2027-28) NPV (as 2018-19 prices)

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 23,586,064	\$ 10,848,759	
Quantified Rebate		\$ 698,271	\$ 35,133,093
Benefits			
Compliance saving		\$ 10,907,608	
Relaxation of regulation (wage saving)	\$ 1,451,169		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP) <i>Adjusted Net Economic Return</i>	\$ 90,963,658		\$ 103,322,435

Net Benefit NPV (as at 2018-19 prices)	\$ 68,828,763	-\$ 639,422	\$ 68,189,342
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Table 36 (b) provides a 10-year (FY2018-19 to 2027-28) NPV analysis indicating a net benefit of \$68.2 million in 2018-19 prices.

Stakeholder engagement confirmed that fishers require the opportunity to fish (and earn a living) in the event that a vessel tracking unit malfunctions and reasonable steps are made to repair the unit. There are a range of requirements in other states and territories where in some cases, a vessel cannot leave port unless the device is correctly operating, whereas in other cases, interim arrangements can be made to allow for fishing to occur whilst the issue is rectified. Securing the ability to fish in the event of a genuine unit malfunction is important and may reduce anxiety that is currently experienced within the cohort.

While it is a recommendation of this PI-IAS that the Regulation is retained, this recommendation is contingent on the following improvements also being implemented:

- Establish an ongoing exemption process to allow fishers to fish in the event of a malfunctioning unit or other circumstances (e.g. units are unavailable). This can be achieved via an administrative procedure implemented through a head of power in the fisheries legislation.
- Continuous market scanning is undertaken to identify new vessel tracking units that are found to meet the requirements of Queensland fisheries, particularly as technology evolves overtime. Commercial fishers and vessel tracking providers can also approach DAF to request an evaluation of new vessel tracking units for use in Queensland fisheries. Overall, other Australian jurisdictions experience less examples of unit malfunction however they are using predominantly higher value units (i.e. CLS). Under the current arrangements, Queensland fishers have greater flexibility in choosing a unit from an approved list and units can also be transferred between boats, which does not occur in other jurisdictions.
- Activities are undertaken to continue to implement and maintain an Information Security Management System (ISMS) based on the international standard ISO27001 including a six-monthly assessment six-monthly risk assessment and monitoring of existing data security controls in the vessel tracking system as part of the Whole of Government Information and Communication Technology planning process administered by the Queensland Government

Customer and Digital Group. This enables risk mitigation activities to be identified and implemented.

It is noted, there is value in exploring opportunities where cost savings may be achieved by a single entity (i.e. the state) managing purchase of vessel tracking units and polling as opposed to the current arrangement where purchase and polling is managed at the enterprise level (i.e. between individual commercial fishers and the polling providers). Evidence obtained from other jurisdictions indicates that there may be savings to be obtained under such arrangements. However any option in Queensland would need to consider factors that are specific to the Queensland fisheries, for example, securing an arrangement that was suitable for a variety of commercial fisher business sizes (noting the comparatively high number of micro and small businesses in Queensland fisheries), meeting flexibility requirements for fishers (i.e. the ability to transfer units between vessels), enabling costs to be recouped by government as applicable (i.e. via levies as is the case in other domestic jurisdictions), and noting alignment with any future requirements for mandatory vessel tracking by Parks Australia. This issue can be considered as applicable alongside the continuous market scanning activities noted above.

10. References

Reports

Queensland Department of Agriculture and Fisheries (2017) *Sustainable Fisheries Strategy 2017-2027*

MRAG Asia Pacific (2014) *Taking Stock: modernising fisheries management in Queensland*

Queensland Rural and Industry Development Authority (2021) *Annual Report 2021*

Queensland Rural and Industry Development Authority (2020) *Annual Report 2020*

John McVeigh (2014) *Fisheries management review moves ahead swiftly*

Academic papers

Arias-Ortiz, A., Serrano, O., Masque, P., Lavery, PS., Mueller, U., Kendrick, GA., Rozaimi, M., Esteban, A., Fourqurean, W., Marba, N., Mateo, MA., Murray, K., Rule, MJ. & Duarte, CM. 2018, 'A marine heatwave drives massive losses from the world's largest seagrass carbon stocks', *Nature Climate Change*, vol. 8, pp. 338-344, <<https://www.nature.com/articles/s41558-018-0096-y>>

Brodeur, RD., Smith, BE., McBride, RS., Heintz, R. & Farley Jr E. 2017, 'New perspectives on the feeding ecology and trophic dynamics of fishes', *Environmental Biology of Fishes*, vol. 100, pp. 293-297, <<https://link.springer.com/article/10.1007/s10641-017-0594-1>>

Duke, N. 2017, 'Mangrove Floristics and Biogeography Revisited: Further Deductions from Biodiversity Hot Spots, Ancestral Discontinuities, and Common Evolutionary Processes', *Mangrove Ecosystems: A Global Biogeographic Perspective*, pp. 17-53, <https://www.researchgate.net/publication/320849105_Mangrove_Floristics_and_Biogeography_Revisited_Further_Deductions_from_Biodiversity_Hot_Spots_Ancestral_Discontinuities_and_Common_Evolutionary_Processes>

Emery, T., Noriega, R., Williams, AJ. & Larcombe, J. 2019, 'Changes in logbook reporting by commercial fishers following the implementation of electronic monitoring in Australian Commonwealth fisheries', *Marine Policy*, vol. 104, pp. 135-145, <<https://www.sciencedirect.com/science/article/pii/S0308597X18307218>>

Gonzalez-Mirelis, G., Lindegarth, M. & Skold, M. 2014, 'Using vessel monitoring system data to improve systematic conservation planning of a multiple-use marine protected area, the Kosterhavet

- National Park (Sweden)', *AMBIO*, vol.43, pp. 162-174,
<<https://link.springer.com/article/10.1007/s13280-013-0413-7#citeas>>
- Gribble, N., Good, N., Tanimoto, M., Peel, D. & Officer, RA. 2007, 'Innovative stock assessment and effort mapping using VMS and electronic logbooks', *Fisheries Research and Development Corporation*, Australian Government,
<https://www.researchgate.net/publication/264978597_Innovative_stock_assessment_and_effort_mapping_using_and_electronic_logbooks>
- Halpern, BS., Kappel, CV., Selkoe, KA., Micheli, F., Ebert, CM., Kontgis, C., Crain, CM., Martone, RG., Shearer, C. & Teck, SJ. 2009, 'Mapping cumulative human impacts to California Current marine ecosystems', *Conservation Letters*, vol. 2, pp. 138-148,
<<https://conbio.onlinelibrary.wiley.com/doi/10.1111/j.1755-263X.2009.00058.x>>
- Hoegh-Guldberg, O., Mumby, P.J., Hooten, A.J., Steneck, RS., Greenfield, P., Gomez, E., Harvell, CD., Sale, PF., Edwards, A.J., Caldeira, K., Knowlton, N., Eakin, C.M., Iglesias-Prieto, R., Muthgia, N., Bradbury, RH., Dubi, A. & Hatziolos, ME. 2007, 'Coral Reefs Under Rapid Climate Change and Ocean Acidification', *Science*, vol. 318, pp. 1737-1742,
<<https://www.science.org/doi/10.1126/science.1152509#:~:text=Under%20conditions%20expected%20in%20the,that%20fail%20to%20be%20maintained>>
- Holbrook, NJ. & Johnson, JE. 2014, 'Climate change impacts and adaptation of commercial marine fisheries in Australia: a review of the science', *Climatic Change*, vol. 124, pp. 703-715,
<<https://link.springer.com/article/10.1007/s10584-014-1110-7>>
- Jackson, JBC., Kirby, MX., Berger, WH., Bjorndal, KA., Botsford, LW., Bourque, BJ., Bradbury, RH., Cooke, R., Erlandson, J., Estes, JA., Hughes, TP., Kidwell, S., Lange, CB., Lenihan, HS., Pandolfi, JM., Peterson, CH., Steneck, RS., Tegner, MJ. & Warner, RR. 2001, 'Historical overfishing and the recent collapse of coastal ecosystems', *Science*, vol. 293, pp.629-637,
<<https://www.science.org/doi/full/10.1126/science.1059199>>
- Jansen, AM., Giebels, E., van Rompay, T.JL. & Junger, M. 2018, 'The Influence of the Presentation of Camera Surveillance on Cheating and Pro-Social Behavior', *Frontiers in Psychology*, vol. 9,
<<https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01937/full>>
- Jennings, S. & Kaiser MJ. 1998, 'The effects of fishing on marine ecosystems', *Advances in Marine Biology*, vol. 34, pp. 201-212, 212e, 213-352,
<<https://www.sciencedirect.com/science/article/abs/pii/S0065288108602126>>
- Deng, R., Dichmont, C., Milton, D., Haywood, M., Vance, D., Hall, N. & Die, D. 2005, 'Can vessel monitoring system data also be used to study trawling intensity and population depletion? The example of Australia's northern prawn fishery', *Canadian Journal of Fisheries and Aquatic Sciences*, vol. 62, <<https://cdnsiencepub.com/doi/10.1139/f04-219>>
- Steffen, W., Rockstrom, J., Richardson, K. & Schellnhuber, HJ. 2018, 'Trajectories of the Earth System in the Anthropocene', *Proceedings of the National Academy of Science of the United States of America*, vol. 115, no. 33, pp. 8252-8259,
<[https://www.pnas.org/doi/10.1073/pnas.1810141115#:~:text=The%20Anthropocene%20represents%20the%20beginning,9\)%20\(SI%20Appendix](https://www.pnas.org/doi/10.1073/pnas.1810141115#:~:text=The%20Anthropocene%20represents%20the%20beginning,9)%20(SI%20Appendix)>
- Sumaila, UR., Cheung, WWL., Lam, VWY., Pauly, D. & Herrick, S. 2011, 'Climate change impacts on the biophysics and economics of world fisheries', *Nature Climate Change*, vol. 1, pp. 449-456,
<<https://www.nature.com/articles/nclimate1301#:~:text=Observations%2C%20experiments%20and%20simulation%20models,the%20economics%20of%20fisheries%20worldwide>>
- Thoya, P., Kaunda-Arara, B., Omukoto, J., Munga, C., Kimani, E. & Omondi Tuda, A. 2019, 'Trawling effort distribution and influence of vessel monitoring system (VMS) in Malindi-Ungwana Bay: Implications for resource management and marine spatial planning in Kenya', *Marine Policy*, vol. 109,
<<https://www.sciencedirect.com/science/article/pii/S0308597X19303793>>

Watson, JT., Haynie, AC., Sullivan, PJ., Perruso, L., O'Farrell, S., Sanchirico, JN. & Mueter, FJ. 2018, 'Vessel monitoring system (VMS) reveal an increase in fishing efficiency following regulatory changes in a demersal longline fishery', *Fisheries Research*, vol. 207, pp. 85-94, <<https://www.sciencedirect.com/science/article/pii/S0165783618301760>>

Websites

Australian Attorney-General's Department, *Offshore Constitutional Settlement*, <<https://www.ag.gov.au/international-relations/international-law/offshore-constitutional-settlement>>

Australian Fisheries Management Authority 2020, *Know your VMS Requirements*, <<https://www.afma.gov.au/news-media/news/know-your-vms-requirements>>

BBC News 2021, *Why is the Great Barrier Reef in trouble? A simple guide*, <<https://www.bbc.com/news/world-australia-57938858>>

Department of Agriculture and Fisheries, *FishNet Public*, viewed July 2022, <<https://fishnet.fisheries.qld.gov.au/Content/Public/LicenceAndPermitAuthorities.aspx>>

Department of Agriculture and Fisheries 2015, *Managing fisheries compliance in Queensland*, <https://www.daf.qld.gov.au/_data/assets/pdf_file/0018/284112/fisheries-compliance-qld.pdf>

Department of Agriculture and Fisheries 2016, *Green paper on fisheries management reform in Queensland*, <<https://www.publications.qld.gov.au/dataset/green-paper-on-fisheries-management-reform-in-queensland>>

Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/319c7e02-f07b-4b2e-8fd5-a435d2c2f3c9>>

Department of Agriculture and Fisheries 2018, *Vessel tracking consultation report 2018*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/a7aadf39-a3e2-47f7-80fe-33e470911376>>

Department of Agriculture and Fisheries 2018, *Results of vessel tracking unit trial, June 2018*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/5339089f-4e66-4f03-83fd-80431d2d241d>>

Department of Agriculture and Fisheries 2018, *Vessel tracking guideline*, <https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/702f9e15-d3f1-48dd-919d-daea3bd20d76?truncate=30&inner_span=True>

Department of Agriculture and Fisheries 2018, *Fisheries data validation plan (March 2018)*, <<https://www.publications.qld.gov.au/dataset/queensland-sustainable-fisheries-strategy/resource/dfbdda3-f0e4-47a2-ba25-644b999734d8>>

Department of Agriculture and Fisheries 2020, *Vessel Tracking Installation and Maintenance Standard*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/c82988cd-e1ee-4f36-a05d-badb543d340d>>

Department of Agriculture and Fisheries 2020, *Approved vessel tracking units*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/vessel-tracking/approved-units>>

Department of Agriculture and Fisheries 2020, *Economic and social indicators of the Queensland charter fishery, 2017/18 and 2018/19*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/7ac87916-a5f8-44e5-9d0a-9d422a0a44d2>>

Department of Agriculture and Fisheries 2020, *Summary economic and social indicators for Queensland's commercial fisheries, 2017/18 and 2018/19*,
<<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-financial-years-2018-and-2019/resource/9f9cd923-892e-49ab-a78f-94d9df50926d>>

Department of Agriculture and Fisheries 2021, *Economic contribution of recreational fishing by Queenslanders to Queensland*, <<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-contribution-of-recreational-fishing>>

Department of Agriculture and Fisheries 2022, *Summary economic and social indicators for Queensland's commercial fisheries in 2019/20*, <<https://www.publications.qld.gov.au/dataset/fisheries-economic-and-social-indicators-2019-20/resource/14a32b86-096d-4b17-ae5a-2cbc94a133a3>>

Department of Agriculture and Fisheries 2023, *Fisheries economic and social data*,
<<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-and-social-data>>

Department of Climate Change, Energy, the Environment and Water 2007, *Guidelines for the ecologically sustainable management of fisheries*,
<<https://www.awe.gov.au/environment/marine/publications/guidelines-ecologically-sustainable-management-fisheries>>

Department of Climate Change, Energy, the Environment and Water 2022, *Great Barrier Reef Intergovernmental Agreement*, <<https://www.environment.gov.au/marine/gbr/protecting-the-reef/intergovernmental-agreement>>

Department of Climate Change, Energy, the Environment and Water, *Guidelines for the Ecologically Sustainable Management of Fisheries 2007*,
<<https://www.dcceew.gov.au/sites/default/files/documents/Guidelines%20for%20the%20ecologically%20sustainable%20management%20of%20fisheries.pdf>>

Department of Climate Change, Energy, the Environment and Water, *The Reef 2050 Plan*,
<<http://www.environment.gov.au/marine/gbr/long-term-sustainability-plan>>

Department of Climate Change, Energy, the Environment and Water, *Queensland managed fisheries*,
<<https://www.environment.gov.au/marine/fisheries/qld>>

Department of Natural Resources and Environment Tasmania, *Vessel monitoring systems*,
<<https://nre.tas.gov.au/sea-fishing-aquaculture/commercial-fishing/commercial-fishing-licences-and-seasons/compliance-and-vms>>

Department of Primary Industries and Regional Development Western Australia, *Vessel Monitoring System*, <<https://www.fish.wa.gov.au/Fishing-and-Aquaculture/Commercial-Fishing/Commercial-Fishing-Management/Pages/Vessel-monitoring-system.aspx>>

Department of Primary Industries and Regions South Australia, *Vessel monitoring system*,
<https://www.PI-IA.ssa.gov.au/fishing/commercial_fishing/licensing_registration/vessel_monitoring_system>

Directorate of Fisheries Norway 2015, *Electronic reporting systems*,
<<https://www.fiskeridir.no/English/Fisheries/Electronic-Reporting-Systems>>

Drone Life 2017, *How Much Should I Spend on a Professional Drone?*,
<<https://dronelife.com/2017/04/04/much-spend-professional-drone/>>

European Commission, *Inspections, monitoring and surveillance*, <https://ec.europa.eu/oceans-and-fisheries/fisheries/rules/enforcing-rules/inspections-monitoring-and-surveillance_en>

Fair Work Ombudsman, *Minimum Wages*, <<https://www.fairwork.gov.au/pay-and-wages/minimum-wages>>

Global Fishing Watch 2017, *Indonesia VMS joint statement*, <<https://globalfishingwatch.org/news-views/republic-of-indonesia-vms-joint-statement/#:~:text=Indonesia%20requires%20VMS%20on%20all,trackable%20by%20any%20other%20means>>

Great Barrier Reef Marine Park Authority 2003, *Great Barrier Marine Park Zoning Plan 2003*, <<https://elibrary.gbrmpa.gov.au/jspui/handle/11017/382>>

Great Barrier Reef Marine Park Authority 2019, *Outlook report 2019*, <<https://www.gbrmpa.gov.au/our-work/outlook-report-2019>>

Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis*, <<https://www.ipcc.ch/report/ar6/wg1/>>

JB Hifi, *Mobile Phones*, <<https://www.jbhifi.com.au/collections/mobile-phones>>

Marine Stewardship Council 2020, *Understanding seafood consumers*, <<https://www.msc.org/understanding-seafood-consumers>>

MarketWatch 2022, *Sustainable seafood market growth size 2022: Competitive landscape, leading players analysis, key dynamics, business strategies, statistics and developments forecast to 2028*, <<https://www.marketwatch.com/press-release/sustainable-seafood-market-growth-size-2022-competitive-landscape-leading-players-analysis-key-dynamics-business-strategies-statistics-and-developments-forecast-to-2028-2022-08-01>>

MRAG Asia Pacific 2014, *Taking Stock: modernising fisheries management in Queensland*, <<https://www.publications.qld.gov.au/dataset/fisheries-management-review/resource/2a97571b-60cf-4a4f-bf8f-306a95833b70>>

Northern Territory, *Fisheries Regulations 1992*, <<https://legislation.nt.gov.au/en/Legislation/FISHERIES-REGULATIONS-1992>>

Olympic World Library 2019, *Olympic Games guide on sustainable sourcing*, <https://library.olympics.com/Default/doc/SYRACUSE/186083/olympic-games-guide-on-sustainable-sourcing-international-olympic-committee?_lg=en-GB>

Pacific Islands Forum Fisheries Agency (FFA) 2008, *FFA vessel monitoring system*, <https://www.ffa.int/vessel_registration>

Queensland Government 2023, *Cost Benefit Analysis Guide Business Case Development Framework Release 3*, <https://www.statedevelopment.qld.gov.au/__data/assets/pdf_file/0013/55030/further-guidance-04-cost-benefit-analysis-guide.pdf>

Queensland Industrial Relations Commission 2019, *State Government Entities Certified Agreement 2019 - Wages Determination - Certified Agreement reprint (CB/2020/78)*, <https://www.qirc.qld.gov.au/sites/default/files/2020_cb78_reprint.pdf?v=1616728595>

Queensland Parliament 2014, *Letter from Minister McVeigh to The Clerk of the Parliament, Mr Neil Laurie (dated 21 March 2014)*, <<https://apps.parliament.qld.gov.au/E-Petitions/Home/DownloadResponse/a4745507-ce6e-46cf-a759-88297340c8a0>>

Queensland Rural and Industry Development Authority, *QRIDA Annual Reports*, <<https://www.qrida.qld.gov.au/annual-report>>

Queensland Rural and Industry Development Authority, *Vessel tracking rebate scheme*, <<https://www.qrida.qld.gov.au/program/vessel-tracking-rebate-scheme>>

Queensland Treasury 2019, *Queensland Government guide to better regulation*, <<https://www.treasury.qld.gov.au/resource/queensland-government-guide-better-regulation/>>

Queensland Treasury 2023, *Queensland Government better regulation policy*, <<https://s3.treasury.qld.gov.au/files/Queensland-Government-Better-Regulation-Policy.pdf>>

Queensland Treasury 2023, *Guidance note: Post implementation review*, <
<https://s3.treasury.qld.gov.au/files/Guidance-Note-Post-IAS.pdf> >

The Queensland Cabinet and Ministerial Directory, *Taking to the skies to protect our fisheries*,
<<https://statements.qld.gov.au/statements/87673>>

Victorian Fisheries Authority 2019, *Implementing VMS in Victorian commercial fisheries*,
<https://vfa.vic.gov.au/_data/assets/pdf_file/0008/494918/VMS-fact-sheet.pdf>

11. Legislative materials

Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

Great Barrier Reef Marine Park Act 1975

State legislation

Fisheries Act 1994

Fisheries Regulation 2008 [Repealed]

Fisheries (East Coast Trawl) Management Plan 2010 [Repealed]

Fisheries (General) Regulation 2019

Fisheries (Commercial) Regulation 2019

Fisheries (General) Regulation 2019, Explanatory notes for SL 2019 No. 179

Fisheries (General) (Vessel Tracking) Amendment Regulation 2019, Explanatory notes for SL 2019
No. 180

Appendix A – Fisheries reform

A.1 Fisheries review

In 2014, the Queensland Minister for Agriculture, Fisheries and Forestry, Hon. Dr John McVeigh announced a wide-ranging review of fisheries management in Queensland. The Minister indicated that the review had arisen to “simplify fisheries management, cutting red tape and improving environmental sustainability.” Minister McVeigh publicly stated that “*the Queensland Government had commenced a wide-ranging review of fisheries management in Queensland to deliver a better system for the State’s Commercial, recreational fishers and Indigenous fishers. The aim of the review is to modernise and simplify fisheries management systems and cut red tape. This will provide the flexibility for industry to prosper, ensure recreational and traditional fishers have reasonable access to the resource, and ensure Queensland’s lifestyle is maintained.*”¹⁰⁷

The Minister indicated that an “Independent specialist would be engaged to lead the review to provide greater transparency.... There will be an opportunity for people to provide feedback throughout the review”.²⁸ MRAG Asia Pacific (MRAG) was commissioned to undertake the review, using a Review Team led by Professor Glenn Hurry, and comprising Duncan Souter, Tom McClurg and Dr Michael Sissenwine. As part of the review, the Review Team conducted extensive consultation with stakeholders including 17 public meetings from the Gold Coast to the Torres Strait, with over 500 attendees in total. In addition, around 280 written submissions were received from fishers, environmentalists, government agencies and others.¹⁰⁸

The review by MRAG resulted in a report (**report**) ‘Taking Stock: Modernising Fisheries Management in Queensland’⁸². The report noted that fisheries management systems in Queensland have evolved over time and become complex with excessive regulation, and this was impacting on commercial fishers and recreational operators alike. The report found unilateral support from all fishers, irrespective of sector, that the health of Queensland’s fish stocks and environments are at the centre of all stakeholder’s interests and that reform of the fisheries management practices was necessary to achieve best practice management and a sustainable future.

Accordingly, the report proposed a new framework to set out ‘*a clear central strategy for the management of fisheries, based on maximising benefits from the use of Queensland’s fish stocks, and is supported by a fisheries management system of integrated components that work together to achieve the objectives of the strategy*’. It went on to identify a number of key messages regarding the structure of a fisheries management system as well as recommendations for how Queensland could progress with its future strategy and management practices.

The report proposed a conceptual fisheries management system to represent the interconnected nature of the main components underpinning the management strategy. Put simply, each of the component is required for the system to work effectively.

¹⁰⁷ Letter from Minister McVeigh to The Clerk of the Parliament, Mr Neil Laurie (dated 21 March 2014), <<https://apps.parliament.qld.gov.au/E-Petitions/Home/DownloadResponse/a4745507-ce6e-46cf-a759-88297340c8a0>>

¹⁰⁸ MRAG Asia Pacific 2014, *Taking Stock: modernising fisheries management in Queensland*, <<https://www.publications.qld.gov.au/dataset/fisheries-management-review/resource/2a97571b-60cf-4a4f-bf8f-306a95833b70>>

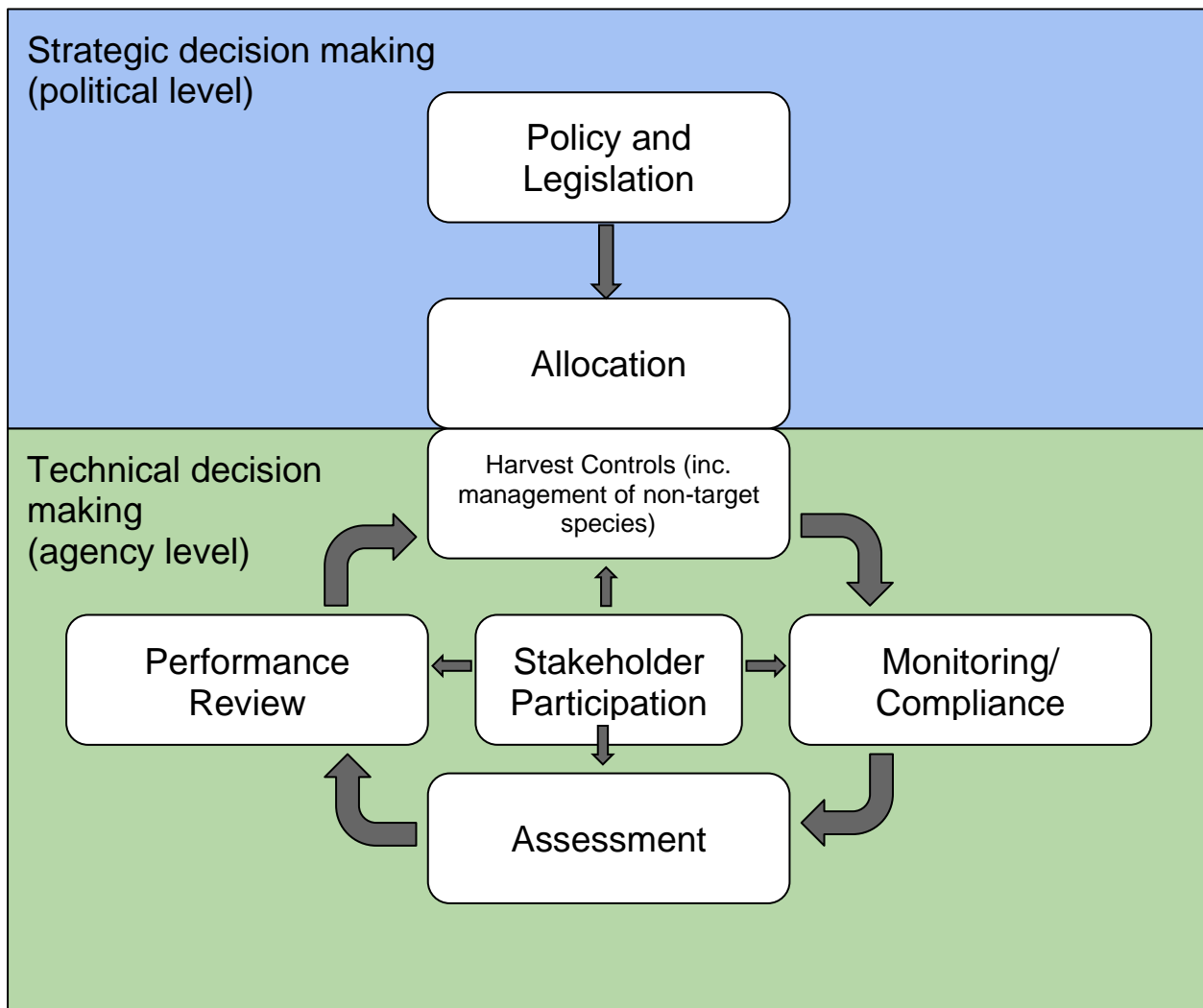


Figure 4 Conceptual fisheries management system with component parts working together to achieve defined goals and objectives. (Source: MRAG Asia Pacific 2014, *Taking Stock: modernising fisheries management in Queensland*⁸²)

The report provided detail on how the findings of the report should be used to develop a clear policy statement for the future management of Queensland's fisheries. Leveraging the findings of the report and the recommendations around the structure of a "good fisheries management system", the report provided the following recommendations in relation to future policy, legislation and decision making:

- a) *overarching objectives for Queensland's fisheries;*
- b) *principles for catch setting, including the use of target stock sizes, harvest strategies and reference points;*
- c) *principles for catch sharing;*
- d) *preferred approaches to the management of each sector's share of the fishery;*
- e) *management of non-target species and ecosystems;*
- f) *systems to allow for stakeholder participation in management/decision making;*
- g) *approaches to compliance;*
- h) *performance review;*
- i) *resourcing;*
- j) *protection of fisheries habitats;*
- k) *interaction between fisheries and marine protected areas."*

Further, eight main components were identified as required in any "good fisheries management system". To this end, the following components were identified in relation to monitoring, information collection and assessment:

"Provides the information to manage fisheries the way we want them to be managed (right information, at the right time, at the right scale, in the right level of detail)."

"Well-managed fisheries have monitoring and assessment systems that deliver information in a timeframe, at a level of detail and at a scale that meets management objectives and compliance."

"Ensures integrity of management arrangements by ensuring everyone plays by the rules Well-managed fisheries have compliance systems that balance voluntary compliance and deterrence, and are informed by risk-assessment, intelligence and information analysis;"

The report acknowledged that VMS¹⁰⁹ were already used in discrete sub industries (specifically the east coast trawl fishery) for the purposes of providing effort-based verification. It was identified that VMS (implemented as currently used) could provide broader benefits to monitoring, information collection and assessment and compliance activities in line with these key areas of a fisheries strategy.

A.2 Fisheries reform

Acknowledging the significant recommendations of the fisheries industry review, DAF sought to take action and deliver the necessary changes to fisheries management. In July 2016, DAF released the *Green Paper on Fisheries Management Reform in Queensland*¹¹⁰ (**The Green Paper**). The intent of *The Green Paper* was to leverage the findings and recommendations from the review and start a discussion around five goals and ten underlying areas for reform that would enable Queensland to best manage access to, and use of, Queensland fisheries. According to the Green Paper, the reforms

¹⁰⁹ The Fisheries Regulation 2008 [Repealed] referred to VMS (Vessel Monitoring Systems) whereas the new regulation refers to Vessel Tracking, we have used VMS when speaking about previous regulations and used the term vessel tracking when talking about the present regulation and future changes.

¹¹⁰ Department of Agriculture and Fisheries 2016, *Green paper on fisheries management reform in Queensland*, <<https://www.publications.qld.gov.au/dataset/green-paper-on-fisheries-management-reform-in-queensland>>

were designed to give commercial fisheries “a more stable, transparent and strategic operating environment”, as well as provide significant ecological benefits that would contribute to the sustainability of the fisheries long term. The five goals and ten areas of reform as introduced by the Green Paper are highlighted in the below figure.

Vision	Fishing is a low risk to Queensland’s aquatic resources and these are shared to optimise benefits to the community				
Reform Goals <i>What we are seeking to achieve</i>	Long-term sustainability and resilient stocks	Economic returns to the community and access for all users	Clear and unambiguous regulatory framework	Enhance systems to support fisheries management	Investment in fisheries management
10 areas for reform <i>How we will get there</i>	1. Managing target stocks to maximise overall benefits to the community, optimise catch rates, and secure community support for fishing				
	2. Managing impacts on ecosystem and non-target species, to maximise benefits to the community				
		3. Clarify resource-sharing arrangements between sectors, to provide certainty about resource use.			
		4. Review authorities for access to the resources, to ensure equity and value for current and future generations			
	5. Optimise decision-making framework, to ensure responsive, fit-for-purpose management arrangements				
	6. Adopt harvest strategies that have the flexibility to maximise benefits, for both the community and the ecosystem				
	7. Improved data and information to underpin best-practice management arrangements				
		8. Improved consultation and engagement, to include stakeholders in the development and implementation of management arrangements			
	9. Fisheries compliance upgrades to underpin all management objectives				
	10. As the fisheries reform program develops, considerations will be given to how the costs of improved management will be met				

Figure 5 The 10 areas and 5 goals of fisheries management reform. (Source: Department of Agriculture and Fisheries 2016, *Green paper on fisheries management reform in Queensland*⁸⁴)

Underpinning various aspects of the reform was the adoption of new technologies. Electronic monitoring technologies or vessel tracking¹¹¹ was identified as a means for collecting data which could be used to inform the management of the fisheries. Specifically, under the seventh area of reform, The Green Paper introduced the application of electronic monitoring technologies and identified that these technologies could be used to facilitate programs that seek to improve the accuracy and timeliness of catch reporting (an independent source to verify catch and effort data. Under the ninth area of reform, The Green Paper identified that information captured by vessel tracking could also be used in compliance activities to redirect efforts in the current on-ground approach to a more sophisticated information-driven compliance effort as well as increasing compliance with area closures.

Publication of The Green Paper also invited consultation that was driven by both active interaction between DAF and key stakeholders (including industry, government, research etc.) across Queensland as well as more passive channels of feedback (for example, online surveys and written submissions). According to The Green Paper, the message received from the consultation process was that all stakeholders wanted reform in the way Queensland manages its fisheries. There was strong support from all sectors for better fishery monitoring, more effective engagement, more responsive decision making and greater fisheries compliance.

The Green Paper led to development of the QSFS, released by the Queensland Government in June 2017, which outlined the long term strategy for fisheries management in Queensland. The QSFS was considered to represent the most comprehensive fisheries reform in Queensland’s history with the primary purpose of ensuring healthy fish stocks that will support thousands of Queensland jobs. It outlined a clear plan for transitioning from the existing management approach to the desired future management approach, ultimately to improve management of Queensland fisheries using best practice tools. In outlining this transition plan, the QSFS specifically acknowledged the issues and problems with the current management approach, as outlined in Table 37 below, and included a plan to transition the industry to a desired future state; namely “where we want to be”.

Table 37 The current management approach versus the desired future management approach

2017 Where we are now	2027 Where we want to be
Basic elements are missing	Management built on firm foundations
Monitoring and research are inadequate to inform management decisions	Fisheries monitoring and research is robust, regular and builds confidence
Ongoing debate about interpreting performance of fish stocks	Sustainable limits are defined for all key stocks/regions
No formal process for seeking stakeholder views	Effective engagement between all stakeholders
No clear system for management of impacts on non-target species	A sound risk-based approach is used to assess impacts on non-target species.
Limited options for management tools	Access to best practice tools

¹¹¹ The MRAG review and the previous regulation referred to VMS, whereas vessel tracking has been used in the new regulations and all later government documents.

Ongoing debate about acceptable harvest levels.	All major fisheries are managed by harvest strategies with defined targets
Rules excessively complicated, too much reliance on input controls	Fishing rules are clear, practical, and appropriate
Ongoing conflict between sectors over access to the resource	Transparent process for resource allocation
Decision-making is slow and criticised for excessive political influence	Responsive and evidence-based decision-making with clear management actions
Implementation is reactive	Implementation is strategic
Limited resources or capacity to forward plan	Management and reform are adequately funded
Limited capacity to enforce regulations (e.g. black market, crab pot raiding)	Education and compliance are effective and provides confidence

Source: Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*¹⁰

Leveraging the themes of *The Green Paper*, ten key areas of reform were identified to help transition fisheries management.

Table 38 The three types of reform

Type	Reform Area
Foundation reforms	1. Improved engagement
	2. Improved monitoring and research
	3. Sustainable catch limits
	4. Impacts on non-target species
Reform tolls	5. Resource Allocation
	6. Harvest strategies
	7. Fishing rules and access
	8. Responsive Decisions
Implementing reforms	9. Resourcing
	10. Compliance

Source: Department of Agriculture and Fisheries 2017, *Queensland Sustainable Fisheries Strategy 2017-2027*

A total of 33 actions across the ten reform areas were presented in the QSFS of which two included the introduction of either a broad concept of monitoring technologies or, specifically, vessel tracking for the purposes of gathering improved and validating collected data to facilitate improved monitoring and research activities and compliance outcomes. Timelines for the actions were set and vessel tracking was scheduled to be installed on all boats by 2020, with a priority to install vessel tracking on net, line, and crab boats by 2018.

Consultation during the reform process

From 2014 to 2017, DAF consulted widely as part of the review of fisheries management in Queensland and the development of the *Queensland Sustainable Fisheries Strategy 2017-2027* (QSFS).

Since the release of the QSFS in 2017, continued consultation has been carried out to inform and execute on the 10 key areas of reform for fisheries management as identified in the strategy. This includes fishery-specific working groups and a Sustainable Fisheries Expert Panel (the Panel).

With respect to the specific action item of implementation of vessel tracking across all commercial fisheries and charter boats, DAF consulted with affected stakeholders in the development of the “Vessel Tracking Policy” and “Vessel Tracking Guidelines” in early 2018. Officers met with more than 280 people at 143 meetings across 22 locations in Queensland. A total of 128 responses were received in reply to an online survey, including by letter, telephone, and email. Other bodies and agencies were also included in the consultation process including Great Barrier Reef Marine Park Authority (GBRMPA). The ‘Vessel tracking consultation report – Feedback on draft policy and guidelines’ is available on DAF website¹¹².

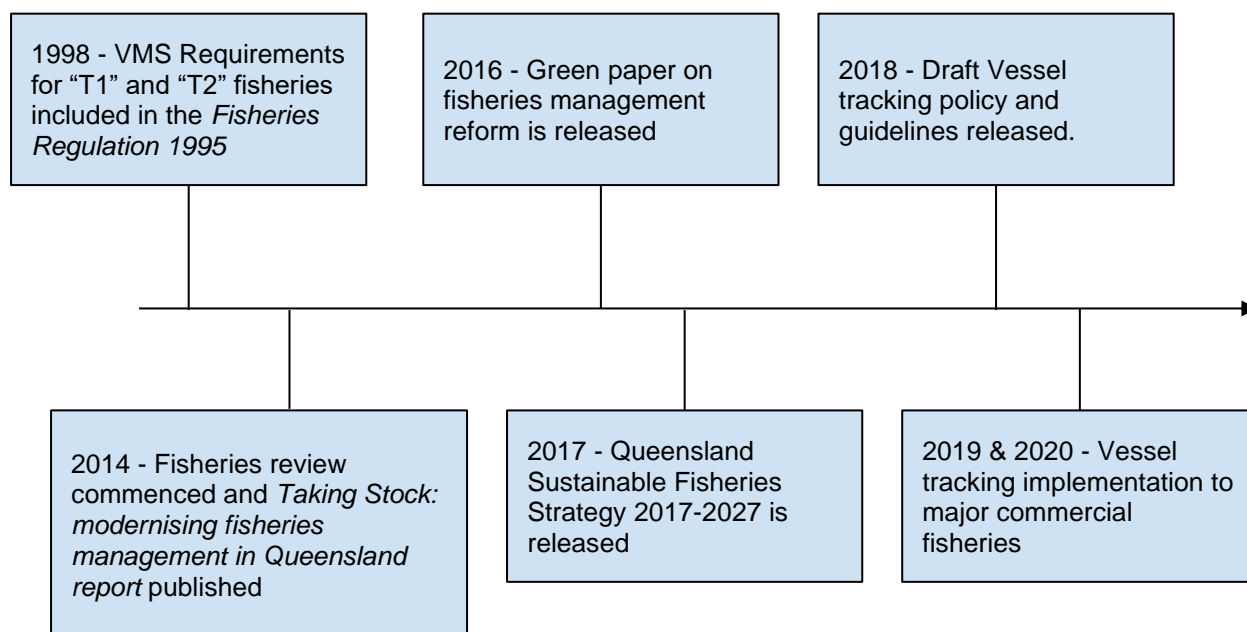


Figure 6 Summary of the consultation that took place along the way to regulation being introduced

¹¹² Department of Agriculture and Fisheries 2018, *Vessel tracking consultation report 2018*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/a7aadf39-a3e2-47f7-80fe-33e470911376>>

Appendix B – Implementation of the vessel tracking regulation

Following the extensive process of review and consultation that resulted in the release of the QSFS, necessary steps were taken to introduce legislation which implemented identified actions under the ten reform areas.

In 2017, DAF undertook a selection process (outlined below) to approve vessel tracking units for use in Queensland fisheries. Further details of the trial can be viewed in the published trial summary report¹¹³.

- Determination of vessel tracking units and provider specifications
- Market scanning of available vessel tracking units
- Assessment of vessel tracking units against the specifications
- Trialling of the vessel tracking units on commercial fishing vessels for up to 10 months
- Analysis of trial vessel tracking data and trial participants' feedback to inform approval decision

The draft Vessel Tracking Policy and Guidelines were released on 2 January 2018. The policy outlined the objectives of the proposed vessel tracking regulations, as well as the obligations for commercial fishing and charter boats to which the regulation applied. Accompanying the draft policy and guidelines was information on the types of equipment available for purchase that would meet the vessel tracking requirements, the initial costs of such equipment (including installation) and ongoing polling costs per month. As per the review process to date, a process of consultation followed the release of the policy and guidelines.

Following the release of the draft policy and guidelines, a rebate scheme was introduced to provide funding to fishers to cover the upfront equipment and installation costs of vessel tracking units. The Vessel Tracking Rebate Scheme provided \$3 million in funding, jointly supported by the Queensland Government and the Great Barrier Reef Marine Park Authority (GBRMPA)¹¹⁴. Reimbursement was provided for part or all of the costs of the equipment from \$300-\$750 and installation costs of up to \$220.

The final Vessel Tracking Policy was released on 7 June 2018 alongside the final Vessel Tracking Guidelines¹¹⁵ and Vessel Tracking Installation and Maintenance Standard¹¹⁶, the latter of which outlined in more detail the specific requirements for vessel tracking in Queensland including approved vessel tracking units and polling rates.

Implementation of vessel tracking to commercial fisheries was staged across 2019 and 2020. The first stage of implementing the vessel tracking requirements was delivered through the Fisheries (Vessel Tracking) Amendment Regulation 2018 authorised under section 118 and 223 of the *Fisheries Act 1994*. It implemented vessel tracking in the commercial net, line, and crab fisheries from 1 January 2019. The vessel tracking installation and maintenance requirements that were used for fisheries that were already required to have vessel tracking (i.e. east coast trawl, large mesh net and sea cucumber) was updated and standardised to align with the broader rollout of vessel tracking.

¹¹³ Department of Agriculture and Fisheries 2018, *Results of vessel tracking unit trial, June 2018*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/5339089f-4e66-4f03-83fd-80431d2d241d>>

¹¹⁴ Queensland Rural and Industry Development Authority, *Vessel tracking rebate scheme*, <<https://www.qrida.qld.gov.au/program/vessel-tracking-rebate-scheme>>

¹¹⁵ Department of Agriculture and Fisheries 2018, *Vessel tracking guideline* <https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/702f9e15-d3f1-48dd-919d-daea3bd20d76?truncate=30&inner_span=True>

¹¹⁶ Department of Agriculture and Fisheries 2020, *Vessel Tracking Installation and Maintenance Standard*, <<https://www.publications.qld.gov.au/dataset/vessel-tracking/resource/c82988cd-e1ee-4f36-a05d-badb543d340d>>

The second stage of implementing the vessel tracking requirements was delivered through the Fisheries (General) (Vessel Tracking) Amendment Regulation 2019. It extended vessel tracking requirements to all remaining commercial harvest and inshore trawl fisheries, excluding the charter fishery, commencing from 1 January 2020.

Appendix C – Vessel tracking exemption procedure

Vessel tracking unit malfunction interim procedure when in port

Purpose of the interim procedure

Fisheries Queensland has developed this interim procedure in response to industry concerns raised during the vessel tracking review. The interim procedure enables fishers to apply to Fisheries Queensland for temporary permission to start a fishing operation if a vessel tracking unit has malfunctioned on a primary boat.

This interim procedure will operate from 17 December 2021 until June 2022 or until the vessel tracking post implementation review is completed.

Vessel tracking unit on a primary boat malfunctions in port

Process for fishers

- If a vessel tracking unit on a primary boat malfunctions and reasonable troubleshooting does not resolve the malfunction, fishers must contact Fisheries Queensland to request for temporary permission to start a fishing operation without a working vessel tracking unit.
 - Phone 13 25 23, and
 - Provide information outlined in Appendix 1.

Assessment of temporary permission requests

- Fisheries Queensland may provide a temporary permission up to 48 hours for fishers to start a fishing operation without a working vessel tracking unit on a primary boat where:
 - a vessel tracking unit has failed on the primary boat
 - the fisher has conducted reasonable steps to have the unit repaired or replaced.
 - fishers have provided information requested in Appendix 1.
- Fisheries Queensland may provide a temporary permission greater than 48 hours however, these requests will only be processed during business hours and be assessed based on additional supporting evidence, for example:
 - email confirmation from the provider about the malfunction and timeframe required to repair / replace the unit
 - other evidence to support the request e.g. postage receipt to demonstrate that the unit has been returned to the provider for assessment / repair.

Conditions

- The temporary permission will be in effect until the earlier of the following:
 - end date of the temporary permission given by Fisheries Queensland, or
 - such time when the fishers receive a replacement unit from the provider.
- Fishers must **manually record or report** the position (latitude and longitude) of the primary boat:
 - at the start of the fishing operation
 - while fishing or steaming
 - every hour for the east coast trawl fishery
 - every 4 hours for all other fisheries
 - at the end of the fishing operation.

📞 13 25 23
✉ vesseltracking@daf.qld.gov.au
🌐 fisheries.qld.gov.au

Version 1.0 (December 2021)



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- Manual reporting of positions can be completed using one of the following means:
 - commercial fishing app (if available for your fishery) – **preferred method**
 - Automated Interactive Voice Response (AIVR) system – (07) 3017 0083
 - If positions have been recorded during the operation (Appendix 2), email vesseltracking@daf.qld.gov.au or call 13 25 23 at the end of fishing operation.
 - Where fishers are landing individual transferable quota (ITQ) or competitive quota species, a **prior notice** must be submitted 1 hour before landing.
 - Fishers operating in the east coast trawl fishery must not cause the relevant trawl boat to enter the Major Scallop Area (MSA) while operating under a temporary permission.

Vessel tracking unit on a tender boat malfunctions in port

- The tender boat cannot be used to start a fishing operation.
- Fishers must have operational vessel tracking units on tender boats before starting a fishing operation.
- If the vessel tracking unit on the primary boat is working, you may move the unit onto the tender boat and request temporary permission for the primary boat.

More information

Failure to comply with the conditions of the interim Malfunction Procedure may result in enforcement action being taken.

For more information about the vessel tracking unit malfunction procedure, email vesseltracking@daf.qld.gov.au or call 13 25 23.

Revision to interim procedure

Fisheries Queensland may review the interim Malfunction Procedure at any time to address any operational or compliance risks identified during implementation.

Appendix 1: Request for temporary permission to start a fishing operation without a working vessel tracking unit

1. Licence and contact details

Full name of commercial fisher in control:			
Primary commercial fishing licence number:		Boat mark:	
Phone (mobile preferred):			
Email:			

2. Details of malfunctioned vessel tracking unit

Vessel tracking unit type:	<input type="checkbox"/> Spot Trace <input type="checkbox"/> IDP800 <input type="checkbox"/> CLS Triton <input type="checkbox"/> Rockfleet / YB3i <input type="checkbox"/> IDP690 / ST6100
Vessel tracking provider:	<input type="checkbox"/> Pivotel <input type="checkbox"/> Pole Star <input type="checkbox"/> CLS Oceania
Serial number:	
Installation:	<input type="checkbox"/> Self installation <input type="checkbox"/> Professional installation
Boat with malfunctioned unit:	<input type="checkbox"/> Primary boat <input type="checkbox"/> Tender boat* *Permission to start a fishing operation without a working unit does not apply to tender boats.
Details about the malfunction, including cause of malfunction if known:	
Steps you have undertaken to address the malfunction:	

3. Details of fishing operation during temporary permission

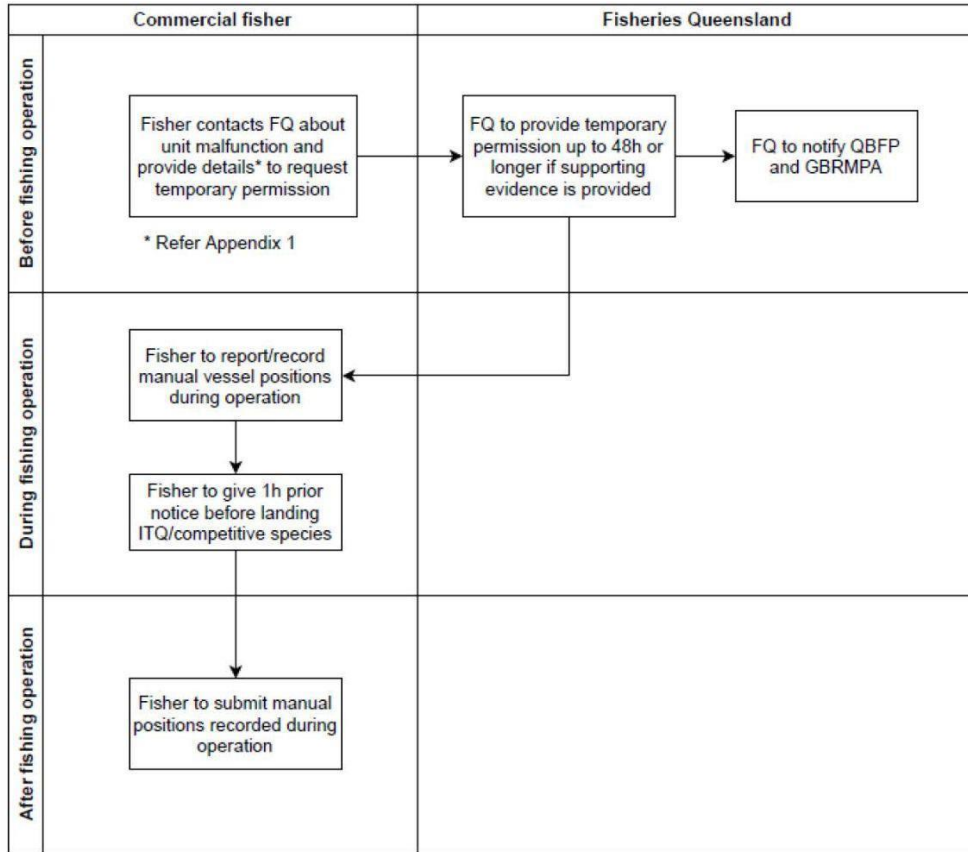
Fishery you operate in (e.g. reef line):		Fishery symbol (e.g. L1):	
Areas you will be fishing in (e.g. Gladstone) :			
Length of temporary permission requested:			
Fishing operation:	<input type="checkbox"/> Day trip <input type="checkbox"/> Extended trip (days)		
For T1, T2, M1 or M2 fishers, include the trawl management region for effort deduction:	<input type="checkbox"/> Northern <input type="checkbox"/> Southern Offshore A <input type="checkbox"/> Central <input type="checkbox"/> Southern Offshore B <input type="checkbox"/> Southern Inshore <input type="checkbox"/> Moreton Bay		

4. Supporting evidence*

Do you have email confirmation from the provider about the malfunction and timeframe required to repair / replace the unit?	<input type="checkbox"/> Yes* <input type="checkbox"/> No If yes, please provide a copy to Fisheries Queensland.
Do you have postage receipt or other evidence to demonstrate that the unit has been returned to the provider for assessment / repair?	<input type="checkbox"/> Yes* <input type="checkbox"/> No If yes, please provide a copy to Fisheries Queensland.

*Supporting evidence must be provided for temporary permission longer than 48 hours

Appendix 3: Summary workflow



Appendix D – Vessel tracking regulation (excerpt)

<https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2019-0179#ch.4-pt.1>

Part 1 Vessel tracking

Division 1 Preliminary

82 Definitions for part

In this part—

malfunction see section 80(6) of the Act.

relevant authority see section 83(1).

relevant boat, for a relevant authority, means a boat prescribed for the authority by section 83(2).

relevant period means the period prescribed by section 85.

vessel tracking standard means the document called 'Vessel tracking installation and maintenance standard' published on the department's website.

Note— The vessel tracking standard is also available for inspection, free of charge, by arrangement with the chief executive.

working properly see section 80(6) of the Act.

Division 2 General matters

83 Authorities and boats in relation to which requirements apply

(1) Section 80 of the Act applies in relation to each primary commercial fishing licence (a **relevant authority**) that has any of the following symbols written on it—

- 'A1' or 'A2'
- 'B1'
- 'C1', 'C2' or 'C3'
- 'D'
- 'J1'
- 'K1', 'K2', 'K3', 'K4', 'K5', 'K6', 'K7' or 'K8'
- 'L1', 'L2', 'L3', 'L4' or 'L8'
- 'M1' or 'M2'
- 'N1', 'N2', 'N3', 'N4', 'N10', 'N11', 'N12' or 'N13'
- 'R'
- 'T1', 'T2', 'T4', 'T5', 'T6', 'T7', 'T8' or 'T9'.

(2) For section 80 of the Act, each of the following boats is prescribed for a relevant authority (and under section 80(1)(b) of the Act is a relevant boat for the authority)—

- (a) the primary boat for the relevant authority; and
- (b) each tender boat with an engine power of more than 3kW authorised under the Act to be used under the relevant authority.

84 Way equipment must be installed

For section 80(2)(a) of the Act, the way for installing approved vessel tracking equipment on a boat stated in the vessel tracking standard is prescribed.

85 Periods during which equipment must be working properly

(1) For section 80(2)(b) of the Act, each period the relevant boat is used under the relevant authority, starting and ending as mentioned in subsection (2) or (3), is prescribed.

(2) If the relevant boat is a boat other than a tender boat, the period the relevant boat is used under the authority—

- (a) starts when the fishing operation in which the boat is used starts; and

- (b) ends when the fishing operation in which the boat is used ends.
- (3) If the relevant boat is a tender boat, the period the relevant boat is used under the authority starts and ends at the same times as the start and end of the period the tender boat's primary boat is used under the authority.

Division 3 Requirements if equipment malfunctions

Subdivision 1 Preliminary

86 Purpose and application of division

- (1) This division prescribes, for section 80(4) of the Act, requirements that apply if approved vessel tracking equipment installed on a relevant boat used under a relevant authority malfunctions during a relevant period.
- (2) The requirements are—
 - (a) if the relevant boat is a boat other than a tender boat—
 - (i) the holder of the relevant authority, or another person acting under the authority, has given the chief executive a boat communication notice under subdivision 2 for the boat; and
 - (ii) subdivision 3 is complied with; and
 - (b) if the relevant boat is a tender boat—subdivision 4 is complied with.

87 Definition for division

In this division—

approved way, for giving a notice to the chief executive, means the way—

- (a) approved by the chief executive; and
- (b) published on the department's website.

88 When person in control of a boat is aware of malfunction

- (1) For this division, the person in control of a relevant boat being used under a relevant authority is taken to be aware of a malfunction of approved vessel tracking equipment installed on the boat if—
 - (a) the person receives a notice from the chief executive or an inspector that the equipment is malfunctioning; or
 - (b) the person becomes aware the chief executive is not receiving details of the boat's position and operation from the equipment, including, for example, because the person does not receive a confirmation of the receipt of the details from the chief executive that the person is, or ought reasonably to be, expecting.
- (2) Subsection (1) does not limit the circumstances in which the person in control of a relevant boat becomes aware of a malfunction of approved vessel tracking equipment installed on the boat.

89 Notices given by chief executive or inspector under division

The chief executive or an inspector may give a notice in relation to a relevant boat under this division—

- (a) orally in person; or
- (b) by an alternative way of communication stated in the boat communication notice given for the relevant boat under subdivision 2.

Subdivision 2 Alternative way of communication

89A Application of subdivision

This subdivision applies if the relevant boat is a boat other than a tender boat.

90 Notice of alternative way

- (1) The holder of the relevant authority, or another person acting under the authority, must, before or as soon as possible after approved vessel tracking equipment is installed on the relevant boat, give a notice (a **boat communication notice**) to the chief executive.
- (2) The boat communication notice must—
 - (a) be given to the chief executive in the approved way; and
 - (b) state an alternative way (an **alternative way of communication**) in which the chief executive or an inspector may communicate with the person in control of the boat whenever that person is on the boat.
- (3) The alternative way of communication—
 - (a) must not involve the use of vessel tracking equipment; and
 - (b) must allow a communication to be received on the boat instantaneously after it is sent by the chief executive or inspector.

Examples of alternative ways of communication—
a facsimile, mobile phone, radiophone or satellite phone

- (4) More than 1 alternative way of communication may be stated in a boat communication notice.

91 Changing alternative way

- (1) The holder of the relevant authority, or another person acting under the authority, may change an alternative way of communication stated in a boat communication notice by giving the chief executive a notice stating another way (a **changed way**) of communication.
- (2) A notice given to the chief executive under subsection (1) must be given in the approved way.
- (3) However, if the holder of the relevant authority, or another person acting under the authority, gives a notice under this section, the changed way of communication must not

be used until the chief executive has advised the holder or other person that the chief executive has received the notice.

Subdivision 3 Manual reporting and landing requirements for boats other than tender boats

92 Application of subdivision

This subdivision applies if the person in control of a relevant boat, other than a tender boat, being used under a relevant authority during a relevant period becomes aware of a malfunction of approved vessel tracking equipment installed on the boat.

93 Manual reporting requirement

- (1) The person in control of the relevant boat must give a notice stating details of the boat's location to the chief executive—
 - (a) in the approved way; and
 - (b) at the following intervals—
 - (i) if the boat is being used in the east coast trawl fishery—every hour;
 - (ii) otherwise—every 4 hours.
- (2) The requirement under subsection (1) continues to apply until the earliest of the following happens—
 - (a) the relevant boat is taken to a landing place under section 94 or 95;
 - (b) the relevant period ends;
 - (c) the approved vessel tracking equipment stops malfunctioning.

94 Requirement to take relevant boat to landing place—boat used under particular authority in particular area

- (1) This section applies in relation to the relevant boat if—
 - (a) the relevant authority under which it is being used has an 'M1', 'T1' or 'T2' fishery symbol written on it; and
 - (b) the malfunction of the approved vessel tracking equipment happens inside the area within the following boundary—
 - from latitude 22°10.80' south, longitude 149°48.00' east to latitude 22°13.20' south, longitude 152°00.00' east
 - to latitude 24°13.80' south, longitude 153°33.00' east
 - to latitude 24°42.00' south, longitude 153°16.20' east
 - to latitude 25°06.00' south, longitude 153°12.00' east
 - to latitude 25°18.00' south, longitude 152°43.20' east
 - to latitude 22°10.80' south, longitude 149°48.00' east.
- (2) The person in control of the relevant boat must—
 - (a) stop the use of fishing apparatus from the boat; and
 - (b) cause the boat to travel to a landing place as soon as practicable.
- (3) Subsection (2) stops applying to the person if the chief executive or an inspector gives the person notice that compliance with subsection (2) is not required.
- (4) The chief executive or an inspector may give a notice under subsection (3) if the chief executive or inspector is satisfied—
 - (a) the approved vessel tracking equipment is working properly; and
 - (b) it is unnecessary for the relevant boat to be taken to a landing place.

95 Requirement to take relevant boat to landing place—other circumstances

- (1) This section applies in relation to the relevant boat if section 94 does not apply in relation to the boat.
- (2) The person in control of the relevant boat must cause the boat to travel to a landing place within the following period—
 - (a) 5 days;
 - (b) if the chief executive has given the person a notice allowing a longer period—the longer period.
- (3) Subsection (2) stops applying to the person if the chief executive or an inspector gives the person notice that compliance with subsection (2) is not required.
- (4) The chief executive or an inspector may give a notice under subsection (3) if the chief executive or inspector is satisfied—
 - (a) the approved vessel tracking equipment is working properly; and
 - (b) it is unnecessary for the relevant boat to be taken to a landing place.

96 Further requirement if relevant boat taken to landing place

- (1) This section applies if the relevant boat is taken to a landing place under section 94 or 95.
- (2) The person in control of the boat must not cause or allow the boat to be used for fishing unless the chief executive has given the person a notice that the approved vessel tracking equipment is in a condition that allows it to work properly.

Subdivision 4 Requirements for tender boats

96A Application of subdivision

This subdivision applies if the person in control of a relevant boat that is a tender boat being used under a relevant authority during a relevant period becomes aware of a malfunction of approved vessel tracking equipment installed on the boat.

96B Requirement to stop fishing

- (1) The person in control of the relevant boat must—
 - (a) stop the use of fishing apparatus from the boat; and
 - (b) attach the boat to its primary boat; and
 - (c) ensure the boat remains attached to its primary boat, and is not used for fishing, for the remaining part of the relevant period.
- (2) Subsection (1)(c) stops applying to the person if the chief executive gives the person a notice that the approved vessel tracking equipment is in a condition that allows it to work properly.

Fisheries Queensland has taken an independent approach in terms of VMS implementation, of which falls under the AFMA national VMS scheme. Under this national scheme all states and territories are included, excluding Queensland and NSW. Whilst each jurisdiction has their own specific requirements for who is required to have vessel tracking, and specific requirements on the approved VMS units, it is consistent in terms of management of the unit purchase, service and overheads (including polling and transmission costs).

Specifically, these representatives were questioned on the following topics:

- User requirements (i.e. who must use the VMS)
- Approach to payment (i.e. who pays for the units, installation, and polling costs)
- Arrangements with polling providers.
- Equipment failure

Appendix E – Comparative assessment of the Queensland commercial fisheries

Fishing industry in Queensland

Fishing industry consists of five sub-industries, as per Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006 (Revision 2.0). Table 39 lists the definitions of these five sub-industries.

Table 39 Definition of fishing industry

Sub-industry	Description	Primary activities
Rock Lobster and Crab Potting	catching rock lobsters or crabs from their natural habitats of ocean or coastal waters, using baited pots.	<ul style="list-style-type: none"> • Crab fishing or potting • Rock lobster fishing or potting • Saltwater crayfish fishing
Prawn Fishing	Catching prawns from ocean or coastal waters	<ul style="list-style-type: none"> • Prawn fishing • Scampi fishing
Line Fishing	Line fishing in inshore, mid-depth or surface waters.	<ul style="list-style-type: none"> • Bottom long line fishing • Line fishing • Ocean trolling • Squid jigging • Surface long line fishing
Fish Trawling, Seining and Netting	Trawling, seining or netting in mid-depth to deep ocean or coastal waters using a variety of net fishing methods.	<ul style="list-style-type: none"> • Beach seining, fishing • Bottom gill netting, fishing • Danish seining, fishing • Finfish trawling • Pair trawling • Purse seining • Set netting, fishing • Surface netting, fishing
Other Fishing	Fishing not elsewhere classified or in other types of marine life gathering	<ul style="list-style-type: none"> • Abalone/paua fishing • Freshwater eel fishing • Freshwater fishing n.e.c. • Marine water fishery product gathering • Oyster catching (except from cultivated oyster beds) • Pearling (except pearl oyster farming) • Seaweed harvesting • Spat catching • Turtle hunting

Source: ANZSIC 2006 (Revision 2.0)

There are 1,075 fishing businesses at the end of FY2021-22 in Queensland and the industry is dominated by micro and small businesses. Of them, 72 per cent (or 771) are micro business (no employee), 27 per cent (or 294) have less than 20 employees (small businesses) and only 1 per cent (or 9) has more than 20 employees (medium businesses), see Figure 7. There is no business with 200+ employee (large business threshold).



Figure 7 Fishing businesses in Queensland by employment size, FY2021-22
 Source: ABS business entry and exit data

Measured by annual turnover, 26 per cent (or 281) has less than \$50,000, 38 per cent (or 409) is between \$50,000 and \$200,000, 32 per cent (or 348) is between \$200,000 and \$2 million, and only 4 per cent (or 38) have over \$2 million (Figure 8).

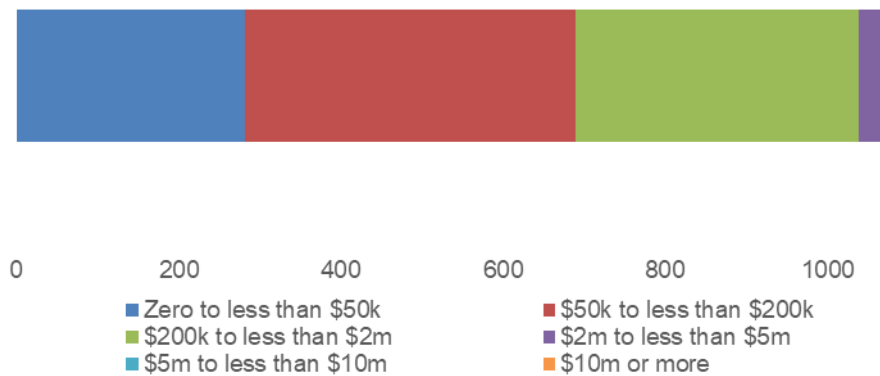


Figure 8 Fishing businesses in Queensland by annual turnover, FY2021-22
 Source: ABS business entry and exit data

Prawn Fishing accounts for the most (24 per cent) businesses in the fishing industry at the end of FY2021-22 (Figure 9), followed by Line Fishing (21 per cent), Rock Lobster and Crab Potting (20 per cent), Other Fishing (18 per cent) and Fish Trawling, Seining and Netting (17 per cent).

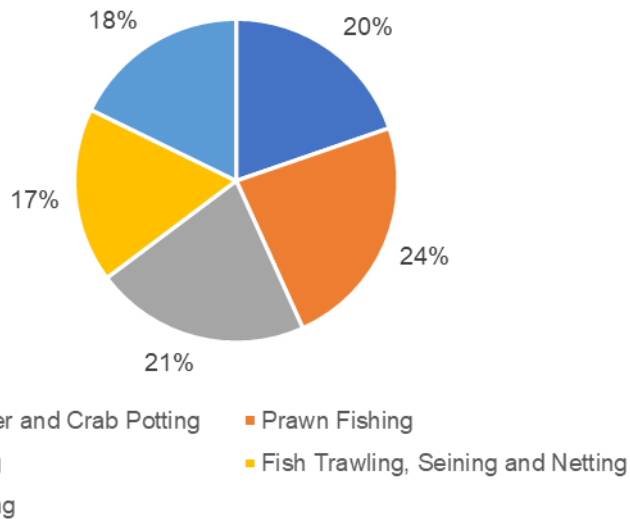


Figure 9 Components of Queensland fishing industry by business number, FY2021-22
Source: ABS business entry and exit data

The annual survival rate of the fishing businesses in Queensland depends on the size of the business (Figure 10). Only 88 per cent of micro businesses survived in FY2021-22. This increased to 92 per cent for businesses with 1 to 4 employees and to 96 per cent for businesses with 5 to 19 employees. All businesses with 20 or more employees survived in FY2021-22. The same patterns hold if measured by business turnover (Figure 11).

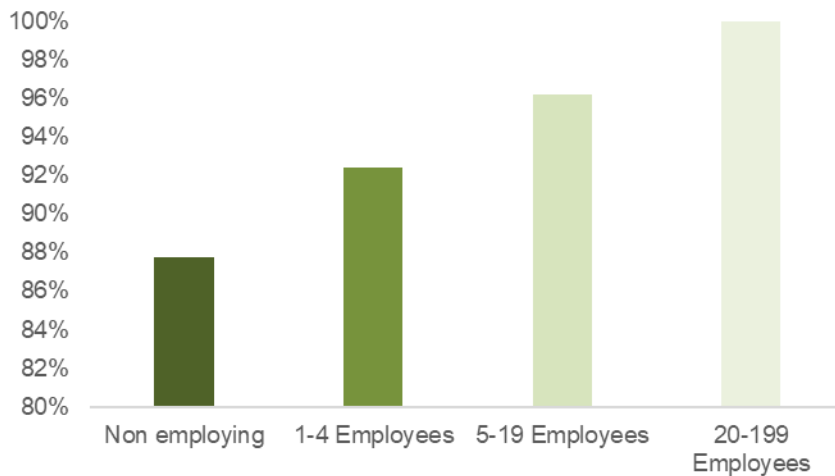


Figure 10 Survival rate by employment size in Queensland¹¹⁷, FY2021-22
Source: ABS business entry and exit data

¹¹⁷ Survival rate is calculated as $1 - \frac{\text{Number of business exits}}{\text{Number of businesses at the start of the financial year}}$.

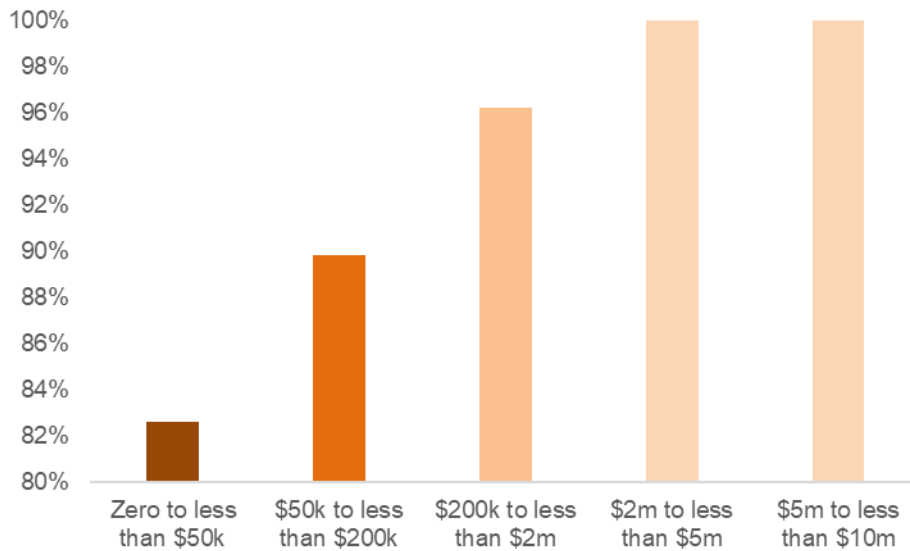


Figure 11 Survival rate by annual turnover in Queensland, FY2021-22

Source: ABS business entry and exit data

In terms of survival rate by sub-industry in Queensland in FY2021-22, Line Fishing is the highest at 93 per cent, followed by Other Fishing (90 per cent), Prawn Fishing (90 per cent), Rock Lobster and Crab Potting (89 per cent) and Fish Trawling, Seining and Netting (87 per cent), see Figure 12.

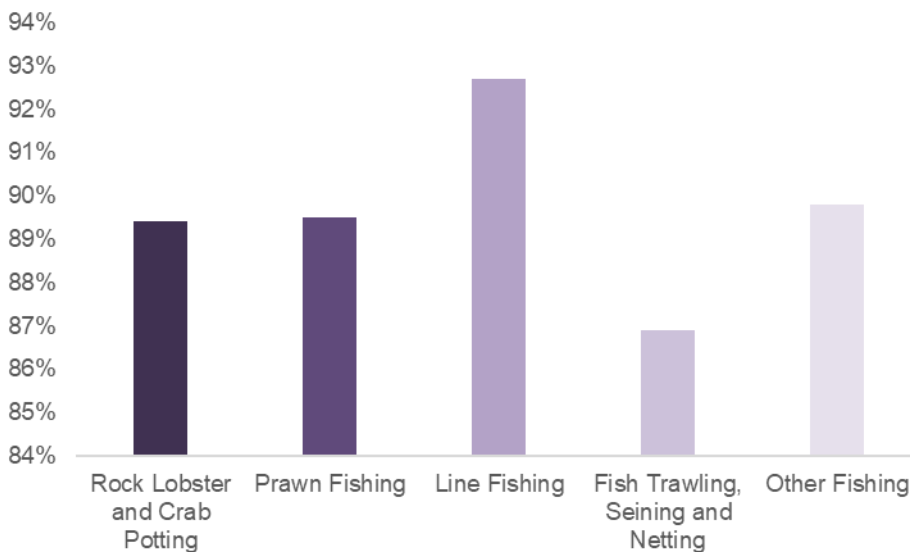


Figure 12 Survival rate by sub-industry, FY2021-22

Source: ABS business entry and exit data

How Queensland compares with other states and the national average in FY2021-22

The share of micro business in Queensland’s fishing industry (72 per cent) is higher than national average (70 per cent) and significantly higher than WA (67 per cent) where the vessel tracking system is implemented (Figure 13). If measured by annual turnover, the same patterns hold (Figure 14).

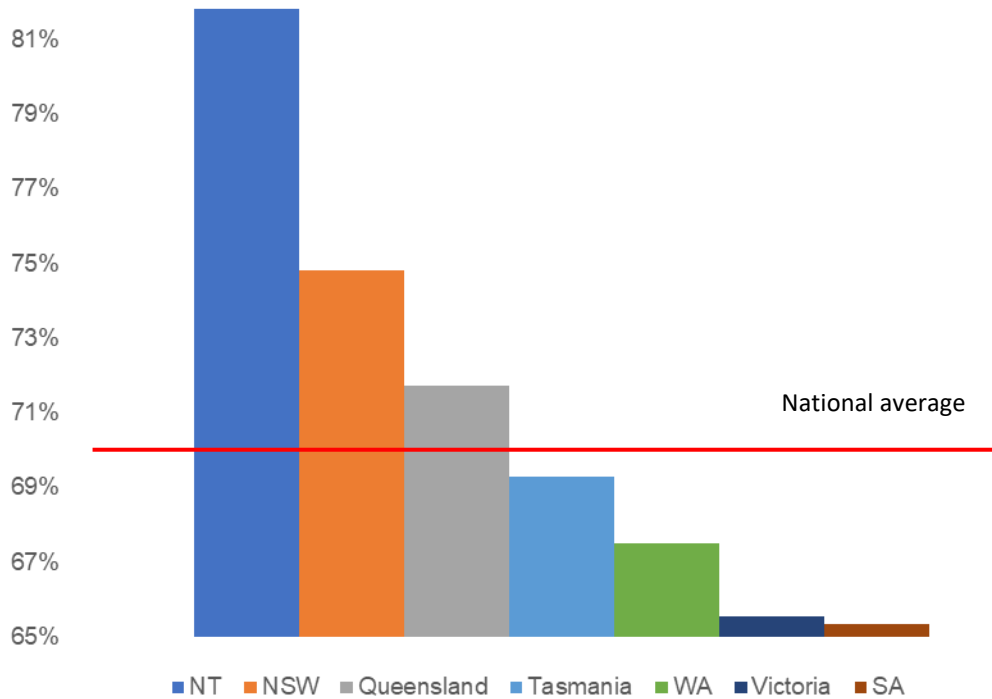


Figure 13 Share of micro business in fishing industry by state, FY2021-22
 Source: ABS business entry and exit data

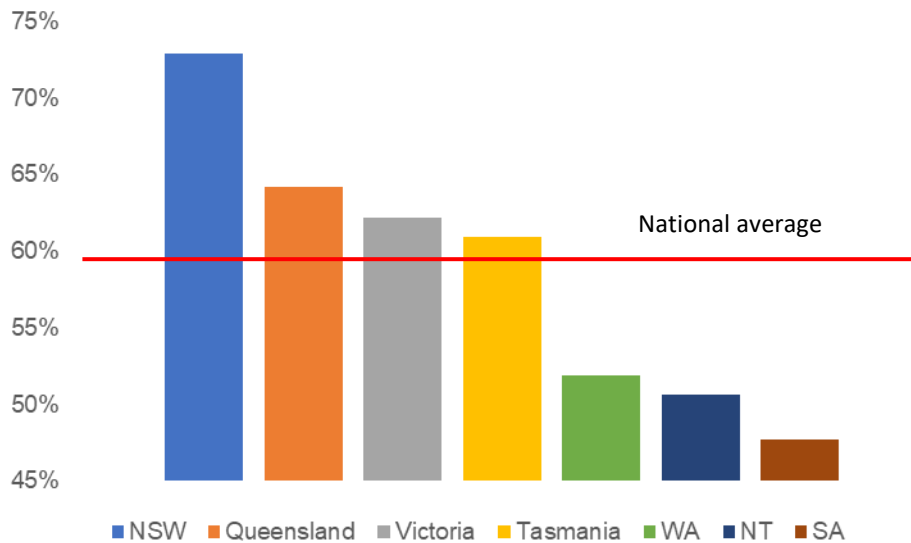


Figure 14 Share of business with annual turnover lower than **\$200,000** in fishing industry by state, FY2021-22
 Source: ABS business entry and exit data

The survival rates of micro and small businesses in Queensland’s fishing industry (89 per cent) are also lower than national average (91 per cent) and WA (91 per cent), as per Figure 15. If measured by annual turnover, Queensland is still below national average but is only very slightly lower than WA (Figure 16). However, it is worth noting that WA has a significantly lower share of businesses with annual turnover less than \$200,000.

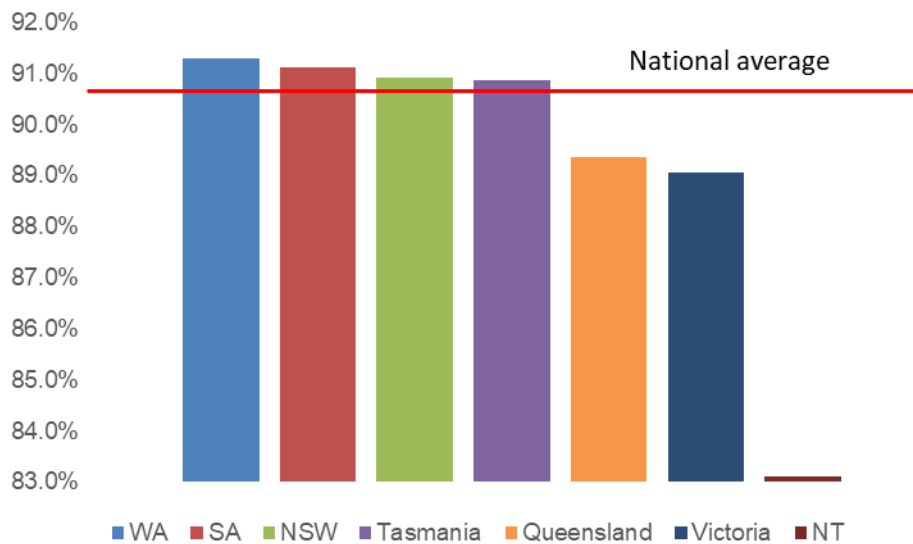


Figure 15 Survival rates of the micro and small businesses by state, FY2021-22
 Source: ABS business entry and exit data

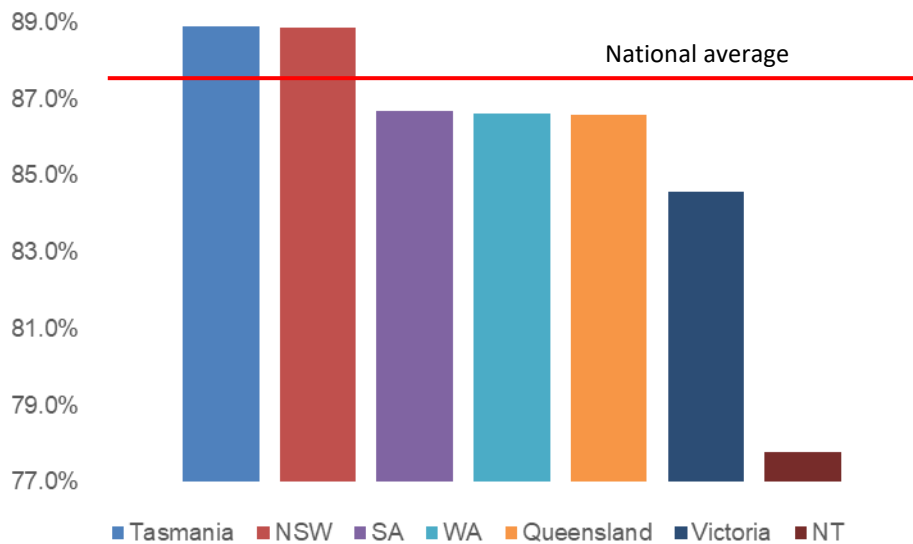


Figure 16 Survival rates of businesses with annual turnover less than \$200,000 by state, FY2021-22
 Source: ABS business entry and exit data

Share of business at a loss by jurisdiction and sub-industry

PwC modelled the share of fishing businesses at a loss by jurisdiction and sub-industry based on the financial stats of the parent industry (Fishing, hunting and trapping) at national level (FY20-21), the number and survival rates of businesses in a sub-industry in a jurisdiction (FY20-21 and FY21-22). Below are the key assumptions:

1. The share of loss-making businesses in the parent industry is similar to the share in the fishing industry as fishing industry accounts for around 90 per cent of the total number of businesses in the parent industry.
2. All exited businesses were at a loss and their shares in all businesses at a loss remain similar across jurisdictions and sub-industries and between FY20-21 and FY21-22.

Queensland has above national average share of businesses at a loss in Rock Lobster and Crab Potting (Queensland: 24 per cent, second highest just behind NT; national average: 18 per cent; see Figure 17), Fish Trawling, Seining and Netting (Queensland: 30 per cent, highest in all jurisdictions; national average: 22 per cent; see Figure 20), and Other Fishing (Queensland: 24 per cent, third

highest in all jurisdictions; national average: 21 per cent; see Figure 21). The Line Fishing businesses in Queensland perform significantly better than the national average (Queensland: 17 per cent at a loss, second lowest in all jurisdictions; national average: 29 per cent; see Figure 19) while Prawn Fishing businesses in Queensland perform slightly better than the national average (Queensland: 24 per cent at a loss; national average: 26 per cent; see Figure 18).

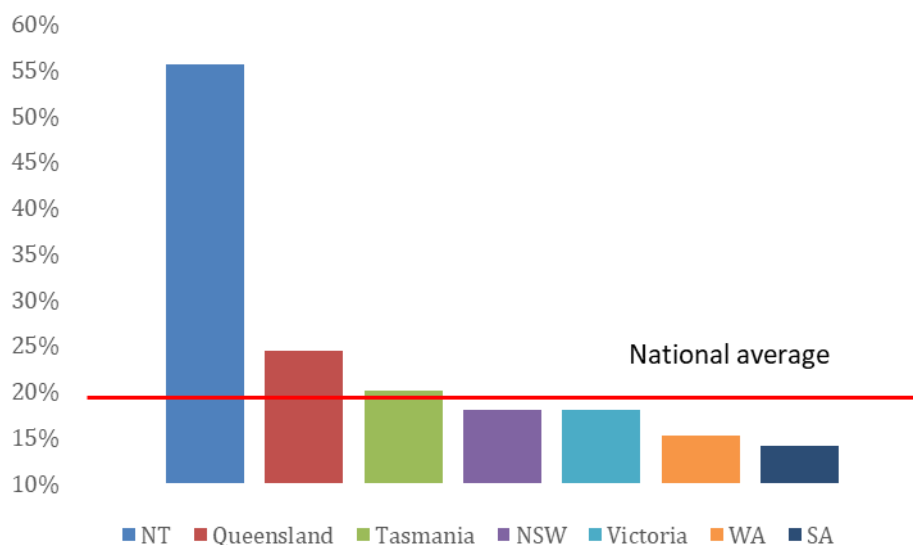


Figure 17 Rock Lobster and Crab Potting businesses at a loss (%) by jurisdiction
 Source: PwC modelling based on ABS business entry and exit data and ABS Australian industry data

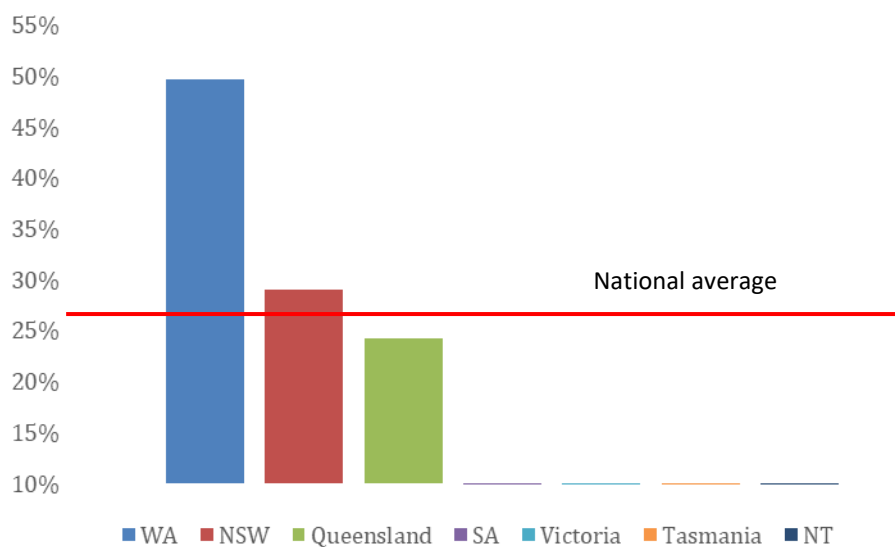


Figure 18 Prawn Fishing businesses at a loss (%) by jurisdiction
 Source: PwC modelling based on ABS business entry and exit data and ABS Australian industry data



Figure 19 Line Fishing businesses at a loss (%) by jurisdiction

Source: PwC modelling based on ABS business entry and exit data and ABS Australian industry data



Figure 20 Fish Trawling, Seining and Netting at a loss (%) by jurisdiction

Source: PwC modelling based on ABS business entry and exit data and ABS Australian industry data

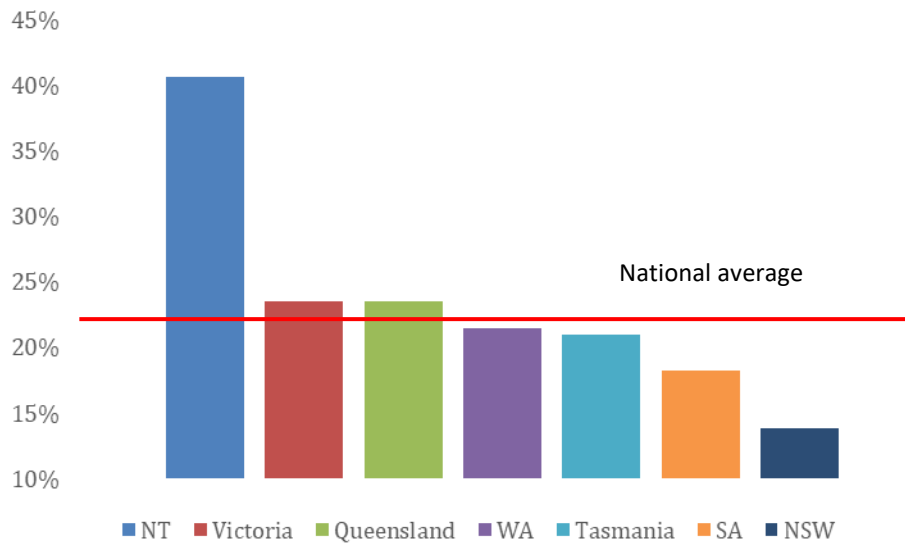


Figure 21 Other Fishing at a loss (%) by jurisdiction

Source: PwC modelling based on ABS business entry and exit data and ABS Australian industry data

Appendix F – Net Present Value (NPV) Analysis and Adjusted Net Economic Return

F.1 Summary Analysis

The below analysis considers costs and benefits of vessel tracking as outlined in the PI-IAS report, factoring a 10-year forecast (FY2018-19 to 2027-28) and NPV (2018-19 prices). The Net Benefit is \$69 469 009.

Table 40 Summary Net Present Value (NPV) Analysis

	Fishers	Government	Total
Costs			
Quantified Operational	\$ 23,586,064	\$ 10,848,759	
Quantified Rebate		\$ 698,271	\$ 35,133,093
Benefits			
Compliance saving		\$ 10,907,608	
Relaxation of regulation (wage saving)	\$ 1,451,169		
Maintaining access to the GBRMP and exports (both GBRMP and non-GBRMP)	\$ 90,963,658		\$ 103,322,435
Net Benefit NPV (as at 2018-19)	\$ 68,828,763	-\$ 639,422	\$ 68,189,342

Further details around the analysis are provided below.

F.2 Costs to government

F.2.1 Financial costs to the State Government

Further to Section 6.2.2.1, the below analysis provides a forecast of costs to government to FY2027-28. Assumptions for the analysis are provided below:

Table 41 Costs associated with managing vessel tracking by DAF

Operational Costs	FY 2018-19	FY 2019-2020	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	NPV
Operational Costs (\$)	975,830	979,156	1,373,241	1,648,191	1,648,191	1,648,191	1,648,191	1,648,191	1,648,191	1,648,191	10,848,759

Assumptions: An assumed 7% discount rate is used for the Real NPV analysis.

Table 42 Vessel tracking rebate uptake

Rebate	FY 2018-19	FY 2019-2020	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	NPV
Rebate Amount (\$)	358,006	270,695	77,248	24,265	-	-	-	-	698,271

Assumptions:

- Charter fishers are not included in the calculation for the rebate scheme. We assume that uptake of the rebate scheme will cease after FY2021-22.
- An assumed 7% discount rate is used for the Real NPV analysis.

F.3 Benefits

F.3.1 Adjusted Net Economic Return - Maintaining access to marine parks- Great Barrier Reef Marine Park and meeting fisheries approval under the EPBC act

Further to Section 6.3.3.1 and 6.3.4, the below analysis shows how the adjusted net economic return associated with GBRMP access and exports outside the GBRMP is calculated.

Table 43 Annual Adjusted Net Economic Return Calculation

Fishery	Coral Reef Fin fish (line fishery)	East Coast Inshore Fin Fish	East coast Spanish mackerel	Mud Crab East Coast	Rocky Reef Fin fish	Spanner Crab	Coral Harvest and Marine Aquarium	Total
Annual average GVP* (\$ millions)	33.1	16.6	4.2	19.6	0.7	10.2	21.4	105.8
Proportion catch by weight from GBRMP	97%	22%	90%	29%	43%	7%	96%	
Annual average value of GBRMP catch (\$ millions)	32	3.6	3.8	5.7	0.3	0.7	20.6	66.7
Non-GBRMPA value (\$ millions)	1.1	13.0	0.4	13.9	0.4	9.5	0.8	39
Exports (Table 22) (\$ millions)	9.6	0.9	-	0.1	-	2.2	16.2	29
Minimum of two rows above = Maximum possible additional export value (\$ millions)	1.1	0.9	-	0.1	-	2.2	0.8	5.10
GBRMPA catch plus maximum possible exports (\$ millions)	33.1	4.5	3.8	5.8	0.3	2.9	21.4	71.80
Net Economic Return 2018/19 (\$ millions)	-4.20	-1.30	-1.60	0.10	2.40	0.30	4.00	
Government / Management Costs 2018/19* (\$ millions)	1.60	3.50	1.10	1.90	0.90	1.40	-	
<i>Net Economic Return Adjusting for Government Costs (\$ millions)</i>	-2.60	2.20	0.50	2.00	1.50	1.70	4.00	
GVP 2018/19* (\$ millions)	30.40	19.10	3.40	22.60	1.10	8.00	16.80	
Adjusted Net Economic Return %	-9%	12%	-15%	9%	-136%	21%	24%	
Net Economic Return 2019/20**	3.80	10.90	3.90	2.50	2.30	6.10	8.70	
Government / Management Costs 2019/20**	2.00	3.50	1.10	1.90	1.10	1.40	1.30	
Vessel Tracking Costs (BDO estimate)***	0.27	0.15	0.05	0.09	0.01	0.04	0.04	

<i>Net Economic Return Adjusting for Government Costs and VMS costs</i>	6.07	-	-	4.49	-	7.54	10.04	
GVP 2019/20**	39.20	16.50	4.80	19.50	0.50	14.80	25.40	
Adjusted Net Economic Return %	15%	-44%	-57%	23%	-237%	51%	40%	
Net Economic Return 2020/21~	15.30	-	-	9.10	-	10.50	17.20	
Government / Management Costs 2019/20~	1.90	3.60	1.30	1.80	1.10	1.60	1.30	
Vessel Tracking Costs (BDO estimate)****	0.26	0.11	0.06	0.09	0.02	0.03	0.04	
<i>Net Economic Return Adjusting for Government Costs and VMS costs</i>	17.46	-	-	10.99	-	12.13	18.54	
GVP 2020/21~	51.30	21.20	5.80	26.00	0.90	18.00	35.10	
Adjusted Net Economic Return %	34%	-13%	-37%	42%	-120%	67%	53%	
Average NER%	14%	-15%	-36%	25%	-164%	47%	39%	
NER GBRMP no additional exports	4.37	-	-	1.41	-	0.33	7.98	11.66
NER GBRMP with minimum possible exports outside GBRMP	4.52	-	-	1.43	-	1.35	8.29	13.03
Midpoint of GVP								69.25
NER of Midpoint (Final benefit)								12.10

* BDO 2018/19 report Table 3-28¹¹⁸

** BDO 2019/20 report Table 6-3 - net economic return adjusted for COVID

***BDO 2019/20 report Tables 3-4 to 3-6

~ BDO 2020/21 report Table 6-3

**** BDO 2020/21 report Tables 3-4 to 3-6

Assumptions:

¹¹⁸ All BDO reports can be accessed at Department of Agriculture and Fisheries website, Fisheries economic and social data, <<https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/economic-and-social-data>>

The net economic return obtained from the BDO reports include Government costs and vessel tracking costs. These are already accounted for in the PI-IAS cost analysis, and therefore are adjusted out of the benefit analysis to calculate adjusted net economic return.

F.3.2 Forecast of Adjusted Net Economic Return

The below analysis provides a forecast of benefits associated with access to the GBRMP and meeting Fisheries approvals under the EPBC Act, to FY2027-28. Assumptions for the analysis are provided below.

Table 44 Net Present Value of Adjusted Net Economic Return

	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	NPV
Total Adjusted Net Economic Return (\$ Million)	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 12.10	\$ 90.96

Assumptions: An assumed 7% discount rate is used for the nominal NPV analysis.

The projection of status quo across all years does not include the future benefits that will be realised by the recommendations in this Decision PI-IAS. The reduction in Spanish mackerel quota, and the future reduction of operators in the East Coast Inshore Finfish fishery may also potentially increase the overall net economic return in the future, as both fisheries currently have negative economic returns.

This has also not been included in the estimates.

F.3.3 Relaxation and removal of other regulations

Further to Section 6.3.5, the below analysis provides a forecast of benefits associated with relaxation and removal of other regulations, to FY2027-28. Assumptions for the analysis are provided below.

Table 45 Forecast of benefits associated with relaxation and removal of other regulations

Wage Saving	FY 2018-19	FY 2019-2020	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	NPV
Annual Labour Cost Saving (\$)	193,097	193,097	193,097	193,097	193,097	193,097	193,097	193,097	193,097	193,097	1,451,169

Assumptions:

- An assumed 7% discount rate is used for the Real NPV analysis.

F.3.4 Compliance activities carried out by delegated agencies

Further to Section 6.3.2.1, the below analysis provides a forecast of benefits associated with a reduction in compliance activities carried out by delegated agencies, to FY2027-28. Assumptions for the analysis are provided below.

Table 46 Forecast of benefits associated with a reduction in compliance activities carried out by delegated agencies

Compliance Saving	FY 2018-19	FY 2019-2020	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	NPV
Annual Labour Cost Saving (\$)	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	1,451,400	10,907,608

Assumptions:

- Labour costs are derived using the assumption of 1 inspection per year per licence holder. It excludes associated boating, fuel and allowance costs.
- An assumed 7% discount rate is used for the Real NPV analysis.