



Fisheries Standard Review

Supporting the prevention of gear loss and ghost fishing

Impact Assessment Report

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The views and opinions expressed in this report do not necessarily reflect the official policy or position of the Marine Stewardship Council. This is a working paper, it represents work in progress and is part of ongoing policy development. The language used in draft scoring requirements is intended to be illustrative only, and may undergo considerable refinement in later stages.

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1 Purpose

This report presents a summary of the impact assessment undertaken for alternative policy options developed for the project [Supporting the prevention of gear loss and ghost fishing](#), which is part of the MSC's [Fisheries Standard Review](#) (FSR).

This report provides a description of the options under consideration at the time of the impact assessment (July-September 2020) and a summary of the likely impacts for each of the different options.

The results of the impact assessment were used to inform the choice of recommended options, which were presented to the MSC's governance bodies in November-December 2020. This report was also presented as supporting background material.

Poseidon Aquatic Resource Management (Tim Huntington and Rod Cappell) were commissioned to support the impact assessment and policy development process.

2 Impact Assessment Framework

The aim of impact assessment is to provide clear information on the impacts of the options developed to sort out the policy issues identified in the project inception. It serves as a basis for comparing options against one another and against the business-as-usual scenario, and identify a preferred option if possible. It does not replace decision-making but is used as a tool to support the decision-making process and underpin evidenced based decision-making; increasing transparency, making trade-offs visible and reducing bias.

Impact assessment should help to:

- Specify how proposed options will tackle the identified issues and meet objectives
- Identify direct and indirect impacts, and how they occur
- Assess impacts in both qualitative and quantitative terms.
- Help find perverse or unintended consequences before they occur.
- Where possible, make risks and uncertainties known.

This is achieved by following MSC's Impact Assessment Framework that outlines when and how to undertake Impact Assessment. This ensures an efficient, systematic and consistent approach to policy development to underpin a responsive, robust and credible program. In particular, the Impact Assessment Framework defines the different types of impact (see below) and a suite of methodologies best suited to assessing each type.

The impact types used in the Impact Assessment are defined as follows:

- **Effectiveness:** The extent to which the change is deemed likely to be successful in producing the desired results and resolving the issue(s) originally identified.
- **Acceptability:** The extent that the change is considered tolerable or allowable, such that the MSC program is perceived as credible and legitimate by stakeholders.
- **Feasibility:** The practicality of a proposed change and the extent to which a change is likely to be successfully implemented by fisheries within a given setting and time period.
- **Accessibility & Retention:** The extent to which the change affects the ability of fisheries (both currently certified and those potentially entering assessment in the future) to achieve and maintain certification (i.e. changes in scores, conditions and pass rates).
- **Simplification:** The extent to which the change simplifies and does not further complicate the Standard such that it can be easily and consistently understood and applied.

- **Auditability:** The extent to which the change can objectively be assessed by Conformity Assessment Bodies (CABs) and Accreditation Services International (ASI) to determine whether the specified requirements are fulfilled, and CABs can provide scores.

The Impact Assessment report presents the results of this process, whereby each of the options for proposed changes to the Fisheries Standard are tested to understand their potential effects across the six defined impact types.

3 Problem Statement

Concerns were raised by the MSC internally and external stakeholders that the way the impact of ghost gear is operationalised in the MSC Fisheries Standard leads to implicit and inconsistent consideration of the issue in fisheries assessments, leading to outcomes which may not demonstrate effective ghost gear strategies.

In the first phase of the FSR, the MSC established that ghost gear impact consideration by Conformity Assessment Bodies (CABs) applying the MSC Fisheries Standard has been inconsistent, absent or incorrect. Additionally, assessment outcomes related to ghost gear mitigation have not aligned with advances in best practice management. To address this and to better encourage ‘change on the water’, there should be more explicit consideration of ghost gear impacts and the promotion of effective gear loss avoidance strategies and mitigation actions.

4 Objectives

The objective is to revise the MSC Fisheries Standard to deliver the following outcomes:

- i) the consideration of ghost gear impact needs to be explicit in fishery assessments.
- ii) the promotion of the implementation of gear loss avoidance strategies and mitigation actions in certified fisheries.

5 Options

The table below details “short-listed” options which were subject to impact assessment. Disregarded options are detailed later in the report.

5.1 Option 0

The ‘business-as-usual’ scenario considered here would see no change to the Standard’s requirements or guidance. The obligation to understand and address impact of lost gear would remain driven through Guidance (see Guidance Box GSA 7, MSC Fisheries Standard 2.01).

5.2 Option 1

Summary: The option resolves the issue through revising and clarifying requirements to include specific consideration of ghost gear impact and management. Best practice is clarified through new guidance.

Detailed proposal:

Revising the general requirements and associated guidance for unwanted catch, currently at SA3.1.6, SA3.5.3 (and for Principle 1 (P1), SA2.4.8.1), to include explicit reference to unwanted catch from ghost fishing. For Endangered, Threatened and Protected (ETP) species; consideration of “direct

effects” (SA3.10.3) to be updated to make it explicit that consideration includes the impact of ghost gear. In relation to habitats, SA3.14.2 the measure/partial strategy/strategy definitions include specific mitigation for ghost gear (management).

Proposed Requirement amendments and additions (in italics):

P1 - Change SA2.4.8 to: SA2.4.8 Scoring issue (f) requires that Unit of Assessment (UoAs) review whether the use of alternative measures could reduce the mortality arising from unwanted catches from the target stocks, *including that from ghost fishing.*

Primary/Secondary - Change SA3.1.6 to: In PIs 2.1.2 and 2.2.2, the term ‘unwanted catch’ shall be interpreted by the team as the part of the catch that a fisher did not intend to catch but could not avoid, and did not want or chose not to use. *This shall include primary or secondary species subject to ghost fishing mortality.*

ETP - Addition to SA3.10.4: *When assessing scoring issue (b), the team shall take into account whether there are any changes in the catch or mortality of ETP species due to ghost fishing.*

Habitats - Change SA3.14.2. The team shall consider the differences between measures, partial strategy, and strategy as they apply to habitat management. *In this context ghost gear management responses are required to be considered.*

Associated Guidance

Update to GSA3.1.8 Unobserved Mortality. Replacement of ‘Box GSA7: MSC Intent: “Ghost fishing” and impacts from gear loss’ with a new box entitled ‘Ghost gear, its impacts and their management’. This would include the following elements:

- Summary of how ‘Ghost gear’ and its impacts are now operationalised in this option.
- New definitions/glossary for ghost gear and its impacts (see below options).

5.3 Option 2

Summary: Option 2 resolves the issue via a new management Scoring Issue (SI) that would require fisheries to periodically review and implement measures to minimise ghost Gear and its impact on P1 and P2. This SI is structurally similar to “review of alternative measures” clauses and would be replicated within P1, Primary, Secondary, ETP and Habitats components. Best practice is clarified through new guidance.

Detailed proposal:

New scoring issues similar to the ‘review of alternative measures’ scoring issues to require the consideration of how ghost gear impacts are managed in the fishery in relation to each component. This option considers impact and management in the same way as the ‘review of alternative measures’, requiring some assessment of impact to inform the review.

The new SIs under this option are (coded in relation to their location in the current standard):

- PI 1.2.1 SI g: Review of ghost fishing of target species.
- PI 2.1.2 SI f: Review of ghost fishing of primary species
- PI 2.2.2 SI f: Review of ghost fishing of secondary species
- PI 2.3.2 SI f: Review of ghost fishing of ETP species

- PI 2.4.2 SI e: Review of ghost gear impact on “main” habitats

SG60	SG80	SG100
There has been a review of the potential effectiveness and practicality of measures to minimise ghost gear and its impact on [insert scoring component].	There is a regular review of the potential effectiveness and practicality of measures to minimise ghost gear and its impact on [insert scoring component] and they are implemented as appropriate.	There is biennial review of the potential effectiveness and practicality of measures to minimise ghost gear and its impact on [insert scoring component] and they are implemented as appropriate.

Associated guidance

Update to GSA3.1.8 Unobserved Mortality. Replacement of ‘Box GSA7: MSC Intent: “Ghost fishing” and impacts from gear loss’ with a new box entitled ‘Ghost gear, its impacts and their management’.

This would include the following elements:

Box GSA7: MSC Intent: Ghost gear, its impacts and their management

MSC Intent: Ghost gear - definitions, its impacts and their management

Assessment teams should consider the following definitions¹ when considering ghost gear and its impacts:

Abandoned fishing gear: fishing gear over which that operator/owner has control and that could be retrieved by owner/operator, but that is deliberately left at sea due to force majeure or other unforeseen reasons.

Discarded fishing gear: fishing gear that is deliberately released at sea without any attempt for further control or recovery by the owner/operator.

Fishing gear: fishing gear is a tool with which living aquatic resources are captured. This refers to any physical device, or part thereof, or combination of items, that may be placed on or in the water or on the seabed with the intended purpose of capturing or facilitating the capture, or harvesting of marine organisms, in accordance with MARPOL Annex V.

Ghost fishing: the continued capture /and or entanglement of target, non-target and ETP species by ghost gear.

Ghost fishing mortality: the mortality of free living or benthic organisms arising from the entrapment, entanglement or other physical interactions with ghost gear.

Ghost gear: fishing gear or parts thereof that is abandoned, lost, or discarded at sea. This is more formally referred to as ‘Abandoned, Lost or Discarded Fishing Gear’ (ALDFG).

¹ Definitions adapted from: FAO. 2019. Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO.

Ghost gear impact: environmental impacts resulting from ghost gear, including ghost fishing and/or its physical impact on the benthos.

Lost fishing gear: fishing gear over which the owner/operator has accidentally lost control and that cannot be located and/or retrieved by the owner/operator.

The assessment of the impacts of both ghost fishing and gear loss are operationalised in the management components of both Principle 1 and Principle 2, where the extent to which the efficacy of measures and their implementation are reviewed are considered.

Various approaches can be taken to manage ghost gear and its impacts. As proposed by Macfadyen *et al* (2009²), interventions can be broadly divided between measures that **prevent** (avoiding the occurrence of ALDFG in the environment); **mitigate** (reducing the impact of ALDFG in the environment) and **Remediate** (removing ALDFG from the environment). These include but are not limited to:

Type of Measure	Example measures
Prevention	<ul style="list-style-type: none">• Marking and identification of fishing gear• Spatial and/or temporal measures to reduce gear conflict• Fishing input controls to limit gear use (e.g. limits on soak time for passive gear types)• Gear design to reduce whole or partial loss of the fishing gear• Vessel design to reduce gear and other aquatic litter discarding• Use of end-of-life fishing gear disposal facilities• Fisher Education and awareness on preventing gear loss
Mitigation	<ul style="list-style-type: none">• Gear design to reduce the incidence and duration of ghost fishing
Remediation	<ul style="list-style-type: none">• Lost gear reporting, location and recovery initiatives

When considering approaches to managing ghost gear and its impacts, assessment teams should consider current best practice, referring to FAO (2009)³ for basic principles, the FAO (2009) Voluntary Guidelines on the Marking of Fishing Gear⁴ and the revised 2020 GGGI ‘Best Practice Framework for the Management of Fishing Gear’⁵. It is widely accepted that prevention is better than mitigation or remediation of ghost gear impacts and this should be taken into account during any reviews of the effectiveness and practicality of measures and their implementation.

² http://www.fao.org/fileadmin/user_upload/newsroom/docs/Ghost_fishing_report.pdf

³ Macfadyen, G., T. Huntington and R. Cappell (2009). Abandoned, lost or otherwise discarded fishing gear. UNEP Regional Seas Reports and Studies, No. 185; FAO Fisheries and Aquaculture Technical Paper, No. 523. Rome, UNEP/FAO. 2009. 115p

⁴ FAO (2019). Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO

⁵ Under final preparation for GGGI – will be published by December 2020.

5.4 Option 3

Summary: Option 3 requires fisheries to implement a management strategy to minimise ghost gear and its impact on P1 and P2. This option is like Option 2, but instead requires fisheries to implement a management strategy to minimise ghost gear and its impact on P1 and P2. This SI is structurally similar to the ‘measures/partial strategy/strategy’ clauses and would be replicated within P1, Primary, Secondary, ETP and Habitats components.

There is also a difference in scope with this option: Ghost gear definition includes Fish Aggregation Devices (FAD). Best practice is clarified through new guidance.

Detailed proposal:

New scoring issues that require the consideration of how ghost gear impacts are managed in the fishery in relation to each component. This option combines impact and management considerations as it requires some assessment of the impact to inform a strategy. The scope of ghost gear definition includes FADs.

The specific changes under this option are (coded in relation to their location in the current standard):

- PI 1.2.1 SI g: Ghost fishing of target species.
- PI 2.1.2 SI f: Ghost fishing of primary species
- PI 2.2.2 SI f: Ghost fishing of secondary species
- PI 2.3.2 SI f: Ghost fishing of ETP species
- PI 2.4.2 SI e: Ghost gear impact on “main” habitats

SG60	SG80	SG100
There are measures in place, if necessary, for the UoA that are expected to minimise ghost gear and its impact on [insert scoring component].	There is a partial strategy in place for the UoA, if necessary, that is expected to minimise ghost gear and its impact on [insert scoring component].	There is a strategy in place for the UoA that is expected to minimise ghost gear and its impact on [insert scoring component].

Associated guidance

The definition for the phrase “If necessary” in Table SA8 would be changed to:

The term “if necessary” is used in the management strategy PIs at SG60 and SG80 for the primary species, secondary species, habitats and ecosystems components. This is to exclude the assessment of UoAs that do not impact the relevant component at these SG levels. *In the case of ghost gear, this refers whether or not the risk of ghost fishing or ghost gear impacts are either demonstrably absent or negligible.*

Update to GSA3.1.8 Unobserved Mortality. Replacement of ‘Box GSA7: MSC Intent: “Ghost fishing” and impacts from gear loss’ with a new box entitled ‘*Ghost gear, its impacts and their management*’.

This would include the following elements. **[Note the definition of FADs highlighted below represents an addition to scope of the option relative to Option 2].**

Box GSA7: MSC Intent: Ghost gear, its impacts and their management

MSC Intent: Ghost gear - definitions, its impacts and their management

Assessment teams should consider the following definitions when considering ghost gear and its impacts:

Abandoned fishing gear: fishing gear over which that operator/owner has control and that could be retrieved by owner/operator, but that is deliberately left at sea due to force majeure or other unforeseen reasons.

Discarded fishing gear: fishing gear that is deliberately released at sea without any attempt for further control or recovery by the owner/operator.

Fishing gear: fishing gear is a tool with which living aquatic resources are captured. This refers to any physical device, or part thereof, or combination of items, that may be placed on or in the water or on the seabed with the intended purpose of capturing or facilitating the capture, or harvesting of marine organisms, in accordance with MARPOL Annex V.

***Fish Aggregating Device (FAD):** refers to a permanent, semi-permanent or temporary object, structure or device of any material, man-made or natural, which is deployed, and/or tracked, and used to aggregate fish for subsequent capture. A FAD can be either an anchored FAD (aFAD) or a drifting FAD (dFAD). For the purpose of MSC assessment, FADs are not considered a gear type as such because they do not capture fish, but merely facilitate subsequent capture. FADs therefore maybe included as a functional part of certain gear types (e.g. purse seine, handline) as they are sometimes used to facilitate the capture efficiency of these gears.*

Ghost gear: fishing gear or parts thereof that is abandoned, lost, or discarded at sea. This is more formally referred to as 'Abandoned, Lost or Discarded Fishing Gear' (ALDFG).

Ghost fishing: the continued capture /and or entanglement of target, non-target and ETP species by ghost gear.

Ghost fishing mortality: the mortality of free living or benthic organisms arising from the entrapment, entanglement or other physical interactions with ghost gear.

Ghost gear impact: environmental impacts resulting from ghost gear, including ghost fishing and/or its physical impact on the benthos.

Lost fishing gear: fishing gear over which the owner/operator has accidentally lost control and that cannot be located and/or retrieved by the owner/operator.

The assessment of the impacts of ghost fishing and gear loss are operationalised in the management components of both Principle 1 and Principle 2, where the degree of management is considered e.g. whether *measures*, a *partial strategy* and a *strategy* are in place at SG60, SG80 and SG100 respectively (see Table SA8 for further discussion of these three phrases).

Various approaches can be taken to manage ghost gear and its impacts. As proposed by Macfadyen *et al* (2009⁶), interventions can be broadly divided between measures that **prevent** (avoiding the occurrence of ALDFG in the environment); **mitigate** (reducing the impact of ALDFG

⁶ http://www.fao.org/fileadmin/user_upload/newsroom/docs/Ghost_fishing_report.pdf

in the environment) and **Remediate** (removing ALDFG from the environment). These include but are not limited to:

Type of Measure	Example measures
Prevention	<ul style="list-style-type: none"> • Marking and identification of fishing gear • Spatial and/or temporal measures to reduce gear conflict • Fishing input controls to limit gear use (e.g. limits on soak time for passive gear types) • Gear design to reduce whole or partial loss of the fishing gear • Vessel design to reduce gear and other aquatic litter discarding • Use of end-of-life fishing gear disposal facilities • Fisher Education and awareness on preventing gear loss
Mitigation	<ul style="list-style-type: none"> • Gear design to reduce the incidence and duration of ghost fishing
Remediation	<ul style="list-style-type: none"> • Lost gear reporting, location and recovery initiatives

When considering approaches to managing ghost gear and its impacts, assessment teams should consider current best practice, referring to FAO (2009)⁷ for basic principles, the FAO (2009) Voluntary Guidelines on the Marking of Fishing Gear⁸, the revised 2020 GGGI ‘Best Practice Framework for the Management of Fishing Gear’⁹ and ISSF best practice for FADs.

It is widely accepted that prevention is better than mitigation or remediation of ghost gear impacts. It is the intent of MSC to promote effective gear loss avoidance strategies and therefore it is expected that measures should include one or more preventative measures at SG60. It is expected that a *partial strategy* should include more than one measure that work together to prevent ghost fishing by the UoA whilst a *strategy* may also include mitigation and remedial measures to address ghost fishing by the UoA.

6 Summary of impacts

The following section provides a summary of the findings of all of the impact assessment activities (both high level and more detailed), informed through consultation and analysis.

Option 0 is a business-as-usual (BAU) scenario. The main issue here is that ghost gear impacts are not addressed directly, with only vague guidance, which has led to incorrect and ineffective outcomes. Additionally, the scoring of fisheries is not reflective of advances in best practice management.

Option 1 resolves the issue through revising and clarifying requirements on unwanted catch, ETP and Habitats components to include specific consideration of ghost gear impacts and management. Best practice will be clarified through new guidance. The option would be auditable and does not add

⁷ Macfadyen, G., T. Huntington and R. Cappell (2009). Abandoned, lost or otherwise discarded fishing gear. UNEP Regional Seas Reports and Studies, No. 185; FAO Fisheries and Aquaculture Technical Paper, No. 523. Rome, UNEP/FAO. 2009. 115p

⁸ FAO (2019). Voluntary Guidelines on the Marking of Fishing Gear. Directives volontaires sur le marquage des engins de pêche. Directrices voluntarias sobre el marcado de las artes de pesca. Rome/Roma. 88 pp. Licence/Licencia: CC BY-NC-SA 3.0 IGO

⁹ Under final preparation for GGGI – will be published by December 2020.

complexity as it retains the structure of Option 0. Whilst the option supports policy objectives there are doubts that it will lead to “change on the water” because it largely assesses ghost gear indirectly (e.g. via unwanted catch considerations). Acceptability of this ‘middle ground’ option is uncertain as stakeholder views would likely be polarised (e.g. NGOs vs fishing industry) - it may please no one. Additionally, there are some minor feasibility and accessibility concerns for fisheries operating in jurisdictions that do not manage ghost gear impacts.

Option 2 resolves the issue via a new management SI that would require fisheries to periodically review and implement measures to minimise ghost gear and its impact on P1 and P2. This SI is structurally similar to “review of alternative measures” clauses and would be replicated within P1, Primary, Secondary, ETP and Habitats management PIs. Best practice is clarified through new guidance directing fisheries adopt measures to prevent the occurrence and impact of ghost gear, including promoting its removal from the environment. This option does support policy objectives and will largely be acceptable to stakeholders but would add auditability issues as the clauses measure several topics simultaneously. The option would also add some complexity given duplication across P1 and P2 (five new SIs) and there are some minor feasibility and accessibility concerns for fisheries operating in jurisdictions that do not manage ghost gear impacts.

Option 3 is similar to Option 2, but instead requires fisheries to implement a management strategy to minimise ghost gear and its impact on P1 and P2. There is also a difference in scope with this option; the ghost gear definition includes lost, abandoned or discarded fish aggregation devices (FAD). This SI is structurally similar to the ‘measures/partial strategy/strategy’ clauses and would be replicated within management PIs for P1, Primary, Secondary, ETP and Habitats components. Best practice is clarified through new guidance, as with Option 2, but expectations of management interventions are set at each scoring guidepost level. This additional specification will strengthen auditability and set clear expectations for fisheries. The increase in scope of the option to include FADs allows for mitigation of some of the more severe ghost gear impacts by some tuna fisheries (e.g. VME impact) in a way which helps clarify intent and drive best practice for FAD management. This is likely to be acceptable to most stakeholders. On the negative side, the option suffers from adding complexity via duplication and there are some minor accessibility concerns for jurisdictions in which ghost gear, including FADs, are not managed.

7 Impacts

7.1 Impact Assessment – High Level analysis

The impact assessment presented in the table below was based on expert judgement of the project and outreach leads, feedback provided by outreach co-readers, responses to a public consultation webinars and survey and the findings of consultants (Poseidon). Any impact type considered significant was subject to further analysis which is provided in further sections below.

Table 1: Impact assessment summary across options.

Impact Type	Description	Option 0	Option 1	Option 2	Option 3
Effectiveness	<i>Is the change effective at meeting the MSC’s intent?</i>	No. The implicit nature of GG criteria mean that assessments do not consider this issue effectively. The analysis has demonstrated this.	Yes, somewhat. Ghost gear impact consideration would be directed however best practice may not be very effectively incentivised. The changes still amount to the assessment of ghost gear indirectly (e.g. via unwanted catch impacts) which may not result in “change on the water”.	Yes. Both objectives would be more specifically supported (than 2) given they would be explicitly assessed and scored. Fisheries would need to consider, and review measures linked to Best Practice via Guidance which should make it clear what expectations of measure “effectiveness” should amount to. It would also drive fisheries to collect more information on ghost gear issue.	Yes. Both objectives would be supported given they would be explicitly assessed and scored; it may be more effective than Option 2 as guidance could specify expected actions in measures & strategy, while review may be more passive. In general, an improved improvement pathway relative to Option 2. The FAD scope addition would represent an increase in “effectiveness” given the ghost gear impacts FADs are known to elicit on ecosystems.
	<i>The option seems effective at resolving the issue(s) consistently and reliably.</i>	<i>1 = Completely disagree</i>	<i>3 = Neither agree nor disagree</i>	<i>4 = Agree</i>	<i>5 = Completely agree</i>
Acceptability	<i>Is the change acceptable to stakeholders?</i>	The majority of stakeholders would not find the BAU acceptable though a few would: a few stakeholders would not consider this impact as critical as others for example (e.g. as there is an	Acceptability of this ‘middle ground’ is uncertain as stakeholder views would likely be polarised (e.g. NGOs vs fishing industry). The consultation survey demonstrated that most fishing industry	Partially. Some would strongly support (e.g. NGOs) whilst others would not (in line with consultation survey results described for previous option) given the likely cost implications (e.g. industry): any mitigation measure (e.g. gear marking; reporting; recovery) would add some	As with Option 2. Some would strongly support (e.g. NGOs) whilst others would not given the likely mitigation costs (e.g. tuna industry). There would also likely be opposition from fisheries operating in jurisdictions where measures limiting FAD loss and impact do not currently exist (e.g. certain RFMOs)

		<p>economic incentive to keep ALDFG impacts low there is not necessarily the justification to address this need within the Standard).</p> <p>The consultation survey demonstrated (38/44 responses) that most stakeholders supported a more explicit consideration of ghost gear impacts. This shows that the BAU option would likely be unacceptable.</p>	<p>representatives (5/6 who responded) would favour a non-normative change (e.g. Guidance); whilst the majority of NGOs (6/7 who responded) would favour normative changes (e.g. Requirements)</p>	<p>upfront costs to the operation and assessment.</p>	
	<i>The option seems acceptable to stakeholders</i>	<i>2 = Disagree</i>	<i>3 = Neither agree nor disagree</i>	<i>3 = Neither agree nor disagree</i>	<i>3 = Neither agree nor disagree</i>
Feasibility	<i>Is the change feasible to fishery partners?</i>	<p>Yes. No change represents no additional action/measure required by fishery partners. This would be highly feasible position for some fishery partners.</p>	<p>Partially– there is an economic incentive to manage ALDFG so there will be measures in place to reduce gear loss in a lot of cases. Additionally, many generic fishery management measures contribute to gear loss avoidance (e.g. bycatch</p>	<p>Partially – as previous, however as ALDFG impact arguably less explicitly assessed, this option may be marginally more feasible than Option 2. However, less feasible where jurisdictions do not currently manage ALDFG in some way.</p> <p>The consultation survey demonstrated that</p>	<p>Partially – mostly as per Option 2, however as ALDFG impact more explicitly assessed in terms of measures/strategy, so this option may be marginally less feasible than Option 2 where jurisdictions do not currently manage ALDFG in some way.</p> <p>With respect to feasibility of FAD measures it is understood that this</p>

			<p>measures; IUU directives etc.). However, in some situations (e.g. some jurisdictions and/or fisheries) info on the scale of loss and impact would be lacking; and there would be a challenge to implement ALDFG avoidance (technically and cost wise).</p> <p>The consultation survey demonstrated that most respondents (27/34) who are involved in a fishery (and who answered the question) have cited that ALDFG is already managed in some way. This would suggest that any new measure would most likely be “feasible” for fishery partners.</p>	<p>most respondents (21/27 who answered the question) felt that changes would need to be made in fisheries in response to any new requirement on gear loss, however a significant portion of respondents (11/24) felt that they were “prepared/very prepared” for gear loss measures. On the other hand, a few (4/24) felt very unprepared for any such measures – these (3/4) tended to be representatives of small artisanal fisheries.</p> <p>The majority of management contexts are likely to direct measures which would work to reduce ALDFG in a general sense (e.g. IUU measures; bycatch mitigation measures; spatial measures to reduce gear conflict; input controls etc.) which will contribute to “Reviews”.</p>	<p>may depend on whether FAD loss/mitigation management exists via fishery controls (e.g CMMs) or has been implemented by the fishery.</p> <p>In this context a large tuna fishery survey respondent supported gear loss measures linked to FAD management but another respondent suggested that the same fishery would be unprepared for any FAD measures.</p>
	<p><i>The option seems technically feasible for fishery partners</i></p>	<p><i>5 = Completely agree</i></p>	<p><i>4 = Agree</i></p>	<p><i>4 = Agree</i></p>	<p><i>4 = Agree</i></p>

	<i>The option seems affordable for fishery partners</i>	<i>5 = Completely agree</i>	<i>4 = Agree</i>	<i>4 = Agree</i>	<i>4 = Agree</i>
	<i>The option seems possible given the management contexts of fishery partners</i>	<i>5 = Completely agree</i>	<i>4 = Agree</i>	<i>4 = Agree</i>	<i>3 = Neither agree nor disagree</i>
	<i>The option seems doable within 5 years for fishery partners</i>	<i>5 = Completely agree</i>	<i>4 = Agree</i>	<i>4 = Agree</i>	<i>4 = Agree</i>
Accessibility and Retention	<i>Does the change affect the accessibility and retention of fisheries in the MSC program?</i>	“No change” would unlikely have a net impact on accessibility and retention.	Fisheries will need to demonstrate an understanding of the scale of ALDFG impact and be able to demonstrate that ALDFG is being actively managed as a part of approach which manages all sources of unwanted catch within the fishery. Whilst for some situations these requirements would be challenging (e.g. certain jurisdictions which do not promote ALDFG avoidance; certain	As per Option 1, however, with this option there will be more expectation that ALDFG is managed directly and specifically and the effectiveness is measured. This is likely to add some ongoing costs to the assessment, in particular in situations where management jurisdictions do not actively manage ALDFG. However, it is unlikely that these factors will be prohibitive in terms of fisheries joining the program.	As per Option 2, however, with this option there will be an expectation that ALDFG is managed directly and specifically and the effectiveness is measured. This is likely to add some ongoing costs to the assessment, in particular in situations where management jurisdictions do not actively manage ALDFG (e.g. RFMOs who don't yet direct management of FADs). However, it is unlikely that these factors will be prohibitive in terms of fisheries joining the program.

			fisheries which do not currently manage ALDFG); on the whole the intervention arguably does not represent significant barriers to fisheries accessing or staying in the program. The main reason for this is that, in general, fisheries try to minimise ALDFG given the economic incentive, and most general fishery management measures can contribute to avoiding ALDFG (e.g. reduction in IUU).	Whilst the consultation survey demonstrated that a significant portion of respondents felt that fisheries would be prepared/very prepared for gear loss measures, it did highlight that “small artisanal fisheries” would be challenged.	Whilst the consultation survey demonstrated that a significant portion of respondents felt that fisheries would be prepared/very prepared for gear loss measures, it did highlight that “small artisanal fisheries” would be challenged.
	<i>The option seems accessible to fisheries seeking certification in the future</i>	<i>5 = Completely agree</i>	<i>4 = Agree</i>	<i>3 = Neither agree nor disagree</i>	<i>3 = Neither agree nor disagree</i>
	<i>The option seems accessible to currently certified fisheries</i>	<i>5 = Completely agree</i>	<i>4 = Agree</i>	<i>3 = Neither agree nor disagree</i>	<i>3 = Neither agree nor disagree</i>
Simplification	<i>Does the change simplify the Standard?</i>	No change by definition is not adding any complication to the Standard; however, one could argue that the status	Whilst this option represents a minor change to existing requirements which will make it clearer how ALDFG should be scored,	As per Option 1, although with more complexity added. This option would represent added complexity given it would be requiring more assessment:	As per Option 2, although would arguably represent another layer of complexity given the scope of the measures has increased to include FADs and arguably more

		quo is not very clear which may be causing some complication/ confusion.	the proposal would be additive in the sense that it is not contributing to the Standard being less complex/ complicated.	Five SIs would be added. The complexity is manifest through duplication of assessment (five components assessed).	consideration of management compared to Option 2.
	<i>The option seems to simplify the Standard</i>	<i>2 = Disagree</i>	<i>2 = Disagree</i>	<i>1 = Completely disagree</i>	<i>1 = Completely disagree</i>
Auditability	<i>Is the change auditable by CABs?</i>	The BAU is arguably not very clear as far as its auditability is concerned, given the vagueness of the requirements. This was demonstrated through previous analysis of fishery assessments.	The amendment of requirements and guidance will lead to more specific assessment outputs with regards to ALDFG, which should be more auditable than BAU.	As per Option 1, although arguably more auditable given the issue being assessed through a specific SI. The one negative is that the SI suffers from trying to measure multiple variables simultaneously. The auditability reviews revealed that both assessors and Assurance Services International (ASI) would find this option auditable (in assessors' perspective more auditable than BAU).	As per Option 2, although arguably more auditable given the tighter definitions of Management Strategy elements (linked to Best Practice Guidance) and the fact that there are less variables being measured than Option 2. The auditability reviews revealed that both assessors and ASI would find this option auditable (in assessors' perspective more auditable than BAU).
	<i>The option seems to auditable by CABs</i>	<i>1 = Completely disagree</i>	<i>4 = Agree</i>	<i>5 = Completely agree</i>	<i>5 = Completely agree</i>

7.2 Impact Assessment – in depth analysis

The most significant impacts identified in the high-level impact analysis are explored in greater depth in relation to risks and benefits below. Impacts that are considered less significant are not explored in detail. For the impact types ‘Effectiveness’, ‘Feasibility’ and ‘Acceptability’, expert judgement was primarily informed by analysis of consultation feedback. For the impact type ‘Accessibility’, the internal scores database of pre-assessment scores from the MSC Pathway projects was analysed, which includes 70 fisheries across nine regions (UK, France, Spain, Australia, Indonesia, Mexico, South Africa and India). The MSC internal scoring database served as the basis to investigate the proposals’ impact on ‘Retention’: the database includes all conditions received by MSC certified fisheries under v1.3 and v2.0 of the Fisheries Standard up to 31 December 2019. Altogether there are 885 unique conditions. Auditability reviews were also conducted by ASI and two P2 assessors to inform this in-depth impact analysis.

Table 2: Option 0. Business as Usual.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
Effectiveness	No change to the current implicit consideration of ghost gear within the Standard would not be effective in delivering either objective of the work: explicit consideration of impact and promoting ghost gear strategies.	Likely no significant impact.
Acceptability	The majority of stakeholders would not find the BAU acceptable. The survey responses demonstrated that stakeholders supported a more explicit consideration of host gear impacts. The TAB conclusion is that BAU is not acceptable.	A minority of stakeholders (CAB/industry/academia) advocate no change due to a perceived risk to retention with changes in the Standard – particularly bringing in new requirements.
Feasibility	Likely no significant impact.	Highly feasible, clearly affordable and possible.
Accessibility	Likely no significant impact.	Likely no significant impact.
Retention	Likely no significant impact.	Likely no significant impact.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
Simplification	Likely no significant impact.	BAU is the simplest option but does not simplify the Standard.
Auditability	Review of assessments has shown that ghost gear is not audited effectively or consistently to date under the current standard (e.g. ghost gear consideration absent in 25% of assessments reviewed).	Likely no significant impact.

Table 3: Option 1. Revised general requirements for unwanted catch, ETP, Primary/Secondary and Habitats.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
Effectiveness	Likely no significant impact.	Both objectives (ALDFG impact and management) would be supported, although the change is not as prominent as a new PI or SI. There is therefore a risk that the consideration of ghost gear impacts in assessments will continue to be inconsistent and, being less evident in the Standard, there is not a clear promotion of effective measures.
Acceptability	<p>Acceptability of this ‘middle ground’ is uncertain. as stakeholder views would likely be polarised (e.g. NGOs vs fishing industry).</p> <p>The consultation survey demonstrated that most fishing industry representatives (5/6 who responded) would favour a non-normative change (e.g. Guidance); whilst the majority of NGOs (6/7 who responded) would favour normative changes (e.g. Requirements).</p> <p>The consultation survey showed this to be one of the least favoured options.</p> <p>It may please nobody.</p>	Some stakeholders would be supportive of a normative change (e.g. NGOs) as demonstrated by the consultation survey.
Feasibility	Although some challenges (the consultation survey responses suggested that “small artisanal” fisheries would be	Likely no significant impact.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
	<p>“unprepared/very unprepared” in relation to ghost gear measures), it is expected to be feasible for fisheries to show required evidence.</p> <p>P2 reviewer indicates marginal additional time/cost due to changes proposed in the option.</p>	
Accessibility	Some challenges with new requirements, but not to the extent that accessibility significantly impacted.	Likely no significant impact.
Retention	Some challenges with new requirements, but not to the extent that retention significantly impacted.	Likely no significant impact.
Simplification	Revision of requirements should clarify the Standard. It is additive, but less than the additional complexity of options introducing new PIs or SIs.	Likely no significant impact.
Auditability	Likely no significant impact.	<p>The amendment of requirements and guidance will lead to more specific assessment outputs re ALDFG, which will be more auditable than BAU.</p> <p>The auditability review confirmed this would be an improvement on BAU.</p>

Table 4: Option 2 New scoring issues under P1 & P2 management PIs on a ‘Review of ghost gear’.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
Effectiveness	Likely no significant impact.	<p>Both objectives are specifically supported given they would be explicitly assessed and scored;</p> <p>The consultation feedback suggests that ghost gear is less likely to have been subject to review than bycatch management. The number of conditions resulting</p>

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
		<p>from a ghost gear scoring issue may be expected to be higher.</p> <p>This is a positive impact in terms of ‘change on the water’.</p>
Acceptability	<p>Some stakeholders would oppose new requirements. For example, the majority of fishing industry representatives opposed any normative change.</p>	<p>Some stakeholders would strongly support (e.g. NGOs; retailers) given the more explicit mitigation.</p> <p>“New gear loss avoidance measures” was supported by majority of NGOs responding to the consultation survey.</p> <p>This option ranked 4th in the consultation survey after new PIs in P2 or P3 and within 2.5 (ecosystems).</p>
Feasibility	<p>Although there are some challenges, it is expected to be feasible for fisheries to show required evidence.</p> <p>P2 reviewer indicates marginal additional time/cost due to changes proposed in the option.</p>	<p>Likely no significant impact.</p>
Accessibility	<p>With this option there is an expectation that ALDFG is managed directly and specifically and the effectiveness is measured. This is likely to add some ongoing costs to the assessment, in particular in situations where management jurisdictions do not actively manage ALDFG currently, such as many artisanal fisheries.</p> <p>However, it is unlikely that these factors will be prohibitive in terms of fisheries joining the program.</p> <p>The PA analysis shows that 1.2.1 and 2.2.2 are already problematic PIs for fisheries, with 52% and 30% failing on these PIs. Within these PIs, the Review of Alternative Measures SG is cited in around 12 of the fisheries listed. This is as a result of the issue being considered at</p>	<p>Likely no significant impact.</p>

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
	SG60, resulting in a fail if not currently considered.	
Retention	<p>Retention has been assessed by using the review of alternative measures as a proxy, as this option proposes a similar structure.</p> <p>22% of open conditions are for management PIs. More than half of these are whitefish (33%) and tuna (21%) fisheries. While the database does not enable filtering by SG, a review of open conditions shows that very few relate to the ‘Review of Alternative Measures’ SGs.</p> <p>There are 63 fisheries with conditions on management PIs, but a review of the rationale suggests 11 of these (17%) refer in full or in part to the ‘Review of Alternative Measures’ SG.</p> <p>While retention will ultimately depend on where the bar is set for each SG, there is no evidence to indicate that including a ghost gear scoring issue will result in fisheries failing or leaving the program. However, this could be avoided by making it an issue scored at SG80 and SG100.</p>	Likely no significant impact.
Simplification	<p>Additional requirements do not simplify the Standard, even though the option represents greater clarity than the current Standard.</p> <p>This option would add complexity with five SIs.</p>	Likely no significant impact.
Auditability	<p>The reliance on ‘review’ wording means this option would suffer from the same ambiguity in assessment as the ‘Review of Alternative Measures’ – clarity is lacking on what would be adequate in terms of review, who undertakes it and how it is considered.</p> <p>The review of auditability indicated this option is less preferable to option 3 in terms of auditability and clarity and sends</p>	Likely no significant impact.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
	a clear message to stakeholders that this is a new, standalone requirement.	

Table 5: Option 3 New scoring issues under P1 & P2 management PIs on ‘Measures or strategies for ghost gear’.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
Effectiveness	Likely no significant impact.	<p>Considered the most effective Option as measures/strategies can directly consider (and so promote) gear loss mitigation strategies. It is also expected that any strategy should make some assessment of ghost gear impact and this expectation can be made explicit in the associated guidance.</p> <p>This option is expected to be more effective than Option 2 in terms of ‘change on the water’, as effective measures and strategy can be better defined in requirements than a review (stronger improvement pathway).</p> <p>The inclusion of FADs makes the option more effective, as the impact of FADs, particularly on VME habitats like coral reefs, will be considered.</p>
Acceptability	Likely no significant impact.	<p>As Option 2.</p> <p>The inclusion of FADs would make this more acceptable than Option 2 to those stakeholders favouring greater consideration of ghost gear impacts.</p>
Feasibility	Although some challenges (the consultation survey responses suggested that “small artisanal” fisheries would be “unprepared/very unprepared” in relation to ghost gear measures), it is expected to be feasible for fisheries to show required evidence.	Likely no significant impact.

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
	P2 reviewer indicates marginal additional time/cost due to changes proposed in the option.	
Accessibility	<p>With this option there is an expectation that ALDFG is managed directly and specifically and the effectiveness is measured. This is likely to add some ongoing costs to the assessment, in particular in situations where management jurisdictions do not actively manage ALDFG currently such as many artisanal fisheries. Again there is likely to be more of a challenge to artisanal fisheries that do not have sophisticated FAD tracking as many of the large scale tuna fisheries are introducing.</p> <p>However, it is unlikely that these factors will be prohibitive in terms of fisheries joining the programme.</p> <p>The PA analysis shows that 1.2.1 and 2.2.2 are already problematic PIs for fisheries, with 52% and 30% failing on these PIs. Within these PIs the Review of Alternative Measures SG is cited in around 12 of the fisheries listed. This is as a result of the issue being considered at SG60, resulting in a fail if not currently considered.</p>	Likely no significant impact.
Retention	<p>Some challenges with new requirements, but not to the extent that retention is significantly impacted (as with Option 2).</p> <p>The inclusion of FADs (used by some certified tuna fisheries), is not expected to change this outcome.</p>	Likely no significant impact.
Simplification	<p>Some additional complexity – e.g. interaction between these various SIs: is a single strategy expected that considers each component?</p> <p>This option would add complexity to five SIs.</p>	Likely no significant impact.
Auditability	The inclusion of FADs is not expected to result in different auditability issues –	This option has the benefit of considering a ghost gear ‘strategy’

Impact type	Risk (expected negative impacts)	Benefit (Expected positive impacts)
	<p>FAD fisheries are likely to focus more on FAD management than gear loss, which is less of an issue for purse seine fisheries.</p>	<p>rather than a reliance on ‘review’ wording as described for Option 3 above.</p> <p>Guidance can reference FAO guidelines and other best practice guidelines to indicate what measures are effective and what a strategy may be expected to contain.</p> <p>The auditability review states “from a purely auditability perspective I would think that these options [2,3] are the clearest, leaving least room for assessor omissions.”</p>

8 Additional options and impacts

Options disregarded
<p>Option A: A new/amended requirement in Principle 3 (i.e. 3.2.1) with the objective that fisheries have short- and long-term objectives to achieve P1 & P2 outcomes (as expressed in option a) which include measures to reduce gear loss and manage the impacts of ALDFG.</p> <p>There were some stakeholders that said to “put the management bit into P3”, but those who know the Standard felt this would not be appropriate and specific issues like ghost gear do not fit in relation to the rest of P3. The most appropriate place seemed to be 3.2.1, but the approach to this is specified in the requirements: SA4.7.1.1 The objectives shall be assessed under this PI and the strategies that implement the objectives shall be assessed under P1 and P2. So this still expects the strategies to be assessed under P1 and P2.</p> <p>Based on this, and considering the fact that impact is not addressed explicitly in P3 (so that objective would need to be addressed elsewhere anyway), we did not include a P3 option.</p>
<p>Option B: A revision to the guidance only. Specifically, this would be a revision to the current text on ‘unobserved mortality’ (GSA 3.1.8) and updating Box GSA7 to describe in more detail the expected consideration of ghost fishing by assessment teams. This could be accompanied by examples of good practice to avoid gear loss and mitigation actions such as the FAO’s gear marking guidelines and the GGFI’s Best Practice Framework.</p> <p>The main reason this option was disregarded was that it scored very low against the impact types ‘Effectiveness’ and ‘Acceptability’. In both cases, a ‘Guidance only’ option would in effect be very similar to the BAU option, which will ultimately not deliver on the policy objectives given that behaviour change would not be mandated as is the case now; any action would remain largely</p>

inauditable and fisheries taking action to reduce gear loss/mitigate ghost gear impact would not be effectively rewarded.

Option C: A new scoring component consisting of a suite of performance indicators within P2. This is based on the current P2 structure of PIs relating to outcome (to consider ghost fishing impact); management (to consider the management measures or strategies in place; and information (to consider the type and level of information collected).

Performance indicator		Scoring issues
2.X.1	Outcome	The UoA meets national and international requirements for avoidance of ghost fishing. The UoA does not cause significant impacts from ghost fishing.
2.X.2	Management	There is a strategy in place that is designed to ensure the UoA minimises ALDFG and does not cause significant impacts from ghost fishing.
2.X.3	Information	Relevant information on gear loss and its impact is collected to support the management of UoA impacts from ghost fishing including: - information for the development of the management strategy; - information to assess the effectiveness of the management strategy; and - information to determine the risk of impact from ghost fishing

Considered unrealistic to include as a suite of PIs. No national or international standards known (only best practice guidelines e.g. FAO & GGGI). Defining ‘significant’ impact is very difficult. Also inconsistency with other PIs in P2 that relate to ecosystem components and risk of overlap when impacts on these are assessed (not a good structural fit). It may also mean that proportionally the weighting of P2 requirements would reduce/be diluted.

Additionally, the option scored very low for ‘Effectiveness’ and ‘Simplification’. Whilst information and management criteria would support policy objectives, impact criteria may not be very auditable or feasible given the uncertainty over what they are measuring.

Whilst it may represent the most comprehensive review of ghost gear issues, other options represent more feasible and effective alternatives at this point in the development process.

Option D. The option explicitly referring to FADs is removed as the proposed definitions make explicit reference to FADs to ensure these are included as part of ghost gear assessment.

SG60	SG80	SG100
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<p>There has been a review of the potential effectiveness and practicality of measures to minimise the loss of UoA gear and FADs associated with ghost gear impacts on [insert scoring component].</p>	<p>There is a regular review of the potential effectiveness and practicality of measures to minimise the loss of UoA gear and FADs associated with ghost gear impacts on [insert scoring component] and they are implemented as appropriate.</p>	<p>There is biennial review of the potential effectiveness and practicality of alternative measures to minimise the loss of UoA gear and FADs associated with ghost gear impacts on [insert scoring component] and they are implemented as appropriate.</p>	
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Option E. A previous option mirrored current option 3, with the difference that FADs were not included. This was removed and merged to make the current option 3. The merging was due to reducing the total number of options for later review.

Option F. Consideration of ‘ghost gear’ would be included one or more of the three Ecosystem PIs e.g. outcome, management strategy and information. This option was disregarded because:

- It would likely be unacceptable to stakeholders.
- Many of the impacts of ‘ghost gear’ are specific to the other P2 PIs e.g. P1 and P2 species, ETPs and habitats and would probably be better addressed directly under these.
- Assessing this specific issue appears contrary to current requirements, specifically: SA3.16.1 The team shall score the other components of the assessment (i.e., P1 target species, primary species, secondary species, ETP species and habitats) separately to this PI, which considers the wider ecosystem structure and function.
- This option might be considered unbalanced e.g. it is highlighting ‘ghost gear’ as a critical issue without considering any other issues that might not be included in the other P2 PIs. It would not fit with Ecosystem PI intent which focused on preventing harm to ecosystem level function and structure and delivery ecosystem services (e.g. trophic cascade; changes in ecological community).
- Ghost gear impact on target species would not be explicitly considered under 2.5. therefore a P1 SI might still be needed.

9 Discussion and conclusion

Option 3 would resolve the main issue through requiring a dedicated strategy informed through information about impact and best practice. Its improvement pathway is stronger than Option 2, as it is linked to the quality, scope and coherence of the management measure rather than the frequency of management review. Further, whilst emphasising that fisheries implement best practice (e.g. ghost gear preventative measures), the option avoids prescription, and so it is scalable and thus feasible for fishery partners. The option does retain some of the weaknesses of Option 2 (e.g. complexity via multiple SIs) and there are some minor accessibility concerns, however it is the most acceptable overall. This option requires consideration of lost/abandoned FADs, which was extensively highlighted as a concern throughout the consultation. It is also the most effective option, particularly in the context of mitigating impacts on VMEs.

In contrast, Option 0 (BAU) is unacceptable to most stakeholders given the ineffectiveness of current requirements at driving best practice management or consistent/correct assessment outcomes. Option 1 represents the least complex option but would be ineffective at driving improvements given its largely indirect consideration of ghost gear impacts. It would thus be unacceptable to stakeholders and would suffer from auditability concerns. Option 2 would be acceptable to stakeholders and resolve the issues but may not be as effective as Option 3 as it is unlikely to incentivise best practice to the same extent. Whilst more auditable than Option 1, it suffers from greater complexity than Option 2.