



**Commercial Fishing
Vessel Monitoring
Systems in Australian
Marine Parks: Impact
Analysis**



Australian Government
Director of National Parks



Australian
Marine Parks

© Commonwealth of Australia 2024

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

Creative Commons licence

All material in this publication is licensed under a [Creative Commons Attribution 4.0 International Licence](#) except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@dcceew.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: Director of National Parks 2024, *Commercial Fishing Vessel Monitoring Systems in Australian Marine Parks: Impact analysis*, Department of Climate Change, Energy, the Environment and Water, Canberra, March. CC BY 4.0.

This publication is available at parksaustralia.gov.au

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090 Canberra ACT 2601
Telephone 1800 900 090
Web dcceew.gov.au

Disclaimer

The Australian Government acting through the Department of Climate Change, Energy, the Environment and Water has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Climate Change, Energy, the Environment and Water, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

Contents

List of Boxes	4
List of Tables.....	4
1. Executive Summary	1
2. Background	1
3. The problem	5
4. Why Government action is required	6
5. Options considered	6
5.1 Status Quo	6
5.2 Policy Options	7
5.2.1 <i>Universal Vessel Monitoring Systems (VMS)</i>	8
5.2.2 <i>Manual Reporting</i>	8
5.2.3 <i>Increased surveillance</i>	8
6. Consultation	9
7. Who would be affected?	10
7.1 Commercial Fishers	10
7.2 Government Fisheries Management Agencies (Fisheries Jurisdictions)	11
8. Benefits and Costs	11
8.1 Accounting for benefits and costs to Fisheries Jurisdictions	11
8.2 Accounting for the benefits of each policy option	12
8.3 Cost and Regulatory burden of options	14
8.3.1 <i>Cost of each option</i>	14
8.3.2 <i>Universal VMS requirement</i>	15
8.3.3 <i>Manual reporting</i>	16
8.3.4 <i>Increased Surveillance</i>	16
9. Analysis of Options	16
10. Implementation pathway	17
11. Evaluation	19

List of Boxes

Box 1 VMS in the South-east Australian Marine Park Network.....	13
Box 2 PV for Universal VMS requirement option	15
Box 3 PV for the Manual Reporting Option	16
Box 4 PV for the Increased Surveillance Option	16
Box 5 Summary of new Universal VMS requirement in Australia Marine Parks	19

List of Tables

Table 1 Summary of EVMS grants and approximate VMS coverage across jurisdictions.....	4
Table 2 Summary of the regulatory costs of each option over a 10-year period.	15
Table 3 Summary of the analysis of each option considered.	17
Table 4 Estimated costs to fisheries jurisdictions under universal VMS.	21
Table 5 Figures used for PV calculations for policy option 1= Universal VMS, 2=Manual Reporting and 3=Increased Surveillance.	22
Table 6 Annual regulatory burden estimates and PV calculations (rounded to the nearest '000)	22

1. Executive Summary

This Impact Analysis prepared by the Director of National Parks (the Director) examines the cost and benefits associated with achieving adequate surveillance coverage of the commercial fishing sector in Australian Marine Parks. It draws on information available to the Director gathered through extensive consultation with individual fishers, industry bodies and fisheries jurisdictions to consider the three most viable options available to the Director. These are:

- (1) Universal Vessel Monitoring Systems (VMS) – The introduction of a new regulation requiring commercial fishing vessels operating in or transiting Australian Marine Parks to have a VMS unit installed;
- (2) Manual Reporting – The introduction of a requirement for commercial fishing vessels operating in or transiting Australian Marine Parks to manually report their fishing locations to the Director;
- (3) Increased surveillance – An expansion to the Director’s current aerial and vessel-based surveillance program to capture all activity of commercial fishing vessels operating in or transiting Australian Marine Parks.

Through this analysis it is concluded that the ‘Universal VMS’ option is the least cost option that best meets the Director’s objective. Incorporating feedback received through consultation, the Director’s chosen implementation pathway has been designed to complement fisheries management requirements, and where possible, avoid imposing additional burdens on fishers by allowing time-bound exemptions where jurisdictions are progressing to VMS implementation.

2. Background

Australian Marine Parks cover 3.8 million km² of Australia’s ocean ecosystems, representing over 43 per cent of Australia’s oceans. These parks which are also often remote, comprise an enormous range and quantity of socio-economic, cultural, heritage and nationally significant marine conservation values.

Well managed marine protected areas support a range of ecosystem benefits, including increased species diversity and biomass. Managing pressures within marine protected areas also supports the resilience of marine environments to withstand pressures into the future.

Despite world-class fisheries management, led by Commonwealth, state and territory governments, fishing is an identified pressure on marine park values. In particular, illegal, unregulated and unreported fishing can modify the natural populations of target species. Bycatch of non-target species and physical disturbance to habitats from certain fishing methods potentially impact marine park values. Marine Park management plans manage these pressures by using zoning and other regulations. Illegal fishing in zones that do not allow for these activities can significantly impact park values and undermine their management. Some fishing techniques have greater consequences than others. For example, fishing

techniques that impact habitat and biodiversity, such as trawling, longlining and fish trapping.

The success of Australian Marine Parks depends largely on effective compliance. However, their sheer size and remoteness presents a significant challenge for enforcing marine park rules. For the commercial fishing sector, effective compliance involves prevention, deterrence, and detection of illegal fishing. Detection of activity undertaken by the commercial fishing sector in Australian Marine Parks relies on the ability to know where and when commercial boats are fishing. Critical to achieving this is adequate surveillance coverage.

The difficulty for the Director to achieve adequate surveillance coverage in Australian Marine Parks is driven by:

- the high costs of vessel and aerial based patrols;
- the limitations of vessel and aerial based patrols, including their spatial and temporal limitations;
- the large proportion of commercial fishing vessels operating in Australian Marine Parks who do not provide location data to the Director.

Real-time location data is considered the gold standard for monitoring commercial fishing activity, far exceeding other reporting methods such as location data self-reported by fishers in logbooks which can be sparse and often not independently verified. Vessel Monitoring Systems (VMS) are the most effective way of transmitting real-time location data from a commercial fishing vessel. A VMS is a tracking unit installed on a vessel, which communicates through satellite networks to land-based receiving stations. The unit transmits data on vessel location, course, and speed, providing real time information on commercial fishing activities to fishery and park managers for compliance purposes. Some VMS units also provide automatic notifications to fishers to help them avoid areas where fishing is prohibited.

Internationally, real-time location data provided through VMS is considered a robust cost-effective tool for the monitoring, control and surveillance of fisheries activities¹. Australia is party to Regional Fishery Management Organizations (RFMOs) that have requirements around the use of VMS to ensure the sustainable management of international fisheries, fish stocks and their related environmental impacts. VMS is also a well-established management tool in Australian fisheries and a proven successful compliance measure for enforcing Australian Marine Park rules where such technology is already installed and in use.

The Australian Fisheries Management Authority maintains a national VMS platform, providing support and a uniform approach to VMS use across jurisdictions. Nationally, more than 1600 commercial fishing vessels are already fitted with VMS units and 300 commercial fishing vessels use the automatic notification service (the Australian Marine Parks alert service)². The Australian Marine Parks alert service is

¹ Food and Agriculture Organization of the United Nations, Fishing Vessel Monitoring Systems (VMS) Factsheet

² Estimates of fleet statistics reported through the National VMS program.

a partnership initiative between Parks Australia and AFMA. It uses VMS technology to provide an alert service for commercial fishing license holders operating in Australian Commonwealth Fisheries that overlap with Australian Marine Parks. The alert service notifies masters and license holders by email and/or text when they enter an Australian Marine Park where their fishing method is prohibited. Since the introduction of the service, the alerts have been highly beneficial to marine park management and fishers by averting compliance incidents, in turn protecting marine park values and saving fishers and the Government in litigation costs. For fishers, having the Australian Marine Park alert service lowers potential risk to Australian Marine Parks values and can help avoid unintentional breaches. For Parks Australia, VMS and the Australian Marine Parks alert service provides a better understanding of potential risks to park values through greater information on the extent of fishing activity.

Fisheries management is moving towards comprehensive VMS coverage with fisheries management reforms progressing to achieve near-universal VMS coverage in Australia's ocean-going fisheries. As part of the \$35 million fisheries assistance package to support the rollout of marine park management plans in 2018, the Australian Government also provided funding to increase the uptake of VMS in use by Australian fisheries. This was in the context of marine park statutory management plans approved by the Parliament that state:

["Following consultation with the relevant fisheries management agencies and the commercial fishing industry, the Director may require all commercial fishing vessels transiting or conducting fishing activities... to carry an operating vessel identification and monitoring system."]

In 2021-22, the Australian Government made available \$5.5 million in grant funding to state and Northern Territory fisheries management agencies to increase the uptake of remote Electronic and Vessel Monitoring Systems (EVMS) for commercial fishing vessels active in Australian Marine Parks (see Table 1 for breakdown of funding). One of the intended outcomes of the EVMS Assistance Program is to reduce costs to the commercial fishing industry in preparing for possible mandatory VMS whilst operating in or transiting through AMPs by 2024.

Table 1 Summary of EVMS grants and approximate VMS coverage across jurisdictions³.

Fisheries Jurisdiction	EVMS Grant funding received	Approximate percentage of vessels currently with VMS	Approximate percentage of vessels with VMS post implementation of EVMS grants initiatives
New South Wales	\$1,865,000	<1%	Up to 60%
Northern Territory	\$103,810	94%	97%
Queensland	\$552,500	100%	No change
South Australia	\$1,279,240	7%	91%
Tasmania	\$475,000	6%	40%
Victoria	\$97,790	100%	No change
Western Australia	\$1,126,660	23%	39%
Commonwealth (AFMA)	N/A	100%	No change
	Total	54%	80%

In early 2023, the Director consulted with the commercial fishing industry and fisheries management agencies on a proposal to mandate the use of VMS on all commercial fishing vessels in Australian Marine Parks from mid-2024 onwards. A consultation paper, example Australian Marine Park commercial fishing class approvals and a draft cost-effectiveness analysis report comparing potential options were provided as part of the consultation process to support stakeholder considerations⁴.

Incorporating the learnings from consultation and further analysis, the Director has concluded that VMS is the least cost option, taking into account both costs to the Australian public as well as costs to the fishing sector. This option is calculated to cost approximately \$5.9 million.

The Director's chosen implementation pathway for the new Australian Marine Park VMS rules has been designed to complement fisheries management requirements, and where possible, avoid imposing additional burdens on fishers by allowing time-bound exemptions where jurisdictions are progressing towards VMS implementation. The maximum extension to any exemption will be the start of new Australian Marine Park management plans in 2028. Arrangements regarding access to VMS data will be negotiated between the Director and the relevant

³ Percentages of vessels reflect the entirety of the jurisdiction and may include vessels that do not currently operate in or transit Australian Marine Parks but may do so in the future. VMS units funded under EVMS grants are for installation on vessels that operate in or transit Australian Marine Parks.

⁴ [Consultation Hub: Commercial fishing vessel monitoring in Australian Marine Parks](#)

fisheries management agency. A communications campaign to increase fisher awareness and understanding of the new Australian Marine Park VMS rules will be undertaken prior to commencement to the new Australian Marine Park VMS rules.

3. The problem

Australian Marine Parks have two objectives:

- to protect and conserve biodiversity; and
- to enable ecologically sustainable use of the parks where this is consistent with biodiversity protection.

Australia's world class fisheries management, led by Commonwealth, state and territory governments, is important for ensuring sustainable fishing practices. Fishing, including illegal, unregulated and unreported fishing can modify natural populations of target species. Bycatch of non-target species and/or physical disturbance to habitats can result from certain fishing methods and in turn impact marine park values. For these reasons, careful consideration is given to which areas within Australian Marine Parks allow or prohibit commercial fishing.

Currently around 52.2% per cent of our parks, or some 2 million square kilometers, allow some form of commercial fishing activity. Commercial fishing is authorised in Australian Marine Parks by a class approval under each marine park network management plan. Class approvals set out the areas where commercial fishing can occur, the fishing methods that can be used, and the conditions that need to be followed while operating or transiting through Australian Marine Parks. They simplify regulation of marine parks by authorising a group of people undertaking the same activity, rather than requiring individual permits or licenses while avoiding duplication by deferring regulation of fisheries to the responsible fisheries management organisations.

Commercial fishing activities make up approximately 60 per cent of domestic compliance incidents in Australian Marine Parks⁵. These incidences are almost exclusively detected by VMS where it is currently available to the Director. Currently, approximately 54% of commercial fishing vessels are fitted with a VMS unit. Noting the significant number of commercial fishing vessels active in Australian Marine Parks currently without VMS, the scale of the potential compliance issue faced by the Director is apparent.

Based on these statistics it is evident that current surveillance measures in Australian Marine Parks do not provide enough information to measure compliance with park management rules, except for those fishers where VMS data is available (i.e. for 54% of commercial fishers). Where there is a low probability of detection, there is an increased likelihood of illegal fishing. While most illegal fishing incidences in marine parks are thought to be inadvertent, the low risk of detection could be seen as a

⁵ Based on Compliance incidents for the 2022/23 financial year. The remaining 40% of domestic compliance incidents are attributed to recreational fishing incidents (27.5%), breaches of permits/authorisations (11%), entry into prohibited areas (1%) and vessel groundings (0.5%)

motivator for illegal activity⁶. This can undermine confidence in management of Australian Marine Parks, leading to perceptions of ineffective “paper parks”⁷. Although it is impossible to detect all non-compliance activities in marine parks, adequate surveillance can identify and address high-risk locations and fisheries that are the most vulnerable to illegal fishing activities.

Monitoring via on-water and aerial patrols is expensive and cannot cover the extent of the Australian Marine Parks network. The Director currently spends more than 20 per cent of its marine operational budget on compliance related activities, which in 2022–23 involved 3,453 aerial patrols and 183 surface patrols⁸.

4. Why Government action is required

Given the extensive area in which commercial fishing activities can be undertaken in Australian Marine Parks, the ability of the Director to meet its primary objective to protect and conserve biodiversity depends largely on effective compliance. The statutory Australian Marine Park management plans require the Director to take actions to achieve high overall levels of compliance with the park rules and, where there is non-compliance, to work to reduce the number of suspected breaches. For commercial fishing in Australian Marine Parks, this means taking actions to prevent, deter and detect illegal fishing that can impact park values.

5. Options considered

5.1 Status Quo

The Australian Marine Park compliance program implements education and awareness initiatives that are aimed at prevention and deterrence of illegal fishing through voluntary compliance by commercial fishers. The success of these initiatives relies on the ability to monitor commercial fishing activity to ensure compliance is achieved and take appropriate enforcement action where it is necessary to do so.

Detection of activity undertaken by the commercial fishing sector in Australian Marine Parks relies on the ability to know where and when commercial boats are fishing. Nationally, more than 1600 commercial fishing vessels (representing ~54% of commercial fishing vessels) are fitted with VMS units and 300 commercial fishing vessels use the automatic notification service (the Australian Marine Parks alert service)⁹.

Parks Australia currently contracts aerial and vessel-based surveillance services

⁶ Kuperan, K. and J.G. Sutinen, 1998. Blue water crime: Deterrence, Legitimacy, and Compliance in fisheries. *Law & Society Review*, 32(2): p. 309.

⁷ Relano & Pauly, 2023 The ‘Paper Park Index’: Evaluating Marine Protected Area effectiveness through a global study of stakeholder perceptions, *Mar. Pol.*, 151 (1)

⁸ Aerial patrol figures include flights undertaken by Maritime Border Command and not directly funded by the Director of National Parks.

⁹ Estimates of fleet statistics reported through the National VMS program.

which in the 2022/23 financial year involved a total of 3,636 patrols⁷. Several factors such as variation in annual compliance budget, availability of assets from suppliers, and increasing operating costs for assets influence the actual number of patrols achieved annually. It is however plausible to suggest that under the continuation of the status quo a similar level of surveillance coverage would be maintained.

An increase from the status quo is required to improve surveillance coverage. The number of commercial fishing vessels who do not currently report real-time location data to the Director is estimated to be as high as 1300 vessels. If it is assumed adoption of VMS continues at the current pace, a conservative figure of 580 commercial fishing vessels may remain who do not report real-time location data.

An analysis by *Read et al 2022* found that 324 vessels reporting through VMS operated (i.e. either fished or transited) a total of 9380 days within Australian Marine Parks boundaries. This can be represented as a rate of ~29 visits to an Australian Marine Parks per vessel. If this rate is applied to the 580 commercial fishing vessels who do not report real-time location data, there would potentially be 16,820 visits to Australian Marine Parks annually that would require coverage from the current aerial and vessel-based patrols (i.e. from 3,636 patrols annually). If one commercial fishing vessel is observed on each patrol (which would represent a very high level of observation from current levels) there would be 13,184 visits unmonitored annually. While there is a high level of uncertainty in an estimate such as this, it demonstrates that the status quo does not produce a high enough level of surveillance coverage to effectively monitor commercial fishing activity. For this reason, the continuation of the status quo is untenable and policy options that increase surveillance coverage are required.

5.2 Policy Options

The Director has considered three key options for achieving adequate surveillance coverage of the commercial fishing sector in Australian Marine Parks to meet its parks management objectives. These are:

- (1) Universal Vessel Monitoring Systems (VMS) – The introduction of a new regulation requiring commercial fishing vessels operating in or transiting Australian Marine Parks to have an VMS unit installed.
- (2) Manual Reporting – The introduction of a requirement for commercial fishing vessels operating in or transiting Australian Marine Parks to manually report their fishing locations to the Director.
- (3) Increased surveillance – An expansion to the Director’s current aerial and vessel-based surveillance program to capture all activity of commercial fishing vessels operating in or transiting Australian Marine Parks.

¹⁰ (2019) A.D. Read, C. McBride, T. Spencer, P. Anderson, J. Smith, T. Costa, S. Clementz, A. Dowd Preventing noncompliance in marine protected areas using a real-time alert system, *Ocean Coast. Manag.*, 17, pp. 123-130

5.2.1 Universal Vessel Monitoring Systems (VMS)

Universal VMS would extend the current coverage of vessels operating in Australian Marine Parks from approximately 54% to close to 100%. Currently only Commonwealth, Victorian and Queensland managed fishers have a universal fishery management requirement for VMS. This option would mandate VMS within Australian Marine Parks for the remaining fishers in South Australia (where current VMS coverage is around 10 per cent of the fleet), the Northern Territory (extending coverage to include an additional fishery) and extending coverage to all fishers managed by New South Wales, Tasmania, and Western Australia. The Director will pursue real-time access to VMS data through data sharing agreements with each jurisdiction to remove the administrative burden of requiring fishers to report directly to the Director. Data sharing agreements would be negotiated with each jurisdiction where such agreements do not currently exist and prioritise sensitive management of fisheries data.

5.2.2 Manual Reporting

Manual reporting would require fishers who do not currently report their positional data to the Director to manually provide information on a regular basis. This would require manual submission of their logbook data to the Director on a daily basis at a minimum each time activity is undertaken in an Australian Marine Park. Currently the Director has powers through parks management plans to compel this requirement however to date this requirement has not been universally pursued. There is an administrative burden that would be imposed to individual fishers in this option and currently there is no digital solution (i.e. online portal or app) that allows for seamless transfer of data from fishers to the Director. It is also noted by Parks Australia compliance that self-reported data would require a means of verification that could incur additional cost to government and fishers. A digital reporting mechanism and independent verification method have not been included in the costings of this option.

5.2.3 Increased surveillance

In the absence of further VMS or manually reported positional data, an increase to both aerial and vessel-based patrols of our parks to effectively monitor the activity of the commercial fishing sector could be pursued. Currently, the Director spends over 20 per cent of its marine compliance budget on compliance monitoring however to increase the Director's surveillance coverage of the commercial fishing sector to an acceptable level, a substantial increase would be required. It is difficult to quantify the exact level of increased surveillance that would meet the Director's objectives; conservatively the ability to capture 5% of unmonitored commercial fishing activity (i.e. from commercial vessels with no VMS) undertaken in Australian Marine Parks annually is considered for comparison to other options. This increase would not result in a level of coverage equivalent to universal VMS for these vessels, but it is plausible in terms of a budget increase that could be realistically pursued.

6. Consultation

In 2018, management plans for five Australian Marine Park Networks signaled that the Director may introduce a VMS requirement during the next 10 years. In 2020 the Director wrote to state and Northern Territory fisheries management agencies flagging the future requirement for commercial fishing vessels to have VMS. In 2022 the Australian Government awarded \$5.5 million in grants to assist in the uptake of VMS on commercial fishing vessels in Australian Marine Parks.

Between 27 February – 26 May 2023, the Director formally consulted with the commercial fishing industry to obtain feedback on the issues and opportunities associated with the proposal for mandatory VMS. Stakeholders were invited to provide their feedback through an online survey or written submissions using the Department of Climate Change, Energy, the Environment and Water's [online consultation hub](#). A consultation paper, example Australian Marine Park commercial fishing class approvals¹¹ and a draft cost-effectiveness analysis report comparing potential options were provided as part of the consultation process to support stakeholder consideration of the proposal.

Submissions were received from individual fishers, industry bodies and a fisheries management agency. Of the submissions received, several acknowledged the importance of Australian Marine Parks in protecting the marine environment and the need to take actions that achieve high overall compliance with park rules. Most submissions, however, were opposed to the introduction of mandatory VMS for commercial fishing vessels in Australian Marine Parks. Common concerns raised across submissions included:

- VMS data use, confidentiality and security;
- the burden of ongoing VMS costs;
- the suitability and reliability of VMS units and potential for lost earnings in the event of unit breakdown;
- applicability of the VMS requirement for infrequent or marginal transit of Australian Marine Parks;
- cumulative impositions on the commercial fishing industry and instability for the sector.
- Some respondents also expressed concern regarding recreational fishing in Australian Marine Parks and that increased compliance focus should be placed on this sector.

In addition to the formal consultation process, the Director engaged with peak bodies and fisheries management agencies to understand potential impediments

¹¹ Australian Marine Park Commercial Fishing Class Approvals set out the areas where commercial fishing can occur, the fishing methods that can be used, and the conditions that need to be followed while operating and transiting through Australian marine Parks. The example provided during consultation included draft provisions for the proposed mandatory VMS in Australian Marine Parks.

and to discuss strategies for instituting a VMS mandate for Australian Marine Parks by mid-2024. Further details of the feedback received from stakeholders is provided at the Electronic and Vessel Monitoring Systems Assistance Program page on the Parks Australia website¹².

Based on the feedback received and the current state of monitoring of activities within parks the following considerations were developed to further guide options:

- 1) Compliance coverage across Australian Marine Parks needs to significantly increase to provide the required assurances around activities within the parks.
- 2) Compliance monitoring should be based on the most cost-effective means available taking into account both the cost to Australian taxpayers and to fishers.
- 3) Australian Marine Park management requirements should seek to complement normal fisheries management requirements to avoid imposing additional burdens on fishers unless it is necessary to ensure compliance within the parks.

7. Who would be affected?

7.1 Commercial Fishers

Commercial fishers operating in or transiting Australian Marine Parks will be the main affected stakeholder group. Commercial fishing in marine parks is diverse, both in fishing practices and their jurisdictional management. Commonwealth fisheries are managed by the Australian Fisheries Management Authority and include 18 fisheries consisting of approximately 316 vessels that potentially operate in or transit marine parks. State and Territory managed fisheries operating adjacent to their jurisdictions also extend to offshore fishing grounds, including marine parks. Collectively, these involve around 90 fisheries, consisting of approximately 3000 vessels active within Australian Marine Parks on a regular or irregular basis.

The actual number of commercial fishers affected will, however, be dependent on the option chosen and the timing of its implementation. For instance, if the universal VMS option were to be mandated immediately, the maximum number of fishers who currently do not have VMS or manually report positional data to the Director would be affected (representing approximately 1300 vessels). If timing is adjusted to allow for progression to VMS for fishery management purposes, for the majority of fishers, the rules will impose no additional burden beyond their existing or planned fisheries management arrangement. VMS on their vessel would serve the dual function of allowing them to comply with their state or territory fisheries management VMS requirement, as well as their Australian Marine Park VMS requirement. This option of delaying the Australian Marine Park VMS requirement

¹² <https://parksaustralia.gov.au/marine/electronic-and-vessel-monitoring-systems-assistance-program/>

to reduce the number of fishers effected is the option analysed below. This option would see up to 580 vessels affected by a VMS mandate.

The manual reporting option would impact all commercial fishing vessels currently who do not currently report real-time location data to the Director, some 1300 vessels. It is assumed that the absence of an Australian Marine Park universal VMS requirement would considerably slow (and in for some fisheries effectively halt) adoption of VMS across jurisdictions. Because it is difficult to predict which fisheries may or may not be subject to manual reporting, a conservative figure of 580 vessels (for comparability with other policy options considered) is used to determine the cost of the manual reporting option.

7.2 Government Fisheries Management Agencies (Fisheries Jurisdictions)

Fisheries jurisdictions will be impacted by a universal VMS requirement as (for some jurisdictions) an increase to current resources to manage a new or expanded program would be needed. The agencies that manage commercial fishing in each jurisdiction are:

- The Australian Fisheries Management Authority (Commonwealth fishers)
- Queensland Department of Agriculture and Fishing
- Victorian Fisheries Authority
- New South Wales Department of Primary Industries
- South Australian Department of Primary Industry and Regions
- Western Australia Department of Primary Industry and Regional Development
- Northern Territory Department of Industry, Tourism and Trade
- Department of Natural Resources and Environment Tasmania

8. Benefits and Costs

8.1 Accounting for benefits and costs to Fisheries Jurisdictions

Costs to jurisdictions can be broadly categorized as 'start up' costs, that will be incurred on implementation of a universal VMS requirement in Australian Marine Parks, and 'ongoing' costs that will be incurred to maintain VMS programs in each fisheries jurisdiction.

It is expected that some jurisdictions will see a reduction in current VMS program costs under the universal VMS option as savings are realised through sharing of administrative costs with a greater number of jurisdictions. For others increased costs, or costs for the first time, will be incurred as new and expanded VMS programs are established.

Previous cost analysis by the Director (Appendix A) quantified the change in VMS program management cost to fisheries jurisdictions and found the maximum

amount to be incurred by a single jurisdiction is estimated at \$395,200 in the first-year, accounting for both 'start up' and 'ongoing' costs.

Jurisdictional 'start up' costs at a minimum are largely offset by the \$5.5 million in grants provided by the Director to increase the uptake of VMS (see Table 1 for breakdown of grants awarded by jurisdiction). Ongoing expected cost benefits will likely exceed projected 'ongoing' cost estimates for all jurisdictions. For example, the recent post-implementation review by Queensland fisheries estimated a resulting net cost benefit, with \$1,344,725 in program costs incurred and an estimated \$1,451,400 in compliance savings from implementation of vessel tracking in Queensland fisheries. This cost benefit, while marginal, was observed despite the challenges that were present with the rollout of vessel tracking in Queensland (specifically around technology and supplier issues), that resulted in much higher administrative burden than originally expected. This demonstrates that under average projections, jurisdictions will likely see a net cost benefit overall.

For simplicity and to avoid overestimating any potential net cost benefits to jurisdictions, the costs and benefits for fisheries jurisdictions have been excluded from further analysis in considering each policy option.

8.2 Accounting for the benefits of each policy option

As explored in Read et al 2019, the most significant saving from the use of real time monitoring of commercial fishing activities in Australian Marine Parks is the resultant protection of marine park ecological and cultural values from damage caused by illegal fishing activities. Under less robust compliance, the impacts on these values will be higher. For example, a litigation case involving trawling in the Ningaloo Marine Park, off Western Australia, impacted ten hectares of deep-water corals (*Minister for the Environment v Lucky S Fishing Pty Ltd, 2015*). The Federal Court imposed civil penalties of \$34,650 along with court costs against Lucky S Fishing Pty Ltd, (fishing concession holder) for failing to take reasonable precautions to prevent commercial fishing being conducted within the Sanctuary Zone of the Ningaloo Commonwealth Marine Reserve by the Australian Fishing Vessel Nansei¹³.

Another case involving longlining from a Marine National Park Zone in the Coral Sea Marine Park, off Queensland, over 12,000 kg of shark and pelagic fish were taken (*R v. Sao Pedro Fishing Pty Ltd and Christopher Michael White, 2016*). Sao Pedro Fishing Pty Ltd and Mr Christopher White (the skipper of the vessel) were convicted and each fined \$5,000¹⁴. Based on these examples, the ecological benefit of averting compliance incidents by commercial fishing vessels is substantial.

The introduction of mandatory VMS for Queensland-managed fisheries in 2020 was highly successful for Great Barrier Reef Marine Park management, resulting in increased detection of illegal commercial fishing and behavioural change resulting in

¹³ Summary of outcomes from the Director of National Park Annual Report 2014-15

¹⁴ Summary of outcomes from the Director of National Park Annual Report 2016-17

long-term benefits to the marine park. The Great Barrier Reef Marine Park Authority has observed a downward trend in the number of commercial line fishing offences reported since the introduction of VMS with 145 offences in 2019–20, declining to 137 offences in 2020–21 and 74 offences in 2021–22.¹⁵ Australian Marine Parks have experienced similar levels of success with VMS as highlighted in Box 1 below.

Box 1 VMS in the South-east Australian Marine Park Network

Lessons from the use of VMS in the South-East Australian Marine Park Network

The South-east network of Australian Marine Parks came into existence in 2013 and was the first suite of Australian Marine Parks managed as a network. The South-east network comprise 14 marine parks around Tasmania covering 702,033 square kilometres and extend into waters off South Australia, Victoria, and New South Wales.

As part of management of the South-east network, Parks Australia gained access to VMS data from Commonwealth fisheries operating within the network. To further enhance the use of VMS technology, Parks Australia was able to set up an alert service which provided real-time information to fishers about the location of Australian Marine Parks.

In 2019, data from the use of VMS was analysed by Read et.al (2019)⁹. The authors concluded the following:

- that the use of VMS avoided 23 non-compliance incidences that would have potentially resulted in prosecution between 2014-2018.
- that each non-compliance incidence can cost up to \$55,000 in litigation costs to the Commonwealth; and,
- that each successful prosecution costs fishers up to \$150,000 in legal fees and fines.

The authors concluded that having VMS available to the Director resulted in around \$4.7 million in savings to both the Director and fishers over a 4-year period relating to the management of the South-east Australian Marine Park network.

In addition to the environmental benefits of the use of VMS, the example from the South-east Australian Marine Park Network can be extended to provide some estimate of direct financial savings both to commercial fishers and the Director. In the first four years (2014 -2018) of the VMS alert service in Commonwealth fisheries, 233 commercial fishing vessels (83% of AFMA licensed fishing vessels) were sent 3307 alerts when crossing into marine park boundaries (and zones) where the fishing activity of the vessel was not allowed. Of these alerts, it was estimated that 23 incidents of potential non-compliance were avoided. These incidents were characterized by an active change in fishing behavior upon receiving the VMS alert such as modifying route to exit area where fishing was not allowed.

While the potential savings from this avoidance behaviour can be quantified, there

¹⁵ (2022) Reef Joint Field Management Program: Annual Report 2021-22, Great Barrier Reef Management Authority.

is a high level of uncertainty with any cost estimate that can be made. For example, 23 incidents of potential non-compliance could (once confirmed to be offences) result in considerable penalties resulting from litigation, awarded court costs and legal fees incurred by both the Australian government and to each vessel committing an offence estimated at around \$1,175,000 per annum¹⁶. This figure extended to the remainder of Australian Marine Parks and the Coral Sea could result in yearly savings as high as \$5,875,000¹⁷. However, if these incidents of non-compliance resulted in Penalty Infringement Notices alone (i.e. without litigation, court costs and legal fees), the resulting penalties could be up to \$359,905¹⁸ or \$1,799,525 if extended across 5 networks. There is also the possibility that once investigated, the 23 incidents of potential non-compliance result in warning notices alone which would see no monetary penalties issued. For this reason, cost savings from avoided penalties, while likely to be observed, cannot be accurately quantified.

In considering manual reporting and the use of logbook data, it is expected that these options would not result in equivalent savings identified under the use of universal VMS. It is difficult to estimate benefits from these options as there would be an observed lack of data and it is not feasible that an uplift in aerial and vessels capability would provide a comparable level of coverage across all zones in our parks.

Given the uncertainty in the cost benefit estimates that can be quantified for universal VMS and the lack of comparability between each of the policy options, the cost benefits have been excluded from further analysis. To evaluate each policy option, the regulatory costs as well as the ability to meet the Directors objectives are used.

8.3 Cost and Regulatory burden of options

8.3.1 Cost of each option

A full summary of figures used in costing each option can be found in Appendix B, Table 5. A summary of the regulatory costs of each option is provided in Table 2 below.

¹⁶ Based on the observed \$4.7 million in savings (\$1.26 million to the Australian Government and \$3.45 million to industry) over a four-year period.

¹⁷ 5 networks multiplied by \$1,175,000 in savings per annum. Assumes the same number of offences and penalties in each network.

¹⁸ 23 incidences multiplied by \$15,650 (the amount of 50 penalty units for a commercial fishing offence)

Table 2 Summary of the regulatory costs of each option over a 10-year period.

	Option	Regulatory cost (10-year total)	Cost incurred by
1	Universal VMS (Section 7.3.2)	\$7,076,000 \$4,640,000 (Annual airtime cost of \$800 for 580 vessels, for 10 years) + \$2,436,000 (Cost of installation at \$4200 for 580 vessels)	Commercial fishing industry
2	Manual reporting (Section 7.3.3)	\$26,744,000 (29 manual reports per year for 580 vessels at \$159 per report for 10 years)	Commercial fishing industry
3	Aerial and vessel-based surveillance (7.2.4)	\$33,640,000 (Additional 841 surveillance visits at \$4000 per patrol for 580 vessels per year across all Australian Marine Parks, for 10 years)	Government

8.3.2 Universal VMS requirement

This option will impose no additional financial costs on commercial fishers who are required to operate VMS under fisheries management regulations prior to 1 July 2028.

For fishers who are not required by fisheries management regulations to carry VMS by 1 July 2028 and who transit or operate in Australian Marine Parks, the Director's VMS requirement may result in financial costs associated with VMS unit purchase, installation, and ongoing operation (airtime). The number of vessels potentially required by the Director to install and operate VMS is estimated at approximately 580¹⁹. It is worth noting that this estimate is based on the very conservative and highly unlikely assumption that none of these fishers would be required by their fisheries management authorities to transition to VMS prior to 1 July 2028. It entails some uncertainty depending on the pace of transition by 1 July 2028, but almost certainly represents a ceiling of potential cost.

The Present Value (PV) of costs on these fishers is estimated at up to approximately \$5,923,000 being calculated as:

Box 2 PV for Universal VMS requirement option

<p>(\$4,200 once-off cost for VMS unit purchase and installation¹ x 580 vessels)</p> <p>+</p> <p>(\$800¹ per year for airtime costs x 580 vessels¹)</p> <p>PV @ 7% discount rate over 10 years</p> <p>= \$5,923,000</p>

¹⁹ This is based on delaying an Australian Marine Park VMS requirement to allow fisheries jurisdictions to progress rollout of VMS.

In the context of achieving 100 per cent VMS coverage on commercial fishing vessels in Australian Marine Parks, these potential costs are considered reasonable and may not be incurred if the Director is satisfied with alternative provision of suitable real-time location data by 1 July 2028.

8.3.3 Manual reporting

The following is based on fishing vessels who do not report real-time location data through VMS providing a report to the Director each time they conduct an activity in an Australia Marine Park. It is assumed the requirement to extract relevant logbook data and provide to the Director takes approximately 2 hours in each instance at the value of time \$159 per report. Based on these assumptions, PV of this option is:

Box 3 PV for the Manual Reporting Option

580 vessels providing 29 reports per year at \$159 per report.

PV @ 7% discount rate over 10 years

= \$20,096,000

8.3.4 Increased Surveillance

Parks Australia currently spends around \$1.5 million per annum on surface and aerial patrols of our parks. Noting that these patrols only cover a small fraction of our parks and are undertaken irregularly, a conservative uplift of patrols would be to capture an additional 5% of unmonitored activity of vessels without real-time reporting post 1 July 2018, the PV of this option would therefore be approximately:

Box 4 PV for the Increased Surveillance Option

847 additional surveillance visits at \$4000 per visit for 580 vessels

PV @ 7% discount rate over 10 years

= \$25,281,000

9. Analysis of Options

Based on the analysis in Table 3, the universal VMS requirement is both least cost to industry and the Australian public and the only option that fully meets the Director's objective. One of the most compelling reasons for adopting universal VMS in Australian Marine Parks is that it is well established in Australian fisheries and is already a proven compliance measure. It is significantly more efficient than the alternatives, offering an option that is universal, consistent, and delivered in real-time with the option to assist voluntary compliance through the Australian Marine Park alert service.

Table 3 Summary of the analysis of each option considered.

Options	Present Value (PV)	Capacity to meet to Director's objective	Overall Evaluation
Universal VMS	<u>\$5,923,000</u> Least cost PV over 10 years	HIGH Greatest protection of marine park ecological values from damage caused by illegal commercial fishing activities of all options considered. Provides high resolution coverage of commercial fishing vessel activity through proven independently verified method in real-time.	Preferred Option Best option available in providing the lowest PV over 10 years and its high capacity to meet the Directors objective.
Manual reporting	<u>\$20,096,000</u> ~3.4 times greater than PV of universal VMS	LOW While manual reporting may increase domain awareness of commercial fishing activities in Australian Marine Parks in some areas, information provided through this method would be sparse, archival rather than real-time and unable to be independently verified.	Higher PV over 10 years that universal VMS and limited ability to meet the Director's objective.
Aerial and vessel-based surveillance	<u>\$25,281,000</u> ~4.3 times greater than PV of Universal VMS	LOW to MEDIUM Increased surveillance could meet the Directors objectives to the monitor activities of the commercial fishing sector in Australian Marine Parks however a significant uplift in current capability would be required.	Could meet the Director's objective but is not cost effective to do so. Highest PV of all options considered.

10. Implementation pathway

The Director will continue to engage with the commercial fishing industry and fisheries management agencies on the intended change and its implementation.

Based on the least cost option with the greatest benefit, to enact the new VMS regulation existing class approvals for commercial fishers will need to be amended to require VMS data for all vessels active in Australian Marine Parks from 1 July 2024 and no later than 1 July 2028. These conditions will state that an approved person must provide relevant VMS data to the Director and that this condition is satisfied where a data sharing agreement is in place between the relevant fisheries management agency and the Director.

Class approval conditions will align with existing fisheries management agency requirements for VMS, building on existing systems and processes to minimise unnecessary change to current practices. Fishers who access Australian Marine Parks and already have a VMS unit for fishery management requirements, or who install one before 1 July 2028 to comply with evolving fisheries management requirements, will not need to do anything new to comply with the Australian Marine Park requirement.

Recognising that some jurisdictions or fisheries are in the process of implementing VMS, time-bound exemptions to the relevant class approval conditions will be provided. This will allow those fishers progressing to VMS the time to do so with the Director's VMS requirements applying as arrangements are implemented.

For those fishers where a VMS requirement is not yet confirmed, time-bound exemptions will allow for more time to meet the Director's requirements around real time provision of locational data. The maximum extension to any exemption will be the start of new Australian Marine Park management plans on 1 July 2028.

Arrangements regarding access to VMS data will be negotiated between the Director and the relevant fisheries management agency. To date, the Director has established arrangements with the Commonwealth, Northern Territory, South Australian and Queensland fisheries management agencies for the use of relevant VMS data for the purpose of facilitating and enforcing compliance in Australian Marine Parks. Parks Australia will utilise its existing systems and processes to ensure security of VMS data and encourage fisheries management agency use of the national VMS platform established by the Australian Fisheries Management Authority.

Prior to commencement of the Australian Marine Park VMS requirement, Parks Australia will run a communications campaign to increase fisher awareness and understanding of the new Australian Marine Park rules. Commencement of the VMS requirement will be supported by an enforcement program to ensure compliance with the new rules.

Universal VMS requirement in Australia Marine Parks

To ensure compliance with Australian Marine Park rules, it is the Director's intention that all commercial fishing vessels will be required to provide real-time location data when operating or transiting an Australian Marine Park no later than the start of new marine park management plans on 1 July 2028.

The Director accepts that some fishers do not currently have VMS installed as a requirement under state or territory fisheries management rules. Noting the issues raised during consultation, the Director seeks to avoid additional burden on fishers at this time and will adopt a graduated approach to implementing the Australian Marine Park VMS requirement in the lead up to 1 July 2028 as follows:

- a. All vessels that carry a VMS under relevant fisheries management regulations must provide Australian Marine Park VMS data to the Director for the purposes of compliance only from 1 July 2024 onwards. This approach will significantly increase compliance coverage but place no additional burden on fishers beyond that imposed by normal fishery management arrangements.
- b. Where a vessel does not have a VMS requirement as at 1 July 2024 but their relevant fisheries management agency is progressing arrangements to transition to VMS, the requirement to provide Australian Marine Park VMS data will apply as fisheries management arrangements are implemented. This approach recognises VMS rollout plans being undertaken and will also result in no additional burden beyond that imposed by normal fishery management arrangements.
- c. For a vessel which does not have a VMS requirement and it is yet to be confirmed when VMS will be required by their fisheries jurisdiction, the Director will work with fisheries management agencies and fishers to ensure the requirement for real-time location data when operating within an Australian Marine Park is met by 1 July 2028.
- d. The Director will work with fisheries management agencies to ensure the provision of VMS data is facilitated between agencies while ensuring the highest standard for security and ensuring information is used for compliance purposes only.

11. Evaluation

Parks Australia will monitor and evaluate the performance of the new VMS rules, including assessing impact on:

- The extent of VMS coverage of the commercial fishing sector in Australian Marine Parks (e.g. Number of vessels reporting VMS in Australian Marine Parks prior to 1 July 2024 compared to post-VMS requirement on a monthly

basis with a goal of 90-100% coverage across all Australian Marine Parks by 1 July 2028).

- The number of non-compliance incidents relating to the commercial fishing sector detected in Australian Marine Parks (e.g., Number of incidents prior to 1 July 2024 compared to post-VMS requirement on a monthly basis).
- The number of confirmed offences relating to the commercial fishing sector in Australian Marine Parks including Penalty Infringement Notices, Warning and Advisory letters issued (e.g., Number of offences prior to 1 July 2024 compared to post-VMS requirement on a monthly basis).
- The number of commercial fishing vessels registered with the Australian Marine Parks alert service offered by Parks Australia (e.g. Number of vessels registered with the VMS alert service prior to 1 July 2024 compared to post-VMS requirement on a monthly basis with a goal of 100% of active VMS users provided the option to opt-in to the service).
- The number of alerts sent through the Australian Marine Parks alert service (Number of alerts through the VMS alert service prior to 1 July 2024 compared to post-VMS requirement).

APPENDIX A: Fisheries Jurisdictions costs

Table 4 Estimated costs to fisheries jurisdictions under universal VMS.

Cost Description	NSW DPI Fisheries \$/yr	SA DPIR Fisheries \$/yr	WA DPIRD Fisheries \$/yr	NT DITT Fisheries \$/yr	Parks Australia \$/yr
Policy and regulation development (start-up)	-	22,900	22,900	4,600	18,300
Education material and training (start-up)	75,700 15,000*	30,000 15,000*	20,000 15,000*	4,600	4,600
Engagement and consultation (start-up)	20,000	20,000	31,300	4,800	26,000
TOTAL START-UP COSTS	110,700	87,900	89,200	14,000	48,900
Provision of day-to-day information (ongoing)	4,000	2,000	2,000	2,000	0
Administration of AFMA contract and project management (ongoing)	29,700	0	0	0	0
Compliance and enforcement (ongoing)	133,900	29,700	29,700	0	139,000
AFMA management and provider charges (ongoing)	116,900	107,800	6,200	(3,900)**	59,000
TOTAL ONGOING COSTS	284,500	139,500	37,900	-1,900	144,900

*Provision for updates

**Reduction in cost due to National efficiencies

Table reproduced from the '2022 Draft Cost-Effectiveness Analysis for the Introduction of Mandatory Vessel Monitoring Systems on Commercial Fishing Vessels Operating and Transiting in AMPs' ADR Consulting for Parks Australia.

APPENDIX B: Figures used in Cost and Present Value (PV) for each policy option.

Table 5 Figures used for PV calculations for policy option 1= Universal VMS, 2=Manual Reporting and 3=Increased Surveillance.

Component	Value	Comment	Policy option where value is applied
VMS unit cost (first year only)	\$4200	Uses the highest cost estimate for an VMS unit capable of two-way communication (obtained from EVMS grants awarded) and includes costs of installation, peripheral hardware, and technician fees.	1
Airtime (annual)	\$800	Assumes an average polling rate of 15 min or less and is estimated at the highest cost rate to account for variations in actual rates that may arise.	1
Vessels	580	Assuming each jurisdiction maintains its current plans to extend VMS coverage, there will be ~580 vessels remaining who do not report real-time location data to the Director. For equal comparison, the same number of vessels have been used to compare all policy options.	1, 2 & 3
Period (years)	10	Default period of 10 years over which costs/benefits are expected to occur.	1, 2 & 3
Discount	7%	Calculation of Present Values (PV) at an annual real discount rate of 7 per cent as per requirement of the Office of Impact Analysis (OIA).	1, 2 & 3
Number of manual reports per vessel (annual)	29	Based on 9380 days where fishing occurred in Australian Marine Parks in 2021 by 324 vessels reporting through VMS (as per analysis by <i>Read et al 2022</i>) resulting in a rate of 29 fishing visits to Australian Marine Parks per vessel. Manual reporting assumes each visit would require a report.	2
Cost per report	\$159	Assumes a single manual report takes 2 hours to prepare (this estimate could be lower or higher depending on the amount of activity required to report) at a rate of \$79.63 per hour. The default hourly cost (\$45.50 per hour) is based on average weekly earnings, adjusted to include income tax and scaled up using a multiplier of 1.75 to account for the non-wage labour on-costs (for example, payroll tax and superannuation) and overhead costs (for example, rent, telephone, electricity and information technology equipment expenses).	2
Number of surveillance visits per year	16,820	Using the rate of 29 fishing visits in Australian Marine Parks per vessel, the 580 vessels who do not report in real-time create 16,820 fishing visits per year.	Status quo & 3
Number of additional surveillance visits (annual)	841	To capture 5% of the surveillance visits per year, a maximum of 841 additional surveillance visits are required.	3
Cost per surveillance visit	\$4,000	Approximate cost of single aerial or surface patrol. Depending on marine park location and hours patrolled, costs can vary. Estimate represents the average cost and accounts for rising costs of patrols likely to occur over time.	3

Table 6 Annual regulatory burden estimates and PV calculations (rounded to the nearest '000)

Year	Option 1 – Universal VMS	Option 2 – Manual Reporting	3 – Increased surveillance
------	--------------------------	-----------------------------	----------------------------

1	\$2,900,000	\$2,674,000	\$3,364,000
2	\$464,000	\$2, 674,000	\$3,364,000
3	\$464,000	\$2, 674,000	\$3,364,000
4	\$464,000	\$2, 674,000	\$3,364,000
5	\$464,000	\$2, 674,000	\$3,364,000
6	\$464,000	\$2, 674,000	\$3,364,000
7	\$464,000	\$2, 674,000	\$3,364,000
8	\$464,000	\$2, 674,000	\$3,364,000
9	\$464,000	\$2, 674,000	\$3,364,000
10	\$464,000	\$2, 674,000	\$3,364,000
PV (with 7% discount rate)	\$5,923,000	\$20,096,000	\$25,281,000