An integrated approach to wildlife bycatch: addressing key issues to progress the implementation of national plans of action
A project under the DAFF – NHT Project 44144
National Strategies to Address Marine Wildlife Bycatch Issues in Australia

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An integrated approach to wildlife bycatch mitigation
Summary

Objectives
The Department of Agriculture, Fisheries and Forestry (DAFF) commissioned this project as part of the Natural Heritage Trust Project 44144 National Strategies to Address Marine Wildlife Bycatch Issues in Australia.

The overarching objective was to examine wildlife bycatch issues to more effectively progress the implementation of national bycatch strategies. The project focused on threatened, endangered and protected (TEP) species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This includes marine mammals, seabirds, marine turtles and some shark species, referred to as wildlife bycatch.

The priority
Australia has been refining the legislative and policy base for wildlife bycatch management since the 1980s. While there are some success stories, there is concern about the effectiveness of bycatch management. This is a fundamental part of ecosystem-based fisheries management (EBFM). The government and fishing industry need to be able to demonstrate the ecological sustainability of fisheries in the face of increasing expectations from the community, markets and consumers.

Sub-projects
The project included eight sub-projects that met specific commitments under national and international policies and also overarching reviews and analyses examining issues across all Commonwealth fisheries. The sub-projects were:

1. Review of wildlife bycatch management in Commonwealth fisheries
2. 2008 National Assessment Report for Reducing the Incidental Catch of Seabirds in Longline Fisheries
4. Australian Wildlife Bycatch Reference Database
5. Seal Risk Assessment Workshop
6. Cumulative assessment of the catch of non-target species in Commonwealth fisheries: a scoping study
7. Bycatch mitigation: social factors affecting adoption by commercial fishers
8. Bycatch Mitigation Workshop.

This report summarises the key outcomes of the sub-projects and draws together the key issues and recommendations for improving the effectiveness of wildlife bycatch management.

Bycatch management implementation constraints
Proactive efforts to manage wildlife bycatch, in line with legislative and policy objectives, are being hampered by implementation issues. These issues are common across most Australian Government-led bycatch mitigation plans and there is a need for:

Improved information to support decision-making. There is a general lack of evidence to demonstrate the performance of bycatch legislation and policy implementation programs.
Effective performance monitoring and evaluation frameworks. The lack of agreed management standards, reference points and performance indicators for wildlife bycatch management contributes to a lack of clear goals for industry and difficulties in demonstrating effectiveness.

Identifying priorities and attributing resources. The translation of legislative objectives into policy and management has lacked clear priorities and implementation has not been well resourced. Consistent and integrated advice on government priorities and performance standards would assist resource allocation and provide more certainty for stakeholders.

Incentives and disincentives for stakeholders. In general, bycatch management and EBFM strategies remain overshadowed by economic imperatives related to target species. A greater focus on working with fishers to find appropriate incentives and disincentives should assist in translating bycatch priorities into action.

Conclusions
The project confirmed that while substantial progress has been made in some fisheries and for some bycatch species, in general, bycatch management has had a lower priority compared to the management of target species. This is despite an increasing need to demonstrate to the community, markets and consumers that Australian fisheries are sustainably managed in every regard. This situation will remain unless agencies act to ensure bycatch management is effectively valued, promoted and implemented.

Recommendations
The following recommendations come from consideration of all the sub-projects and are suggestions to improve the implementation of bycatch policies and legislation and to provide industry with the ability to clearly demonstrate their environmental stewardship.

1. **Develop a more integrated, inter-agency working relationship.** A common message from stakeholders was the need for consistent and clear priorities and approaches for bycatch issues across the agencies. Given finite resources and common agency goals, a collaborative, inter-agency working relationship would support a more cost-effective and integrated approach. An initial step could be joint discussion of the project results and next steps. This may also be progressed through a review of the Commonwealth Policy on Fisheries Bycatch (2000), including consideration of the potential value of an EBFM policy.

2. **Implement bycatch mitigation performance standards and assessments.** Agreed performance standards and assessments of bycatch management would assist managers and stakeholders to understand what is trying to be achieved and how effective management has been. A similar approach to the Commonwealth Fisheries Harvest Strategy Policy (2007) for key commercial species, with clear reference points and agreed decision rules could be considered. Similarly, technical bycatch status reports may assist policy and management priority setting and demonstration of progress against performance standards.

3. **Consideration of an expert-based bycatch resource assessment group.** The AFMA fishery-specific Resource Assessment Groups (RAGs) and Management Advisory Committees (MACs) are tasked with identifying bycatch issues and suggesting management options. However, these forums are dominated by target species considerations. A dedicated technical forum to examine bycatch issues across all Commonwealth fisheries could supplement the existing RAGs and assist in developing a consistent approach to bycatch management. Alternatively, capacity within the existing RAG and MAC structure could be enhanced to perform this function.
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1. Introduction

In 2006, the then Fisheries Policy Branch, of the Department of Agriculture, Fisheries and Forestry (DAFF) commissioned the Bureau of Rural Sciences (BRS) project An integrated approach to wildlife bycatch: addressing key issues to progress the implementation of national plans of action. The project formed part of the DAFF Natural Heritage Trust (NHT) Project 44144 National Strategies to Address Marine Wildlife Bycatch Issues in Australia. The BRS project was designed to assist DAFF in improving the implementation of fisheries wildlife bycatch legislation and policy.

Bycatch is the incidental capture of non-target species by fisheries. This project focused on fisheries interactions with threatened, endangered and protected (TEP) species classified under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). This includes marine mammals, seabirds, marine turtles and some shark species, referred to as wildlife bycatch.

The project consisted of eight sub-projects that met specific commitments under national and international policies and also overarching reviews and analyses examining issues across all Commonwealth fisheries. The sub-projects were:

1. **Review of wildlife bycatch management in Commonwealth fisheries** — a review of wildlife bycatch related legislation, policy and management measures, their interactions and how they are implemented.


4. **Australian wildlife bycatch reference database** — expanding the BRS database to include policy and management information.

5. **Seal Risk Assessment Workshop** — a technical workshop to examine risk assessment approaches for seal–fishery interactions, in support of the National Strategy to Address Interactions between Humans and Seals: Fisheries Aquaculture and Tourism (the National Seal Strategy).


7. **Bycatch mitigation: social factors affecting adoption by commercial fishers** — insights into the social factors driving or impeding fishers’ use of bycatch mitigation practices.

8. **Bycatch Mitigation Workshop** — a national workshop with key stakeholders to discuss project outputs, stakeholder perceptions of the outcomes of bycatch management and uptake issues.

This report summarises the key outcomes of the sub-projects and draws together the key issues and recommendations for improving the effectiveness of wildlife bycatch management.
1.1 Objectives

The overarching objective of the project was to examine key wildlife bycatch issues in Commonwealth fisheries to more effectively progress the implementation of national bycatch strategies. The outputs from the sub-projects were designed to provide:

- recommendations to improve performance against legislative, policy and management objectives
- information to assist managers to more effectively identify the need for, and design, high priority wildlife bycatch mitigation strategies
- tailored information resources to support policy development, implementation and review.

While the focus is on wildlife bycatch the project has wider application and may assist in increasing the effectiveness of the management of other bycatch species. Similarly, some of the instruments discussed apply to all jurisdictions and some of the issues and recommendations could also be considered by state/territory agencies.

The industry and environment portfolios share responsibility for ensuring ecologically sustainable management of Australia’s marine environment. Therefore, the three key agencies are DAFF, the Australian Fisheries Management Authority (AFMA) and the Department of the Environment, Water, Heritage, and the Arts (DEWHA). The elements of the project were developed in consultation with these agencies to ensure they addressed immediate and strategic policy and management issues.

The project was also supported by a Reference Group that comprised representatives from DAFF, AFMA and DEWHA. The Reference Group provided guidance to the project and reviewed progress and reports. This group facilitated cross–agency discussion on issues identified during the course of the project and also provided a mechanism to extend the project results to the key agencies.

1.2 The priority

The Australian fishing industry is under increasing pressure to ensure interactions with bycatch species are both minimised and publicly acceptable. This is driven by legislative objectives which require fisheries to demonstrate they are managed in an ecologically sustainable manner and with due regard for TEP species.

Australia has been developing and refining the legislative and policy base for wildlife bycatch management since the 1980s. At the same time, Australia has also promoted high international standards and has often led the way in recognising the importance of bycatch management. Over this period there are some clear demonstrations of Australian fisheries effectively reducing and managing their impact on wildlife bycatch (e.g. turtle bycatch in the Northern Prawn Fishery (Brewer et al. 2006), seabird bycatch in the Eastern Tuna and Billfish Fishery (Baker and Finley 2010). However, there are some concerns (raised by agencies and environmental non-government organisations) about the effectiveness of bycatch management and the need for improvement.

Fisheries also face increasing environmental standards and expectations from the public, markets and consumers. Under these circumstances the inability to demonstrate the effectiveness of bycatch management is of concern. This concern was also identified in the 2005 Direction to AFMA from the then Minister for Fisheries and Forestry, to take action to address, amongst other things, the broader environmental impacts of fishing, including on threatened species or those otherwise protected under the EPBC Act.

In light of these concerns, DAFF commissioned BRS to undertake this project to identify opportunities to improve the implementation of bycatch legislation and policy.
2. Sub-Project Results

The following section summarises the key results and recommendations of the eight sub-projects (refer to the relevant reports for additional detail):

2.1 Review of wildlife bycatch management in Commonwealth fisheries

Objective

Review the wildlife bycatch legislative, policy and management frameworks and how they are translated into actions within fisheries. This review aimed to clarify roles, responsibilities and key management tools across the key agencies, identify common objectives, examine implementation methods and provide recommendations to increase effectiveness.

Output


Recommendations

- **Inter-agency approach to wildlife bycatch management.** Greater communication and collaboration is required across the three key agencies (DAFF, AFMA and DEWHA). The agencies need to identify key issues and priorities to ensure the most effective investment of resources. The formation of a dedicated inter-agency bycatch working group may assist this process.
- **Streamline work plans and increase accountability for the delivery of outcomes.** To ensure the new AFMA Fishery-specific Bycatch and Discarding Work Plans are effective, these need to focus on explicit priority actions that can be achieved in a reasonable timeframe. Actions need to be well defined, outcome focused and measurable. Priority must be given to allocating resources during the development phase of the work plans.
- **Develop reference points and management decision rules.** A more targeted and transparent process including reference points and decision rules for bycatch management would better support priority setting, stakeholder engagement and decision-making. This would also include benchmarking and performance assessment to demonstrate the effectiveness of management approaches.
- **Review of the Commonwealth Policy on Fisheries Bycatch (2000).** There would be value in reviewing this policy against its objectives and with regard to its relevance in the current management environment and the Australian Government’s commitment to ecosystem-based fisheries management (EBFM).

2.2 2008 National Assessment Report for Reducing the Incidental Catch of Seabirds in Longline Fisheries

Objective

Prepare and publish an updated National Assessment Report in accord with Australia’s commitment to implement the IPOA–Seabirds.

The report was endorsed by the Australian Fisheries Management Forum and the Marine and Coastal Advisory Committee, under the Natural Resource Management Ministerial Council.

**Recommendations**

- The *Threat Abatement Plan 2006 for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations* (TAP), developed in accord with the EPBC Act, is largely fulfilling the role of a National Plan of Action. Effective implementation of the TAP should address the major risks posed to seabirds by Australian longline fisheries.
- Shortfalls in achieving the levels of observer coverage required by the TAP for all Commonwealth fisheries need to be addressed.
- State and territory fisheries are unlikely to be causing an impact at the population level to seabird breeding populations. In the absence of robust risk assessments, data validation needs to be encouraged in state and territory longline fisheries to confirm that seabird interactions are low.
- Further development and trials of seabird bycatch mitigation measures for pelagic longline gear remains a high priority.
- An assessment of seabird bycatch in Australian trawl fisheries is warranted to ensure they are not impacting seabird populations.

**2.3 2008 National Assessment Report for the Australian NPOA–Sharks**

**Objective**

Prepare and publish an updated NPOA–Sharks National Assessment Report to support a review and update of Australia’s commitment to the IPOA–Sharks.

**Output**


The report was supported and reviewed by the Shark Implementation Review Committee (SIRC).

**Recommendations**

Although progress in shark conservation and management has been identified, many of the issues identified in the 2001 Shark Assessment Report remain. In the short-term, actions to address the following needs should be a priority during the review of the 2004 NPOA–Sharks:

- an improved application of data verification methods in target and non-target shark fisheries
- the effective implementation of robust management measures and recovery actions to mitigate threats to high-risk and TEP shark species, and to rebuild over-exploited stocks
- implementation of precautionary management measures to prevent any further declines in shark species.

In the longer-term, there is a need to:

- develop abundance or fishing mortality indices and conduct stock assessments for significant target and byproduct shark species
• ensure further and more consistent application of risk–based approaches to shark conservation and management
• assess the significance of cumulative fisheries and other impacts on high–risk shark species
• review the need for, and methods to obtain accurate market and trade data
• examine the need for improved management measures to reduce or restrict the targeting of sharks for the purpose of supplying shark fin export markets
• support the development of more effective shark bycatch mitigation methods
• conduct assessments of the risk non-commercial fisheries pose to sharks
• continue to encourage the effective monitoring and management of the harvest and bycatch of pelagic shark species on the high seas
• assess the sustainability of imported shark products.

2.4 Australian wildlife bycatch reference database

Objective
Expand the publicly accessible database of Australian wildlife bycatch related research papers to include management and policy references to facilitate stakeholder access.

Output
The searchable database (http://adl.brs.gov.au/fishbycatch/index.php) was expanded to include key management and policy references.

Recommendations
• Consider investigating alternative low cost means of promoting and sharing the information that has been gathered. This would be guided by stakeholder needs.

2.5 Seal risk assessment workshop

Objective
Progress Action 1.1 of the National Seal Strategy—Develop criteria for the assessment of fisheries as to their risk of adverse interactions with seals.

Output
The technical Seal Risk Assessment Workshop was held in Adelaide in February 2007 and reviewed the risk assessments of seal–fisheries interactions that have been undertaken to date, the value and opportunities for the use of common criteria or approaches to risk assessments and the need and opportunities to examine cumulative impacts across fisheries and jurisdictions. The workshop recommendations were presented to the National Seal Strategy Group for consideration.

Recommendations
• Addressing interactions with Australian sea lions is a higher management priority than fur seal issues.
• There is value in a common approach to risk assessments of seal-fishery interactions across jurisdictions, such as the approach applied in South Australian waters. A common approach
across jurisdictions could provide a basis for developing targeted management responses to minimising interactions.

- Risk assessments would be limited by available data and there is an ongoing need to monitor seal and sea lion colonies and for research to address key information gaps.

### 2.6 Cumulative assessment of the catch of non-target species in Commonwealth fisheries: a scoping study

**Objective**

Assess the viability of conducting cumulative wildlife bycatch risk assessments across Commonwealth fisheries and, if feasible, state fisheries. This should assist moves to EBFM by informing the design of wildlife bycatch management and monitoring programs to account for all fisheries impacts on species.

**Output**


**Recommendations**

- Appropriate levels of observer coverage are needed to enable cumulative assessments; the current and historic levels of observer coverage are generally too low to enable robust assessments of the cumulative catch of wildlife bycatch across all Commonwealth fisheries. In some fisheries the observer coverage is too low to provide robust estimates of the level of interaction within the particular fishery. The limited availability of long time series of observer data and the limited reliability of species records (stemming from identification challenges) constrain the assessment of historic cumulative incidental catches.
- For most TEP species a comprehensive assessment of cumulative incidental catch would need to include mortality in state/territory fisheries, as well as Commonwealth fisheries, particularly for sea turtles and sharks. However, this would depend on whether adequate levels of observer coverage and data are available from state/territory fisheries.
- The high number of albatross observed interacting with the Commonwealth Trawl Sector of the Southern and Eastern Scalefish and Shark Fishery in 2006 highlights the need for assessing and potentially reducing seabird interactions in this sector.

### 2.7 Bycatch mitigation: social factors affecting adoption by commercial fishers

**Objective**

Provide preliminary insights into the social factors driving or impeding fishers’ use of wildlife bycatch mitigation measures.

**Output**

Recommendations

- Work with stakeholders to promote recognition and appreciation of the different values and goals associated with bycatch issues. This will assist in identifying common goals and benefits of bycatch mitigation practices and the tailoring of mitigation strategies.
- Improve funding for bycatch research, management and training programs, including support for fishers to be actively involved in the design and modes of delivery of mitigation initiatives. More flexible funding mechanisms could be examined to support small-scale innovations in bycatch mitigation.
- Improve information on the scale of bycatch issues, costs–benefits of bycatch reduction for fishers and the environment and uptake rates of different measures/devices. In addition to improved understanding of how fishers’ access to social networks and education/skills drive or impede their adoption of bycatch mitigation/reduction practices.
- In communicating and working with industry, use both formal and informal networks and provide multiple contact points in a fishery and alternatives to printed/internet media (e.g. one-on-one and/or group training); improve support for industry champions and under-represented fishers/businesses.

2.8 Bycatch Mitigation Workshop

Objective
Facilitate an open discussion on priorities and future directions for wildlife bycatch mitigation with key stakeholders (managers, industry, environment non-government organisations). The outcomes may assist the development of policy and management initiatives aimed at increasing the effectiveness of bycatch mitigation initiatives.

Output
The Bycatch Mitigation Workshop was held in Sydney in April 2008 and outcomes are detailed in Flood, M. and Bensley, N. (2010) Bycatch mitigation workshop report.

Recommendations

- Improve the prioritisation of bycatch issues, preferably through consistent or at least complementary approaches across fisheries and jurisdictions.
- Improve the design and implementation of observer programs.
- Establish appropriate bycatch benchmarks. It was noted that current data are not generally adequate for reliable and ongoing benchmarking of bycatch issues.
- Improve data availability and access. Non-government stakeholders are facing difficulties when trying to access data on the types and scale of bycatch occurring in Australian fisheries.
- Improve incentives for fishers to improve bycatch mitigation practices.
- Encourage broader representation of stakeholders at future bycatch forums.
- Ensure effective implementation of AFMA’s new approach within Commonwealth fisheries (Bycatch and Discarding Work Plans).
3. Discussion

Australia appears to be moving away from a reactionary approach to wildlife bycatch management, but progress has been slow. A more proactive approach in line with legislative and policy objectives is hampered by implementation issues. These issues are common across most of the Australian Government-led bycatch mitigation plans (work plans, recovery plans, national plans of action and strategies, etc). Here we briefly discuss some common issues identified by the sub-projects that may constrain the likelihood of more effective bycatch management.

3.1 Improved information to support decision-making

There is a general lack of evidence to demonstrate the performance of bycatch legislation and policy implementation programs, i.e. whether bycatch has been reduced or minimised as appropriate. This limits the ability of the government and the fishing industry to demonstrate the ecological sustainability of some fishing practices. Both the shark and seabird National Assessment Reports (Sections 2.2 and 2.3) were critical of the quality and quantity of data and recommend improvements in this area as a priority. The cumulative assessment report (2.6) similarly highlights problems with logbook data and observer programs as key constraints to meaningful assessments of total bycatch rates. Stakeholders who participated in the Bycatch Mitigation Workshop (2.8) were also critical of the lack of species-specific data and the review of implementation (2.1) raised the same issue. This is a concern given the long standing need for reliable data to ensure species conservation and ecological assessments of the sustainability of industry.

All aspects of this project relied on the capacity of the relevant agencies to consult and provide data. When the project was developed there was an expectation that bycatch data would be available and accessible within the timeframe of the project; yet for many aspects of the project this was not the case. Data gaps and data access proved to be a limiting factor.

Observer data are critical in understanding and estimating wildlife-fishery interactions. However, due to operational constraints and conflicting priorities the data are not necessarily representative, particularly in terms of spatial and temporal coverage. Robust estimates require appropriately designed and implemented observer programs, or alternative strategies (e.g. supplementary crew member observer programs, electronic monitoring, etc). As the design of most observer programs involves trade-offs between different objectives (e.g. monitoring target catch vs. wildlife bycatch) the analyses of the available data should take into account the ability of the data to represent the fishery. Otherwise they may over or underestimate bycatch rates which could result in inappropriate management or policy responses.

3.2 Effective performance monitoring and evaluation frameworks

The lack of agreed management standards, reference points and performance indicators for bycatch management has made demonstrating effective management difficult. This is despite these being longstanding requirements of fishery management plans and the Commonwealth Policy on Fisheries Bycatch (2000). As a consequence, in many fisheries there is a reliance on qualitative assessments of bycatch trends and bycatch management performance. Qualitative assessments limit the ability of stakeholders to critically examine the basis for management decisions or debate the relative priority of different bycatch management issues.

Appropriate evaluation frameworks, including quantitative targets and performance standards will facilitate technical assessments which can determine what is required to meet and report against those measures. This would assist in the discussion of priorities, development of business cases for bycatch mitigation work, improve transparency and help to tailor management tools. The Commonwealth Fisheries Harvest Strategy Policy (2007) and associated guidelines and its positive
impact on fisheries management, is due at least in part to its target-based, performance management framework. A similar approach is likely to benefit bycatch management.

3.3 Identifying priorities and attributing resources

While there are overarching legislative objectives for the management of wildlife bycatch, their translation into policy has lacked clear priorities and standards, and generally the implementation has not been well resourced. Greater guidance and agreement across agencies would assist AFMA’s prioritisation and resource allocation. This would also provide more certainty for stakeholders. It was clear from the Bycatch Mitigation Workshop (Section 2.8) that government priorities and expectations were not necessarily apparent to stakeholders. The absence of clear guidance can result in inconsistent interpretations and tension between agencies and stakeholders alike.

Clear standards would also assist the design of mitigation strategies that are more resilient to changing policy environments as high priority issues would be easier to identify and promote on an ongoing basis. Some key questions that remain unanswered in this respect include:

- What constitutes all reasonable steps to avoid interactions with TEP species?
- What constitutes minimising bycatch?
- What is the acceptable level of impact per bycatch species?
- What level of impact might threaten bycatch species?

Answers to these questions would provide all stakeholders with more clarity about what is expected from management.

3.4 Incentives and disincentives for stakeholders

Due to competing priorities, bycatch management and EBFM strategies are likely to remain overshadowed by economic imperatives, unless the appropriate incentives or disincentives are made available to fishers, managers, and policy makers alike. Finding and testing possible solutions in collaboration with fishers was strongly emphasised throughout the project. It was noted that often the best solutions are found by fishers themselves, or people working closely with fishers. A greater focus on working with fishers to find appropriate incentives and disincentives for bycatch management should assist in translating bycatch priorities into effective action on–ground.

Given the common links to EPBC Act provisions in fishery management plans and arrangements, the potential benefit of formally incorporating relevant EPBC Act provisions in the Fisheries Management Act 1991 could be considered. This may simplify some of the regulatory and compliance arrangements between AFMA and DEWHA. However, the interaction between the two Acts may change if recommendations from the recent review of the EPBC Act (Hawke 2009) are implemented.
4. Recommendations

There is no prioritisation in legislation or policy between the management of commercial species (target and byproduct) and bycatch species. While substantial progress has been made in some fisheries and for some bycatch species, in general commercial species issues have been treated as a higher management priority. This is despite an increasing need to demonstrate to the community, markets and consumers that Australian fisheries are sustainably managed in every regard. To meet this need long-term, consideration should be given to facilitating a positive change in the way EBFM is valued and implemented.

Each sub-project generated specific recommendations which the relevant agencies and other stakeholders should consider. The following overarching recommendations are suggestions to improve the implementation of bycatch policies and legislation and provide industry with the ability to clearly demonstrate their environmental stewardship.

1. Develop a more integrated, inter-agency working relationship

The project was initiated to assist DAFF, DEWHA and AFMA review the effectiveness of their approaches to wildlife bycatch management. Given the finite resources and common goals, to increase the effectiveness of wildlife bycatch management there is value in agencies developing a more integrated, inter-agency working relationship. A common message from stakeholders was the lack of clarity on the prioritisation of bycatch issues and the need for consistent or at least complementary approaches across agencies. Greater communication and collaboration is required, particularly in terms of identifying key issues and priorities to ensure the most effective investment of resources. The development and agreement on performance standards (Recommendation 2) would be most effective if agreed across agencies.

The formation of a dedicated inter-agency bycatch working group may assist this process and an initial step could be joint discussion of the project results and next steps. This may also be best served by a review of the role of the Commonwealth Policy on Fisheries Bycatch, including consideration of the potential value of an EBFM policy.

2. Implement bycatch mitigation performance standards and assessments

The effectiveness of wildlife bycatch management generally is unclear due to a lack of baseline data and clear and agreed performance standards and measures. Without these frameworks and information it is not possible to judge progress against objectives or the relative importance of bycatch concerns. This would also assist stakeholders and the community in general, to understand what is trying to be achieved and how effective management has been.

The BRS Fishery Status Reports (e.g. Wilson et al. 2009) have been fundamental in establishing and reporting on the status of key commercial species in Australian Government-managed fisheries. They have helped frame debate about the status of stocks in an independent way, which supports community interest and participation in fisheries management decision-making. An equivalent approach may benefit bycatch policy and management priority setting. This could be used to demonstrate progress against performance measures and reflect the commitment to move to EBFM.
3. Consideration of an expert–based bycatch resource assessment group

The fishery-specific AFMA Resource Assessment Groups (RAGs) and Management Advisory Committees (MACs) are the key forums tasked with identifying bycatch issues and providing management options. However, the results of this project indicate that these forums are dominated by target and byproduct species considerations. One option to relieve some of the pressure on RAGs and MACs may be a dedicated technical bycatch forum. It could operate as a bycatch RAG to examine bycatch issues across all Commonwealth fisheries on an ongoing basis, or simply be set up to establish targets and performance measures. A dedicated forum would enable the appropriate expertise and capacity to strategically consider bycatch issues. To support consideration of this recommendation, Appendix A provides potential Terms of Reference (ToR) for such a group, structured around AFMA’s generic RAG ToR.

Such a forum could supplement the existing RAGs and build on AFMA’s Bycatch and Discarding Program. Alternatively, capacity within the existing RAG and MAC structure could be enhanced to perform this function.
## Acronyms

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AFMA</td>
<td>Australian Fisheries Management Agency</td>
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<tr>
<td>BRS</td>
<td>Bureau of Rural Sciences</td>
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<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific Industrial Research Organisation</td>
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<tr>
<td>DAFF</td>
<td>Department of Agriculture, Fisheries and Forestry</td>
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<tr>
<td>DEWHA</td>
<td>Department of the Environment, Water, Heritage and the Arts</td>
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<tr>
<td>EBFM</td>
<td>Ecosystem-Based Fisheries Management</td>
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<tr>
<td>EPBC Act</td>
<td><em>Environment Protection Biodiversity Conservation Act 1999</em></td>
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<tr>
<td>FRDC</td>
<td>Fisheries Research and Development Corporation</td>
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<tr>
<td>IPOA–Seabirds</td>
<td>International Plan of Action for Reducing the Incidental Catch of Seabirds in Longline Fisheries</td>
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<td>IPOA–Sharks</td>
<td>International Plan of Action for the Conservation and Management of Sharks</td>
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<td>MAC</td>
<td>Management Advisory Committee</td>
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<td>NHT</td>
<td>Natural Heritage Trust</td>
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<td>NPOA–Sharks</td>
<td>National Plan of Action for the conservation and management of sharks</td>
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<td>RAG</td>
<td>Resource Assessment Group</td>
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<td>SIRC</td>
<td>Shark-Plan Implementation and Review Committee</td>
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<td>TAP</td>
<td>Threat Abatement Plan</td>
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<td>TEP</td>
<td>Threatened, Endangered or Protected species</td>
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<td>ToR</td>
<td>Terms of Reference</td>
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References


Appendices

Appendix A—Bycatch Resource Assessment Group suggested Terms of Reference

As per the general operation of RAGs, it would be important to operate such a group as principally a technical forum to develop technical advice. This advice could feed into existing forums such as fishery–specific MACs, the AFMA Environment Committee, recovery plan/threat abatement groups and national strategy/national action plan implementation groups. These groups are well placed to consider the policy and management implications of technical advice. The results of the AFMA and Commonwealth Scientific Industrial Research Organisation (CSIRO) ecological risk assessment project and AFMA’s ecological risk management framework provide a platform upon which to establish such a group.

Suggested Terms of Reference

i. Analyse, assess, and report status (by fishery sector) against agreed reference points for non–target species, impacts on the marine environment from fishing and the economic efficiency with which bycatch is managed.

ii. Analyse, assess and report on the fishery socioeconomic status, including, economic and compliance risks associated with the biological status of bycatch species and current or proposed management strategies.

iii. Identify improvements and refinements to bycatch assessment methodologies.

iv. Evaluate alternative bycatch management strategies or reference point settings. This includes providing advice on confidence limits or risk levels associated with particular management strategies.

v. Assist the Australian Government (DAFF, DEWHA, and AFMA) to develop, test, and refine sustainability reference points and performance indicators for Australian Government-managed fisheries. Advise on non–target species status and trends relative to these reference points and indicators.

vi. Identify and document fishery assessment and monitoring gaps, needs and priorities. These should be incorporated in AFMA, DEWHA and FRDC strategic research plans.

vii. Facilitate peer review of assessment outputs.

viii. Maintain awareness of current issues by promoting close links with relevant MACs, AFMA management, RAGs, Recovery Plan/Threat Abatement Groups and National Strategy/National Action Plan implementation groups. Liaise with other researchers, experts and key industry and conservation sector representatives.