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Meeting Sustainability Expectations:

Policy Translation, Objective Setting and Reporting for Australian Fisheries

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Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
AFMA	Australian Fisheries Management Authority
AFMF	Australian Fisheries Management Forum
ANCORS	Australian National Centre for Ocean Resources and Security
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFO	Department of Fisheries and Oceans (Canada)
EPBC	Environment Protection and Biodiversity Conservation
ESD	Ecologically Sustainable Development
FAO	Food and Agriculture Organisation (of the United Nations)
FRDC	Fisheries Research and Development Corporation
GVP	Gross Value of Production
IMAS	Institute for Marine and Antarctic Studies
NSW	New South Wales
NT	Northern Territory
PIRSA	Primary Industries and Regions South Australia
PZJA	Protected Zone Joint Authority
SA	South Australia
SAFS	Status of Australian Fish Stocks
SIA	Seafood Industry Australia
TAS	Tasmania
TS	Torres Strait
UN	United Nations
VIC	Victoria
WA	Western Australia

Executive Summary

What this report is about

This report presents findings of a research project which examined the extent to which the stated objectives being pursued to guide the management of Australia's fisheries are aligned with community expectations for sustainability. And, further to this, the extent to which the design of objectives can effectively support agencies in achieving this.

A team of researchers and policy staff from IMAS, PIRSA and ABARES has examined the policies, legislation, management documents, operational plans and strategies, and performance reports for a selection of Australia's important fisheries. This report outlines the results of this analysis, implications for policy and management, and the resources developed to support better future objective design.

Why the project was undertaken

Recent global sustainability initiatives have demonstrated a more holistic and multidimensional definition of sustainable development (for example, the United Nation's Sustainable Development Goals). This has been reflected in the expansion in the goals of fisheries management beyond biological sustainability, in the array of management instruments and decision-support tools available to managers, and in the demands for public accountability and better performance against more, and more holistic sustainability goals.

The analysis undertaken asked - can current Australian fisheries policy, management and reporting arrangements demonstrate that public interest goals for these fisheries are being met? These public interest goals include generation and sharing of economic, cultural and social benefits. These public interest goals also include the provision and communication of a coherent, consistent and effective set of policy frameworks for Australia's managed fisheries. And where these goals are not being met, what resources can be developed to address any design challenges?

What project aimed to do

The project's aims were to:

Describe the policy and objective frameworks and scope for Australia's managed fisheries, and the degree of commonality in policies and objectives across Australia's fisheries

Assess the alignment of policies and objectives for Australia's managed fisheries with community preferences and public values, and the effectiveness of objective framework design and performance in achieving stated goals.

Develop resources to support fisheries management agencies and industry and other key stakeholders in generating better objective frameworks.

What method was used

Mixed methods of data collection and analysis were used to investigate policy frameworks, objectives and reporting components for Australia's key fisheries. The overall design of this research included the following stages:

1. identification of best practice design of fisheries policy and objective frameworks through a review of literature;

2. collation of data (fisheries legislation, policy and management documents; and community aptitudes to fisheries management) from secondary sources;
3. content analysis and comparison of policy, objective and public preferences and values data using legal research, policy analysis (including interpretive) methods; and
4. expert elicitation methods and participatory workshops to validate results, and to pilot and refine the resources developed to support better design.

What we found

Current policy and objective environment

- The majority of Australian-managed fisheries do not have stated objectives linked to management strategies or decision frameworks
- Where provided, information about the objectives guiding fisheries management is typically distributed across different types of policy documents that are not readily accessible
- There is no standard format to management-level objectives as these range from replications of legislative objectives through to more defined objectives which reflect specific fishery characteristics and contexts

Commonality in objectives

- Across most jurisdictions, Australian fisheries are managed to meet similar, or common, objectives
- The highest extent of commonality is for biological and ecological objectives
- The lowest extent of commonality is for economic, governance and then social objectives
- There is a high level of policy ambiguity or lack of clarity in legislative objectives for fisheries management in some jurisdictions, particularly concerning 'optimum utilisation' and 'benefits'
- Gaps in management objectives at the fishery level make it difficult to assess the extent of commonality or potential conflict across managed fisheries accessing shared stocks

Alignment with community expectations and public value

- Formal objectives for the management of fisheries are largely aligned with community expectations and recommended public values for the biological sustainability of targeted fish stocks, and the protection of the supporting marine environment from ecological effects of fishing
- The more varied, less specific and less consistent interpretation of 'human wellbeing', or social and economic benefits and beneficiaries, found in formal objectives suggests there is less alignment between formal objectives and both community expectations and recommended public values. However, this is also more difficult to assess.
- Provision of local, safe seafood is a community expectation and a recommended public value which is not reflected in formal management objectives.

Effectiveness of objectives frameworks in supporting decision making

- Less than half of the fisheries assessed (40%) provide easily accessible defined biological objectives and operational components to support decision making and management of catches of target species
- Where provided, biological, governance and to a lesser extent, ecological, objectives are more likely to be defined and have the necessary operational components to support decision making, management and performance assessment. This is likely to reflect the requirements of a number of policy instruments, such as harvest strategy policies and frameworks, and Fisheries Strategic Assessments required under the EPBC Act.
- Social and economic objectives are less likely to be defined and have the necessary operational components to support decision making, management and performance assessment. This is likely to reflect their higher level of goal ambiguity and generality, and the lack of policy direction.
- The combination of objectives for different types of social and economic benefits and beneficiaries presents the greatest risk of conflict, due in part to the high level of policy ambiguity (i.e. who should benefit, in what forms) and lack of direction for reconciliation. This is particularly the case for Traditional Owners and Indigenous communities, recreational fishers, and Australian seafood consumers.

Recommendations:

Gaps and underperformance in policy and objective design identified included a number that are due to structural factors, such as the design of policy processes and instruments (e.g. management plan design and what it includes), or the lack of such processes and instruments for an agency.

These gaps can be partly addressed by development of a national ESD guideline for fishery policy or management strategy design to complement the *National Guidelines for Harvest Strategy Development* (Sloan, Smith et al. 2014). These types of initiatives are policy-level decisions in themselves and require the support and coordination of the AFMF.

The greatest gains are to be achieved at the fishery-level. Further development and specification of fishery-specific policy would result in the availability of clear and definable objectives that could guide fisheries managers and decision makers in selecting management instruments and settings to improve performance.

Key gaps which can be addressed by fisheries policy staff for objective design for specific fisheries include: the lack of stated objectives, especially at the fishery-specific and operational levels; the high level of goal ambiguity (or lack of definition) of objectives that are stated; the lack of reference points and performance indicators to make objectives operational as required; and the lack of direction in reconciling countervailing objectives.

Resources developed to address gaps:

- *Database of stated management objectives for Australian fisheries*. The Microsoft Access database can be accessed from the project page on the FRDC website. It is also available via the following link: Objectives database.
- *Selecting and reviewing objectives for fisheries management – Options and Checklist* is a step-by-step guide to reviewing or selecting management-level objectives for a specific fishery. It can be downloaded from the project page on the FRDC website. It includes a

matrix which can be used to identify potentially countervailing combinations of objectives as well as options to address commonly-occurring conflicts. It can be downloaded from the project page on the FRDC website. It is also available via the following link: Countervailing objectives - matrix

Keywords

Fisheries management objectives; Legislative objectives; Operational Objectives; Performance Indicators; Reference Points

1. Introduction

1.1. Why policy, objectives and reporting matter for fisheries

Fisheries are managed for a purpose, and that purpose is expressed in the public policies concerning marine resource and fisheries management, in the objectives of fisheries management legislation and plans of management, and reflected in the indictors used to assess, evaluate and report performance.

The purpose of fisheries management is to achieve an intended set of outcomes from use of the fisheries resource. These outcomes include:

1. Constraining extraction of target stocks and associated impacts on non-target species, supporting habitats, ecological communities and functions to within ecologically sustainable limits; and
2. Generation of specific benefits (or, at least, the absence or minimisation of specific economic, social and/or cultural costs) through use of resources. Beneficiaries are, by default, the state which has jurisdiction over the resources under law. Other beneficiaries may be stated also.

Fisheries are common property resources that are used for public and private reasons. Because of this, a complex mix of public agency regulatory and market-based instruments are used. These multiple reasons and mix of instruments mean that the broad task of fisheries management is more accurately described as governance, which involves “articulating a common set of priorities, coherence and coordination, steering, and accountability” (Pierre & Peters 2005). Public policy settings, management objectives and performance measurement and reporting are the technical forms through which this governance task is directed.

A third intended outcome of fisheries management is therefore:

3. Governance of fisheries resources that is accountable to public interest

Policies, objectives and reporting matter for fisheries because they direct the scope and direction of decision making and performance of managed fisheries. In turn, these decisions and the subsequent performance of fisheries has significant outcomes for:

- the health of fish stocks and supporting marine ecosystems;
- dependent commercial fishing industries and communities;
- amenity and cultural benefits available to recreational users and Indigenous users and owners, and
- community net benefits (i.e. those accruing to the broader public from use of a public resource).

Globally, failure to identify clear and defined policy goals and objectives to guide fisheries management has been identified as a main cause of fisheries management failure, and the subsequent impact on the health of fish stocks and loss of benefits (FAO 2002).

> "Identifying such goals is important in clarifying how the fish resources are to be used to benefit society, and they should be agreed upon and recorded, both at the policy level and for each fishery. Without such goals, there is no guidance on how the fishery should be operated, which results in a high probability of *ad hoc* decisions and sub-optimal use of the resources (resulting in lost benefits), and increases the probability of serious conflicts as different interest groups jostle for greater shares of the benefits. This is often seen in practice and one of the important causes of failures in fisheries management has been identified as the frequent absence of clear and precise objectives." (FAO 2002)

What are sustainability expectations for fisheries management?

Sustainability expectations for fisheries management refers to the desired state of fish resources, the types of substantive outcomes sought, and the procedures used by institutions to pursue those outcomes.

Sustainable development according to the FAO reflects definition of the World Commission on Environment and Development (1987) as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs".

The FAO Council in 1988 further defined it a*s* "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment of continued satisfaction of human needs for present and future generations. Such sustainable development conserves (land,) water, plants and (animal) genetic resources, is environmentally non-degrading, technologically appropriate, economically viable and socially acceptable".

According to Garcia (1996), this definition implies "an objective of optimizing welfare from a limited natural resource base, minimizing resource and environmental degradation, and regulating the rate of use of these resources over time."

More recent interpretations of sustainability have included procedural dimensions, such as the ability to govern and by whom, and the implications for justice (for example, UN Sustainable Development Goal 16).

What is a policy framework for fisheries management?

The policy framework for fisheries management is made up of relevant high-level public policies, legislative and fisheries-specific management objectives, and performance measurement and reporting systems (Figure 1). This policy framework is linked with legal and operational management frameworks that enable public management to be implemented.

Public policy frameworks more generally include a hierarchy or set of tiered levels of 'policy goals', from high-level broad goals of national or international policy through to specific, defined and targeted objectives for directing operational management (Howlett 2009). In the case of fisheries, high-level goals are stated in policy concerning marine environmental protection and resource management, broad objectives in fisheries management legislation and plans of management, and specific operational objectives are provided in harvest strategies and other operational strategies.

For the purposes of this project,

Policy framework refers to the set of goals stated in a range of high-level policies with relevance to the management of fisheries as resources at a sub-national and national jurisdictional level. These frameworks include goals articulated in policies outside of formal fisheries management legislation and policy (e.g. the EPBC Act).

Objective framework refers to the fishery-specific hierarchy or tiered levels of stated objectives, from legislative objectives through to operational or harvest strategy objectives and performance assessment components in place for a single fisheries management unit.

Further definitions are provided in the Glossary at the end of the report.

Public policy goals and objectives vary in type, as well as level. Objectives can be concerned with process and procedure, substantive outcomes, or how outcomes are to be shared (Lowi 1972, Howlett 2009). Procedural goals and objectives describe processes that management should aim to follow (for example, fisheries management should be conducted in a transparent manner). Substantive goals and objectives describe ecological, economic, social or cultural outcomes that management should aim to achieve (for example, management of fisheries should ensure catches are constrained to within maximum sustainable yield). Distributive goals and objectives describe how desired outcomes and benefits should be shared among users and members of the relevant community (for example, management of fisheries should contribute to regional employment and economic development).

The process of setting policy goals and objectives for fisheries management is influenced by the relevant policy community surrounding a fishery (Barber and Taylor 1990; Rice 2011). This includes the public management agency itself, the international policy community through the influence of conventions and agreements, users of the fisheries resource (i.e. commercial, recreational and Indigenous users), Traditional Owners, interest groups, and the research community.

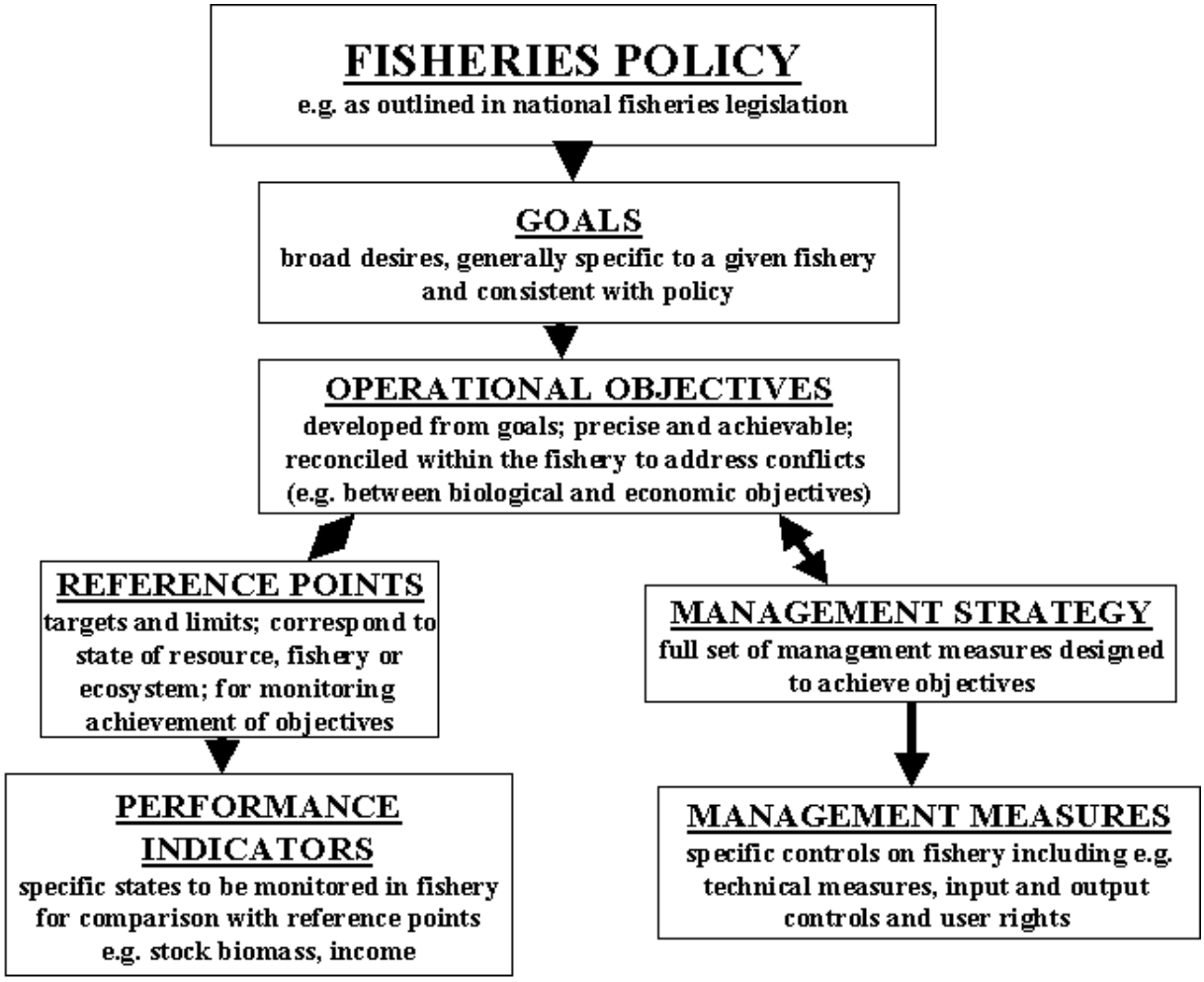

Figure 1. Recommended structure and components of a policy and objective framework for fisheries management (FAO 2002, FAO 2003)

Why examine policy translation, objective setting and reporting?

Success or failure of fisheries management is in large part attributable to the design and implementation of policy frameworks for fisheries management (see Table 1). Translating high level goals, setting objectives, and linking performance measurement with policy evaluation and review are critical steps in the policy processes and components required to design and implement a policy framework for fisheries management (Figure 2). The absence or inadequacy of these processes and components can prevent fisheries management from delivering its intended outcomes, either in the form of failure to constrain resource exploitation to within acceptable limits or failure to deliver intended benefits to society (for example, the lost economic returns from underperformance of management of Australia's fisheries - see Ridge Partners (2009)).

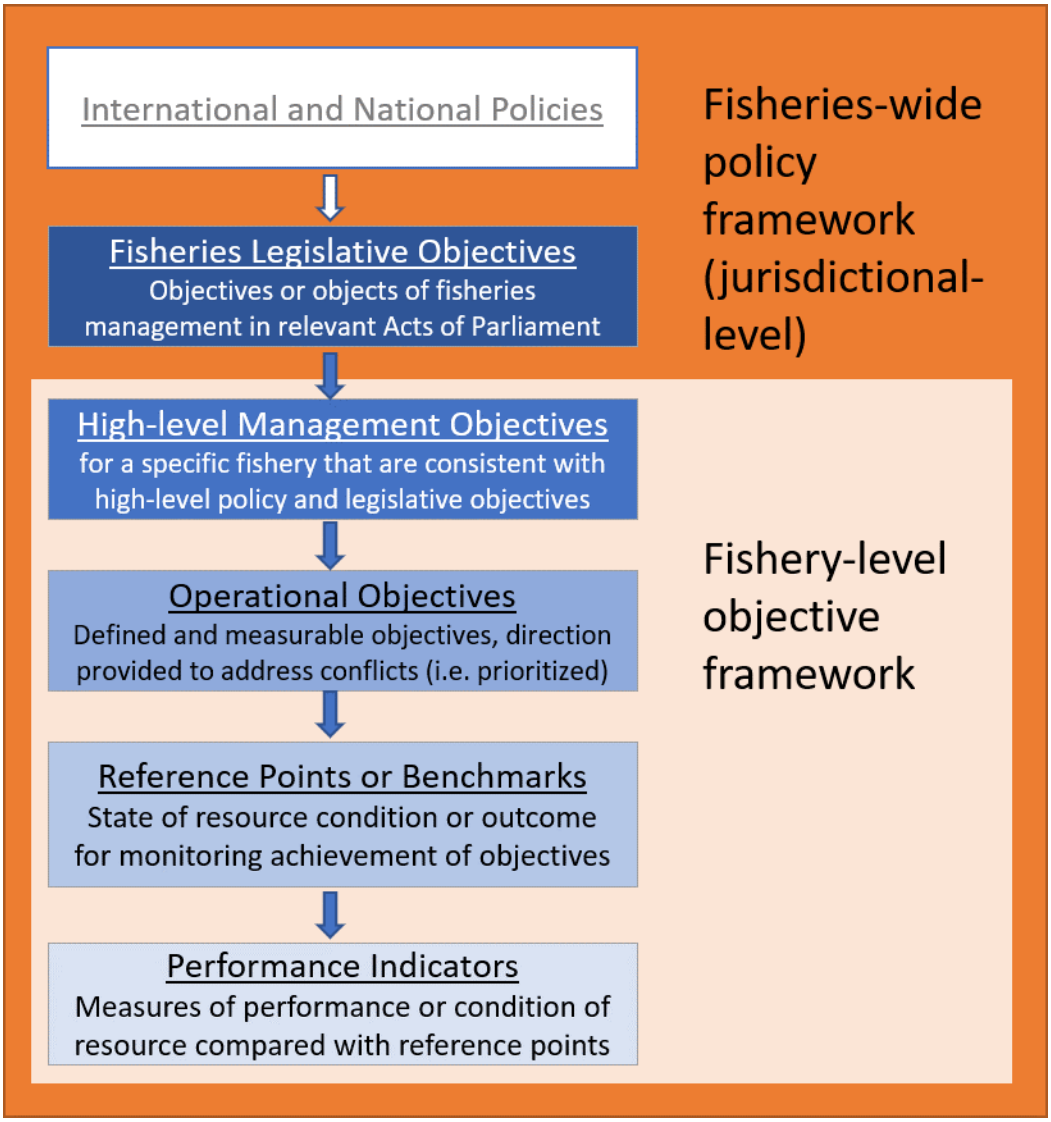

Figure 2. Generalised fisheries management policy and objective framework for fisheries (adapted from the FAO 2002; 2003).

Table 1. Links between objective framework design and fisheries management performance.

Objective framework level	Area of substantive performance	Area of procedural performance
High-level management objectives for a fishery	What natural resources may be used What extent of resource use is supportable What ecological components need to be protected, and to what extent What benefits are to be generated Who is to benefit (i.e. beneficiaries) How benefits are to be distributed	Selection of types of measures (i.e. instruments) by which a fishery is managed Capacity to define operational objectives and their components Capacity to reconcile any countervailing objectives Direction for evaluating alternative management options Accountability of management decision making
Operational objectives; Reference points and benchmarks of performance; and Performance indicators	Effectiveness of constraints on catch and ecological impact Levels of economic, social and cultural benefits generated	Determination of settings for management measures (e.g. input controls) Capacity to implement harvest strategy Capacity for performance evaluation to enable adaptive management Accountability of management performance

What are the risks to fisheries performance from limited policy and objective scope and poor design?

The risk to governments and communities is that of social cost (or lost opportunity), arising from the inadequate inclusion directly within fisheries policy and objective frameworks of a number of areas of fisheries performance (see Table 1 and 2). This means they are unaccounted for in the scope of management, and management strategies and measures to address these cannot be implemented. Areas of fisheries performance that are often under-accounted for include the following:

1. Maintenance of supporting marine ecosystem function and integrity (Fletcher et al 2012;
2. Indigenous Peoples' cultural rights and interests (Schnierer and Hagan 2015; Lee 2019);
3. Defined benefits to society (community 'net' benefits) due to the public nature of the resource (Andersen et al. 2015; Bromley 2009; Squires, Weber et al. 2018);
4. Defined benefits to resource users, including:
    a. livelihood opportunity for commercial fishers (Brooks et al. 2015);

b. economic returns to commercial fishers (Grafton, Kompass et al 2012; Ridge Partners 2009);

c. quality of recreational experience (Arlinghaus 2004; Hunt and Sutton 2013); and

d. local consumer benefits from provision of locally-produced seafood (McClanahan, Allison et al. 2015).

The risk to governments and communities from poor policy and objective design is similar to the risks of poor procedural performance in other public policy areas (Howlett 2009). The risks include:

1. Increased likelihood of inefficacy and ineffectiveness (policy failure) arising from the inability to monitor and benchmark performance against objectives; and
2. Heightened social conflict due to lack of transparency of policy goals and management objective, and lack of accountability regarding decision making.

These risks are described in further detail in Table 2, below.

Table 2. Issues and risks arising from design of policy and objective frameworks for the performance of fisheries management identified in global literature

(Barber and Taylor 1990, Caddy and Mahon 1995, FAO 2002, Rice and Rochet 2005, Grafton, Kompas et al. 2007, Hilborn 2007, Garcia and Charles 2008, Symes and Phillipson 2009, Rice 2011, Cochrane, Joyner et al. 2015, OECD 2016, Stephenson, Benson et al. 2017, Benson and Stephenson 2018, Young, Webster et al. 2018)

Design issue	What this looks like	Fisheries management risk
Lack of harmonisation	Policy goals and objectives are not broadly consistent or harmonised across states or fisheries targeting same stocks	Reduced performance arising from spill overs caused by conflicting objectives being pursued for shared stocks Loss of benefits from inefficiencies that arise from shared stocks being managed for different objectives Increased levels of mistrust due to community uncertainty about the policy goals for fisheries management and perceived inconsistency of objectives for fisheries management between states
Failure to account for public preferences and public value	Community goals or public interest not seen as reflected in policy guiding fisheries management	Increased levels of public conflict regarding: social acceptability of fishery impacts on stocks and supporting ecosystem distribution and flow of benefits from the managed fishery to different users Increased levels of mistrust due to perceived failure to ensure public interest in managing fisheries
Lack of defined objectives	Policy and management objectives are not clear (ambiguous) and implementation cannot be assessed	Loss of benefits due to lost opportunity to define preferred benefits and set management actions to achieve these Unintended negative consequences due to lack of means to evaluate management performance and impact against management actions Increased levels of mistrust due to lack of accountability and increased uncertainty about the policy goals, objectives and actual performance of fisheries management
Gaps in what should be being managed and measured	Defined management objectives and/or performance indicators are missing	Reduced performance due to lack of means to track performance against objectives and selected management measures Loss of benefits due to lost opportunity to target preferred benefits and set management actions to achieve these (e.g. benefits arising from targeting economic returns or recreational satisfaction, rather than catch or participation) Untracked negative consequences due to lack of means to track performance against objectives and selected management measures

Hidden objectives	Management objectives and/or performance indicators are used informally (implicit) but not stated	Increased levels of mistrust due to lack of accountability and increased uncertainty about the policy goals, objectives and actual performance of fisheries management Reduced performance due to lack of means to track performance against management actions
Lack of consistency between policy objective, management objective and measure	Objectives being pursued are not consistent with the themes of higher level policy goals or selected performance measures	Loss of benefits from management decisions and measures being misaligned with agreed policy objectives or from mis-measurement of performance, preventing adjustment to enable preferred benefits to be generated Increased levels of mistrust due to lack of accountability and increased uncertainty about the policy objectives, management objectives and actual performance of fisheries management
Conflicting objectives	Policy goals and objectives are in conflict with each other and no means to address this is provided	Reduced performance arising from spill overs caused by conflicting objectives being pursued Unintended negative consequences due to lack of recognition of the potentially countervailing interaction between objectives

1.2. National context

There are over 200 managed fisheries under Australian jurisdiction. These are managed on a varying basis, including gear type, species and region. For more information see Australian Fisheries Statistics.

Operating environment for fisheries management policy frameworks

In Australia, the generalised policy framework for fisheries management is determined by the federal system of government, as a result of which there is no single piece of legislation at the national level which provides directly for fisheries management. There are national policies and legislation which provide broad policy goals and constraints for the use of marine resources. These include the *Heads of Agreement on Commonwealth/State Roles and Responsibilities for the Environment*, under which the *National Strategy for Ecologically Sustainable Development* (Council of Australian Governments 1992) sits; and the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). Collectively, these provide and define the broad policy goal of ecologically sustainable development (ESD) for Australian fisheries (Table 3) and the basis of constraints applied to development to ensure environmental protection and biodiversity conservation of key components.

Table 3. Australia's goal, core objectives and guiding principles for the *National Strategy for Ecologically Sustainable Development 1992 (COAG 1992)*

National Strategy for Ecologically Sustainable Development*	
The Goal	Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.
Core Objectives	To enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations
	to provide for equity within and between generations
	to protect biological diversity and maintain essential ecological processes and life-support systems
Guiding Principles	Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations
	The global dimension of environmental impacts of actions and policies should be recognised and considered
	The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised
	Decisions and actions should provide for broad community involvement on issues which affect them
	Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
	The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised
	Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms
*These guiding principles and core objectives need to be considered as a package. No objective or principle	

should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ESD.

Coastal or nearshore fisheries in Australia are managed at the sub-jurisdictional level (i.e. State or Territory), as outlined in the offshore constitutional settlement (OSC) arrangements made between each sub-national jurisdiction and the Commonwealth Government. Under the OSC the Commonwealth of Australia manages only those fisheries located in its Exclusive Economic Zone or shared by agreement. Each of Australia's sub-national jurisdictions, as well as the Commonwealth Government for Commonwealth-managed fisheries, provides its fisheries management policy in its primary legislation or fisheries management acts of parliament (Figure 3).

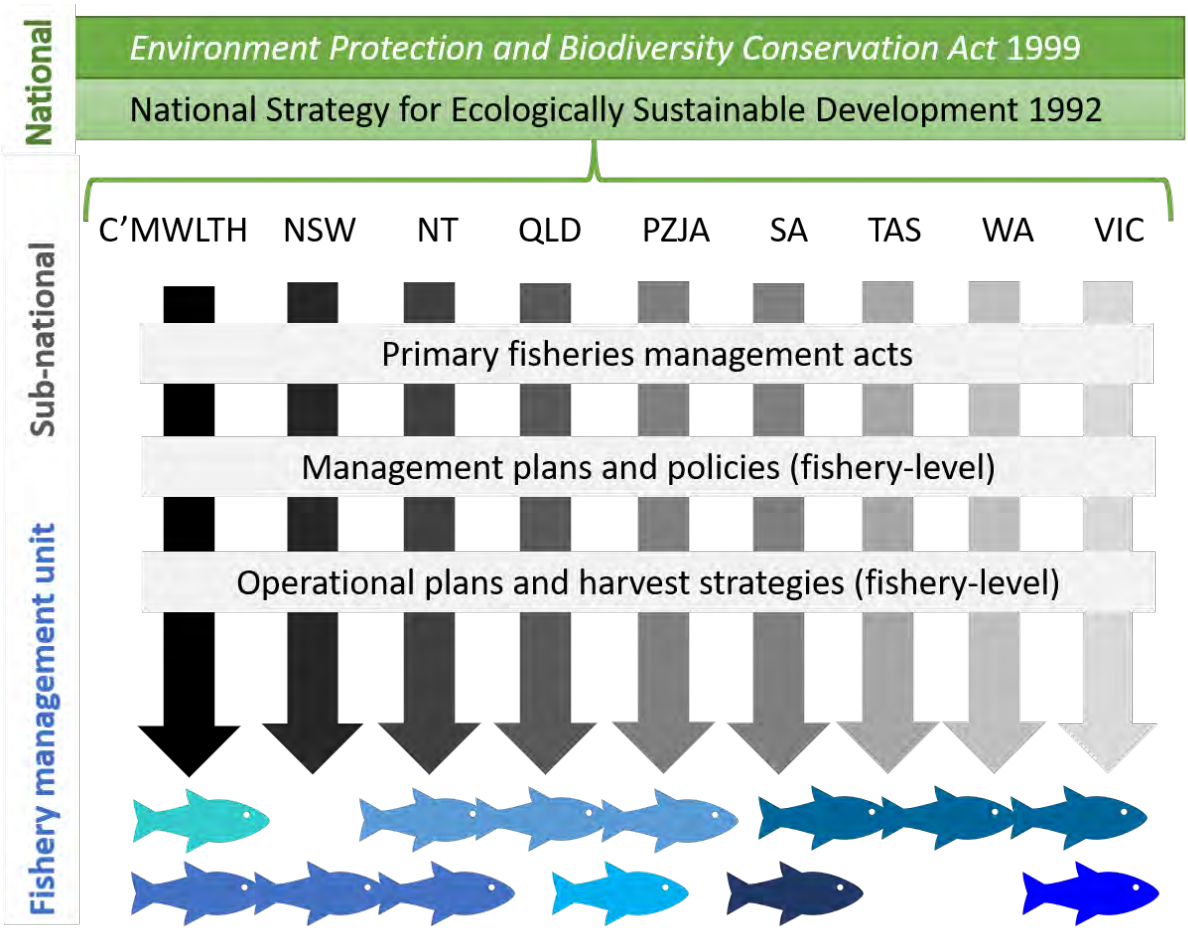

Figure 3. National and sub-national operating environment for fisheries management policy and objectives

Issues faced in policy and objective design

Areas in which fisheries management performance is failing to realise benefits and could be improved to achieve best-practice were identified in the 2009 FRDC-funded report, *Evaluating Australia's Marine Capture Fisheries* (Ridge Partners 2009). The first, and highest priority, area was a more strategic approach to management at the fishery level, including the setting of clear objectives for performance across all uses. The report also identified the provision of information to the Australian community on the performance and status of wild catch fisheries and fish stocks as a priority area.

The Productivity Commission's report into marine fisheries management in Australia found that benefits were not being fully realised, particularly social and cultural benefits, by current policy settings (Productivity Commission 2016). It highlighted the inconsistent management arrangements in place across jurisdictions with management responsibility for shared stocks, and the implications for realising benefits that this presented. Recommendations included more extensive development and implementation of resource sharing and harvest strategy frameworks to guide policy settings and implementation, and that the policy settings guiding major decision for fisheries management should publicly available. "Governments should publicly release reasons for the management approach taken for each fishery" (Productivity Commission 2016: 35). Similarly, it recommended that jurisdictions that do not already do so should make publicly available summaries of fishing interactions with protected species.

Borthwick identified the need for clearer and less fragmented policy settings, in his review of legislation, policy and management of Commonwealth fisheries management (Borthwick 2012)

These and other technical issues facing Australia's fisheries management policy and objective frameworks have been acknowledged by the Australian Fisheries Management Forum in its Statement of Intent (2017). They include:

- Low level of national consistency (harmonisation) of objective themes and associated loss of benefits (particularly in cases of straddling stocks) and reduced trustworthiness
- Lack of measurable indicators and benchmarks (i.e. reference points) to enable performance measurement and evaluation at the national level

Existing enablers of better policy and objective design

In recognition of the need to demonstrate ecological performance more accountably, and to meet the requirements of global markets and conventions to which the Australian Government is a signatory, the requirement for Fisheries Strategic Assessments was incorporated in to the *EPBC Act*. These involve an independent assessment of all export and all Australian Government managed fisheries of their ecological performance. They require specific principles and objectives are addressed for all ecological and environmental impacts associated with fishing for each fisheries management unit, and that performance against these be reported periodically to maintain approval. These objectives are specified in the *Guidelines for the Ecologically Sustainable Management of Fisheries* (2nd edition).

In addition, a range of non-statutory resources, policy frameworks and best practice materials has been generated to assist fisheries management agencies in addressing the issues recognised. They include:

- National Ecologically Sustainable Development Reporting Framework for Australian Fisheries, The 'How to' Guide for Wild Capture Fisheries (Fletcher, Chesson et al. 2002), which a number of sub-national jurisdictions have adopted.
- National Guidelines to Develop Fishery Harvest strategies (Sloan, Smith et al. 2014) (Figure 4).
- Status of Australian Fish Stocks
- Developing and testing social objectives for fisheries management (FRDC-2010-40).

- Building economics into fisheries management decision making - to utilise a suite of SA case studies (FRDC 2016-213).
- Healthcheck Phase 2 (FRDC 2016-060)
- Developing triple bottom line harvest strategies that include all environmental aspects for multi-sector fisheries (FRDC 2015-013)
- Completing Australia's First National Bycatch Report (FRDC 2015-208) and Design and implementation of an Australian National Bycatch Report: Phase 1 - Scoping (FRDC 2017-180)

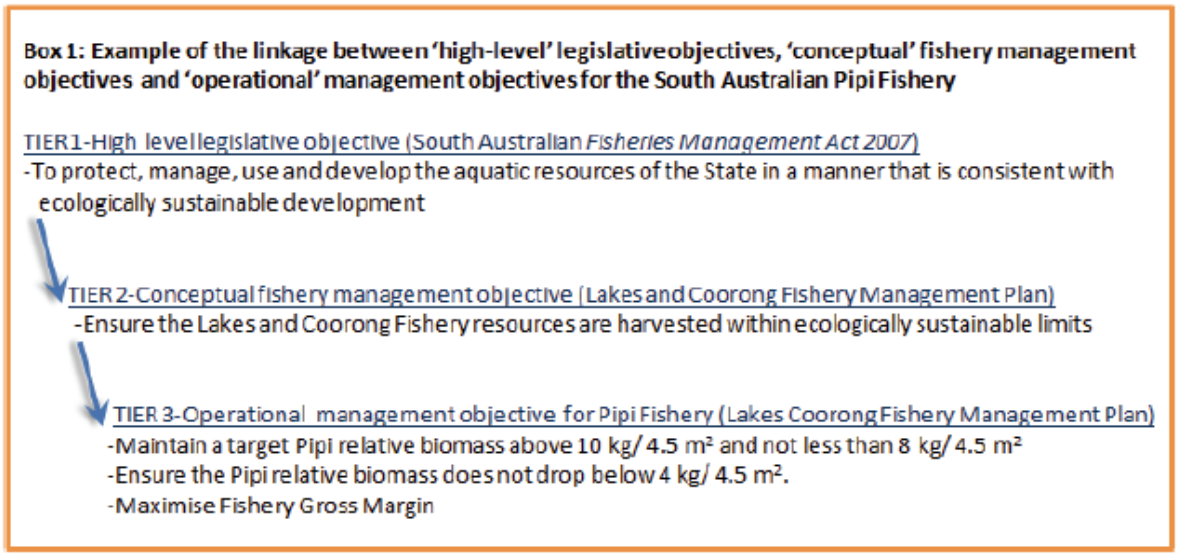

Figure 4. Example of a best practice objective framework and where different types of objectives are provided for the South Australian Pipi Fishery (Source: Sloan, Smith et al. (2014))

1.3. State and Territory-level context

Operating environment for fisheries management policy frameworks

Each Australian jurisdiction has a primary or head piece of legislation that enables management fisheries under the responsibility of that jurisdiction. Under these acts of parliament previsions are enables for management of specific fisheries under management plans or policies and their subsidiary legislation (i.e. fisheries rules or regulations) (Gullet 2008). In a number of cases these primary acts also refer to a range of related but not fisheries-specific jurisdictional-level policies or enabling acts. The policy and objective frameworks used in Australia's sub-national jurisdictions vary considerably although there are equivalent components and processes to the FAO framework.

All Australian jurisdictions require that public consultation is undertaken (via public submission processes) when revising or drafting a new act of parliament for fisheries management or, in the case of high-level goals for specific fisheries, a revised management plan (Gullet 2008).

Policy goals for the management of fisheries with a jurisdiction are consistently provided in the primary fisheries management acts of parliament in each jurisdiction. However, the policy

forms used to provide specific objectives for individual management fisheries varies between jurisdictions.

Issues faced in policy and objective design

Issues facing fisheries management policy and objective frameworks for various sub-national jurisdictions have also been extensively documented as part of the national reviews identified earlier. Issues include substantive gaps in:

- Ecological objectives for the protection of ecological function and integrity, and for specific ecological components, at the operational objective level (Sainsbury 2008);
- Cultural objectives for recognition of First Peoples' rights and access, as well as interests in both cultural values and livelihoods at both the high-level and operational level (Schnierer and Egan 2015);
- Economic objectives for commercial and recreational extraction, for the fishing sector and for wider community benefit at both the high-level and operational level (Ridge Partners 2009, Emery, Gardner et al. 2017);
- Social objectives for recreational and commercial uses, for the fishing sectors, and wider community benefit at both the high-level and operational level (Triantafillos, Brooks et al. 2014, Brooks, Schirmer et al. 2015);

Issues also include procedural gaps in:

- Provision of stated objectives (AFMF 2007; Ridge Partners 2008)
- Definition of objectives to enable implementation and rules to guide decision making (Ridge Partners 2009, Sloan, Smith et al. 2014).

Existing enablers of better policy and objective design

Broad fisheries policies designed to guide the design of fisheries policy and management at the fishery-specific level are available in a number of jurisdictions. These provide direction for the substantive focus and the operational components of objectives and objective frameworks. At a general level, these include:

- Harvest Strategy framework policies and guidelines (for example, Commonwealth, Northern Territory, Western Australia)
- Bycatch policies and guidelines (for example, Commonwealth)
- ESD and other forms of ecological risk assessments (for example, South Australia, Commonwealth, Western Australia)
- Resource sharing policies, frameworks and procedures (Western Australia, Commonwealth)

2. Objectives

Objectives of the project were as follows:

1. Undertake a review and analysis to:
    a. Compare the Australian public's expectations for the performance of fisheries and objectives for the management of fisheries in Australia
    b. Determine the extent of commonality between legislative objectives for fisheries resources between Australian jurisdictions
    c. Determine the level of comprehensiveness of and consistency between management-level objectives and performance reporting frameworks for each of Australia's key fisheries
2. Identify options and provide recommendations for common and consistent objective and performance reporting frameworks for social, economic, ecological and governance performance and status of Australia's key fisheries
3. Develop guidelines and identify instruments and processes for the optimal design of fisheries objective and reporting framework for specific fisheries.

To meet the project's objectives we addressed the following research themes and questions (Table 4).

Table 4. Research themes and questions

Research theme	Project objective	Research question
Current policy environment and provision of objectives	Objectives 1 a., b. & c.	What types of policy frameworks are used in Australian fisheries management?
		Which policies inform the objectives being pursued for management of Australia's fisheries?
		Where are the objectives provided?
Commonality in policies and objectives	Objective 1 b.	How consistent are policies and objectives across jurisdictions and similar fisheries?
	Objective 1 b.	Are there common policy and objective themes for all areas of ESD? Ecological, biological, social, economic and governance?
Alignment with public preferences and values	Objective 1 a.	What are the Australian public's expectations for and interest in the sustainable management of Australian fisheries?
	Objective 1 a.	How are these expectations and interests included in Australian fisheries management policy and objectives?
Effectiveness in supporting decision making and management	Objective 1 c.	To what extent do selected objective frameworks and objectives demonstrate best practice attributes?
Resources to support better objective design	Objectives 2 & 3	What conditions enable or disable best practice design and implementation of policy, objective and reporting frameworks for Australian fisheries management?
	Objectives 2 & 3	What processes and resources can be made available to address issues and minimise identified risks in selecting or reviewing objectives for fisheries management?

3. Method

Mixed methods of data collection and analysis have been used to investigate policy frameworks, objectives and reporting components for Australia's key fisheries.

The overall design of this research included the following:

1. identification of best practice design of fisheries policy and objective frameworks through a review of literature;
2. collation of data from secondary sources;
3. content analysis and comparison of policy, objective and public preferences and values data using legal research, policy analysis (including interpretive) methods; and
4. expert elicitation methods and participatory workshops to validate and refine results.

The stages of the project are provided in Figure 5 and the range of research methods included:

- Legal research methods in the form of content analysis of formal policy and legal documents to determine the state intent of policies, objectives and objective framework.
- Policy research methods in the form of content and thematic analysis of a range of materials including policies themselves to describe policy development, type and theme, functionality and implementation
- Interpretivist policy analysis to compare and contrast findings of the legal research and policy analysis with interpretive analysis of material concerning normative frameworks and public preferences for outcomes from fisheries management
- Participatory research and expert elicitation methods involving fisheries managers and policy staff, and research experts, to assess, interpret and validate findings

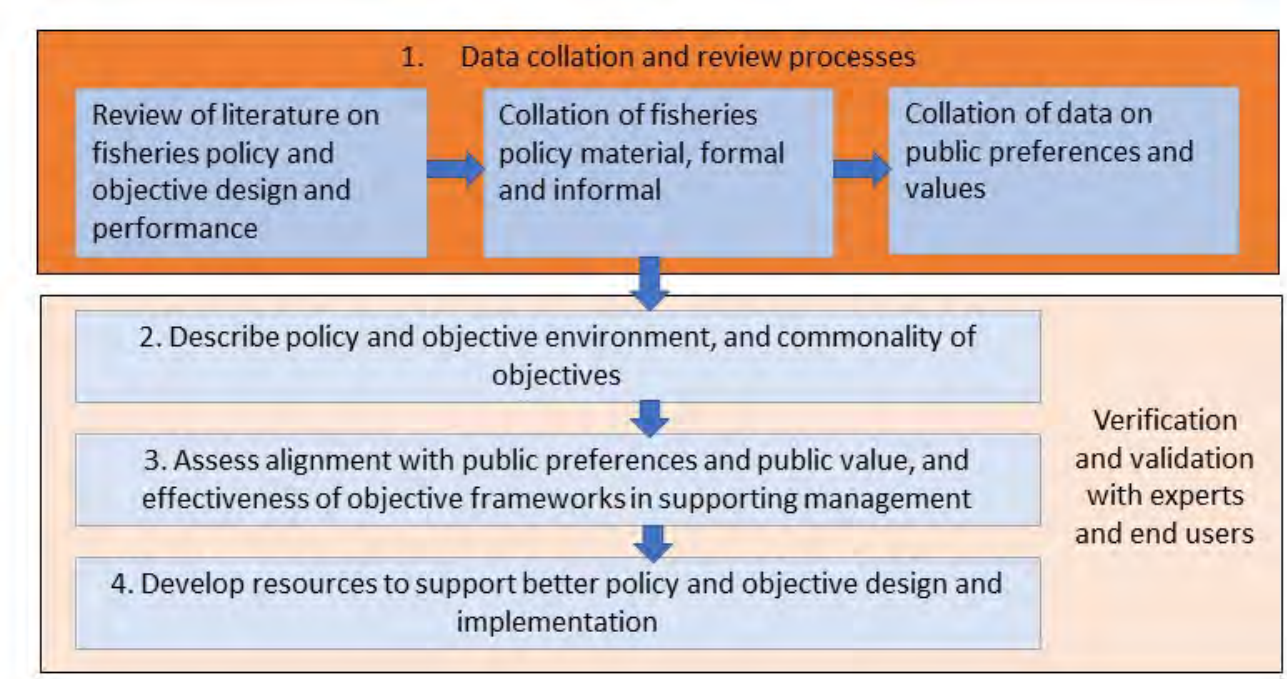

Figure 5. Stage of the project.

3.1 Review of literature

A review of literature was undertaken to identify key attributes or 'best practices' of fisheries management processes and components which are required to ensure public policy goals and objectives for managed fisheries can be met. The literature reviewed included peer reviewed papers and grey literature on fisheries management, both global and specific to Australia. Literatures were collated then reviewed. Attributes were organised by which stage of the public policy process, or which public policy components, to which they applied (for example, management objective selection, designing operational objectives, identifying performance indicators, etc.). Key texts were identified on the basis that they applied to multiple processes and components. These included fisheries management guideline documents (FAO 1995, FAO 2002, Fletcher, Chesson et al. 2002, FAO 2003, Australian Government 2007, De Young, Charles et al. 2008, Sainsbury 2008, Fletcher 2012, Fletcher and Bianchi 2014, Sloan, Smith et al. 2014, Triantafillos, Brooks et al. 2014) and articles (Barber and Taylor 1990, Rice and Rochet 2005, Grafton, Kompas et al. 2007, Hilborn 2007, Brooks 2009, Pascoe, Proctor et al. 2009, Symes and Phillipson 2009, Fletcher, Shaw et al. 2010, Pascoe, Dichmont et al. 2013, Cochrane 2017, Stephenson, Benson et al. 2017, Young, Webster et al. 2018).

The following best practice attributes of objective frameworks, or sets of objectives, for Australia's managed fisheries were identified and used in the analysis (see Table 7):

- Communicated (i.e. publicly accessible in identifiable policy document)
- Comprehensive (i.e. all relevant ESD components and sub-components/benefits and beneficiaries are included)
- Common (i.e. with objectives for managed fisheries for shared stocks)
- Coherent internally (i.e. basis for reconciling any conflict between objectives is provided)

The following best practice attributes of individual objectives for Australia's managed fisheries were identified and used in the analysis (see Table 8):

- Clear (i.e. what is to be achieved for what component of a fishery is defined and not ambiguous)
- Consistent vertically (i.e. with higher-level objectives and policy)
- Complete (i.e. a way to assess and benchmark performance is provided, and a management response to performance is provided)

3.2. Collation of data

Policy and objective data sources

Fisheries were selected based on their inclusion in the Status of key Australian Fish Stocks Report 2014 (Flood, Stobutzki et al. 2014). This sample included fisheries in each sub-national jurisdiction of Australia (referred to as jurisdiction, or State and/or Territory hereafter).

All primary acts for fisheries management in each Australian jurisdiction, as well as publicly-available management plans or policies and harvest strategies for the fisheries selected for analysis, were collated by desktop search methods. Sources included fishery stock and status assessment reports, and strategies, position and policy papers concerning a range of performance areas – all of which were approved or published by the recognised public management agency (full list provided in Table 27 in Appendix B: Policy material for each jurisdiction and fishery). The list of sources was verified at meetings with every fisheries management agency in 2016 (see Appendix D: Technical workshops for details of these meetings).

Public preferences and public value data

To undertake this study we drew on established values clarification and public values mapping techniques (Dunn 2004, Bozeman and Sarewitz 2011, Bozeman and Johnson 2015). This part of the study involved collecting and entering into Nvivo 11 software value-laden statements expressed in:

- attitudinal surveys of the Australian public regarding management of Australian fisheries (informal public preferences and values);
- policy-based recommended guidelines for fisheries management (normative/recommended formal public values).

We assumed that societal values and preferences for fisheries management would be accurately represented through attitudinal statements captured through national surveys.

Table 5. Sources of public preferences and normative public value data.

Type of public value	Source	Sections of source used	Criteria for inclusion
Community or broad Australian public preferences (informal)	Attitudinal survey conducted by Mazur, Curtis (2014) Attitudinal survey conducted by Sparks (2015) Attitudinal survey conducted by Essence Communication (2015)	Attitudinal statements concerning Australian fisheries and their management	Data collected 2010 – 2015 Sample statistically representative of the Australian population Value-laden statement supported by >50 % of respondents
Normative (recommended) public policy value	National Strategy for ESD 1992	Part 1 concerning the definition of ESD and the strategy's goal, objectives and guiding principles	National policy at the time of analysis
	Guidelines for the ecologically sustainable management of fisheries - Edition 2 (Australian Government 2007)	Principle 1 and 2	Guidelines adopted by all jurisdictions for export-based fisheries at the time of analysis
	National ESD Reporting Framework for Australian Fisheries (Fletcher, Chesson et al. 2002)	ESD component trees	Framework adopted by the majority of jurisdictions at the time of analysis (non-statutory)

3.3. Analysis and comparison of data

Policy and objective data analysis

Content analysis was used to identify key functions and themes of the objectives in primary fisheries legislation for each jurisdiction, and in fishery-specific plans of management and harvest strategies for all of the fisheries in the study sample using NVivo 11 software.

Primary codes used for all material entered were:

- Jurisdiction
- Fisheries management unit/s to which policy/objective applied
- Target specie/s to which policy/objective applied
- Type of document (High-level Policy, Legislation, Management plan/policy, Operational/Harvest strategy, Performance report, Other type of strategy)
- Level of authority (Statutory / Non-statutory)

A hierarchy of themes within public policy goals was applied, following Howlett (2009). ESD policy goals are referred to from here on as 'generalised policy or objective themes'. First pass coding identified frequently occurring key 'value terms' which were used to develop the thematic coding framework (Table 6). Key terms were those clusters of terms which referred

to valued components (e.g. listed species) and intended outcomes for those components (e.g. protection from impacts of fishing), following the Fisher, Slade et al. (2010) method of identifying 'value structures' in policy content. Five policy themes were identified: biological, ecological, economic, social and governance. Six objective themes were identified: sustainable resource use; maintain and protect ecosystem values; ensure economic benefits; ensure social wellbeing; ensure fisheries administration; and ensure good governance.

Second-pass coding was undertaken to code key terms within each objective by theme then by sub- theme in cases where the objective themes were specific enough to do so.

We assumed that goal ambiguity was present when policy goals and objectives could not be coded at any sub-level theme (Rainey and Jung 2015). In some cases where objectives referred to a conceptual goal (i.e. ecologically sustainable development), it was inferred that the objective referred to all of the first level of sub-themes on the basis of the value terms specified in the *National Strategy for Ecologically Sustainable Development 1992*, to which all Australian jurisdictions are signatories. The requirement to infer the sub-themes of a legislative objectives was also used to indicate goal ambiguity.

Coding was also used to capture the functional level of an objective or performance assessment component, i.e. Legislative; Management; and Operational.

Objectives were then entered into a searchable Microsoft Access database according to the categories developed by the content analysis. The relational database was constructed to enable queries of objectives by fishery objective framework characteristics (FisheryT), fisheries types (TypeT), and by objective theme. The link to the database, extracts, and relational tables are provided in Appendix E: Legislative objectives for fisheries by jurisdiction.

Analysis of the performance of policy and objective frameworks and objectives at the fisheries management unit level was undertaken by assembling the components of the observed objective frameworks and coding for the objective themes and functional levels. Criteria for the analysis were based on comparison of each objective and objective framework with the attributes identified in published best practice guidelines for fisheries management (see Tables 7 and 8).

A more in-depth examination of the commonality and completeness of objective frameworks was undertaken using three case study fisheries: scallop (three jurisdictions); Rock Lobster, various spp (five management units in four jurisdictions); and Spanish Mackerel (three jurisdictions). The purpose of this analysis was to examine whether fisheries targeting similar, or the same, stocks but under different jurisdictional arrangements, revealed similar or diverging levels of commonality and completeness, measured by explicit inclusion of each of the objective themes at all functional levels. The case study fisheries were selected on the basis of shared biological stocks, or similarity in key defining characteristics (stock attributes) that influence management.

Table 6. Thematic coding framework showing main themes in policies and high-level fisheries management objectives.

Policy theme	Objective theme	Objective sub-theme
Biological 	Sustainable resource use	Identified through inductive coding
Ecological 	Ecosystem maintenance and protection	
Economic 	Economic benefits	
Social 	Social benefits	
Governance 	Fisheries administration Good governance	

Table 7. Criteria for assessing objective framework design against best practice attributes

Best practice attribute	Technical definition	How assessed	Rubric		
			Absence	Undetermined	Presence
Communicated	Extent to which high and operational level objectives and performance assessment components are publicly accessible in one identifiable policy document	Coding of Objectives, Type of document, Functional level by fishery	Objectives and performance assessment components across all functional levels are: Unavailable (i.e. implicit, not stated anywhere); and/or Stated in different documents	Objectives or performance assessment components for one functional level are available in one document	Objectives and performance assessment components across all functional levels are: Available Stated in one document
Common	Extent to which objectives are in common between objective frameworks for managed fisheries for shared stocks	Coding of Themes by fishery	Objectives for specific sub-level themes are not present in multiple objective frameworks for managed fisheries that share stocks	Objectives included at a theme-only level (i.e. very generalised, non-specific)	Objectives for specific sub-level themes are not present in multiple objective frameworks for managed fisheries that share stocks
Comprehensive	Extent to which relevant ESD components and sub-components are included in objective themes and sub-level themes	Coding of Themes by fishery	Objectives for specific themes /sub-themes not present	ESD component/s included at a theme-only level (i.e. very generalised, non-specific)	Objectives for all relevant themes present
Coherent internally	Extent to which objectives are potentially in conflict with each other and means to address this is provided	Coding of Themes by fishery Presence of direction given for reconciliation	Potentially countervailing objectives are present No direction is given as to how to reconcile	Objectives included at a theme-only level and extent to which they are potentially countervailing cannot be determined	Potentially countervailing objectives are present Direction is given as to how to reconcile

Table 8. Criteria for assessing individual objective design against best practice attributes.

Best practice attribute	Technical definition	How assessed	Rubric		
			Absent	**Undetermined**	**Present**
Clear	Extent to which what is being managed and for what outcome are described (i.e. extent of goal ambiguity).	Coding of Themes by fishery Descriptors of object of management (i.e. activity, user, valued component of fishery)	Objectives cannot be coded at the sub-theme level. Object of management is not provided in the objective wording.		Objectives can be coded at the sub-theme level. Object of management is provided in the objective wording.
Consistent vertically	Extent to which objectives being pursued are consistent with higher level policy goals or selected performance measures	Coding of objectives and performance indicators by Theme for each fishery	Objective is provided for a specific theme/sub-theme but no higher-level objective consistent with that theme is present AND/OR Performance indicator is stated for a specific objective but not consistent with the theme/sub-theme of that objective	Objectives for performance indicators are not provided	Objective provided for a specific theme/sub-theme is thematically consistent with a stated higher-level objective AND/OR Performance indicator stated for a specific objective is consistent with the theme/sub-theme of that objective
Complete	Extent to which all functional levels are present to support performance evaluation and management action	Coding of functional level High-level, operational level, performance assessment components	Objectives at high-level management and operational level not present AND Performance assessment components linked to objective not present		Objectives at high-level management and operational level present AND Performance assessment components linked to objective present

Public preferences and values data analysis

This analysis drew on techniques of interpretivist analysis to examine what is meant by 'community expectations', public interest and the generation of public value (Bozeman and Johnson 2014, Emery, Gardner et al. 2017, Sullivan 2016).

Public preferences were identified by undertaking content analysis of survey data which met the inclusion criteria (i.e. statements of preference deemed to be representative of informal public preference). The technique used was adapted from Fisher, Slade et al. (2010) whereby systematic content analysis using NVIVO (2011) was undertaken of value-laden statements. Keyword searches were used to identify commonly occurring keywords or 'value terms' that pertained to goods, services or components of fisheries that were the subject of preference or interest. Value-laden statements with similar value terms were grouped into the first, most general level of value terms. The value-laden statements within each high-level grouping of value terms were then further coded by value-term specificity (i.e. where what was valued was defined) where provided, to generate a second level of preference categorisation.

We then determined which informal 'public values' or public preferences were supported most frequently. In order to determine the level of alignment of formal policy objectives (i.e. high-level objectives for Australia's fisheries management) with informal public values, we compared themes or value-terms of both to determine which supported generalised public values were represented within the generalised objective themes and sub-themes representative of formal public values.

Normative recommended public values were identified using the same technique to thematically analyse statements within recommended or normative policy frameworks (see Table 5 for a list of these frameworks). Value-laden statements were analysed to identify key 'value-terms', which were then grouped and categorised to provide a second level of normative public value categorisation. As described above, in order to determine the level of alignment of formal stated policy objectives with informal but recommended normative public values, we compared themes or value-terms of both to determine the extent to which stated policy objectives include these normative public values.

3.4. Expert validation and refinement

Technical workshops and meetings were held with fisheries policy officers and managers in 2014 and 2015, and with academic policy experts in 2017, to collate policy and objective data, validate the coding framework and refine the assessment of policy and objective design conditions for the relevant jurisdiction and fishery. The workshops were also used to discuss the risks to fisheries management performance from poor policy and objective framework design and refine the list for an Australian context. Types of project materials that would meet the needs of fisheries managers and policy officers were also confirmed through these discussions.

Workshop outlines, participant lists and summaries of recommendations are presented in Appendix D: Technical workshops.

4. Results

Findings are presented under the following research themes:

- Description of current policy environment and provision of objectives; and of commonality in policies and objectives
- Analysis of alignment with public preferences and values; and of the effectiveness of objective frameworks in supporting decision making and management; and
- Development of resources to support better objective design.

Findings reflect the policy and objective environment as of the end of 2015 within all jurisdictions with responsibility for fisheries management in Australia.

4.1 Current policy environment and provision of objectives

The extent to which objectives are **communicated** and provided in identifiable policy documents is varied across jurisdictions. This is explained by the differences in the structure of policy and objective frameworks for fisheries management in each jurisdiction (see Tables 9 - 17).

Major differences in the provision of objectives and objective frameworks across jurisdictions are as follows:

- level of provision of fisheries-specific objectives
- types of documents in which fisheries-specific objectives and performance indicators are provided
- level of specificity to a fishery

Overall, these results indicate that:

- the majority of Australian-managed fisheries do not have stated management-level objectives linked to management strategies or decision frameworks
- where provided, information about the objectives guiding fisheries management is typically distributed across different types of policy documents that are not necessarily readily accessible
- there is no standard format to management-level objectives as these ranged from replications of legislative objectives through to more defined objectives which reflected specific fishery characteristics and contexts

Provision of objectives

Across all jurisdictions, legislative objectives were provided for fisheries management.

In the majority of jurisdictions, management-level and operational objectives were not provided for the majority of fisheries (for example, Tasmania and Queensland). In these cases, however, performance indicators were publicly provided in many cases for biological, ecological and other areas of performance, which indicates the existence of implicit (i.e. unstated) objectives being used to guide fisheries management (for example, Northern Territory).

Types of policy documents

In some cases, all parts of the objective framework for a managed fishery were provided in one publicly-accessible document which integrated and provided all levels of objectives as well as linked reference points, performance indicators and management actions. Examples of jurisdictions with these integrated objective frameworks include South Australia (see Management Plan for the South Australian Blue Crab Fishery 2020), and New South Wales.

In other cases, objective components were distributed across a variety of policy documents. These included fisheries rules, non-statutory fisheries and environmental strategies (for example, environmental management strategies, bycatch action plans), Fisheries Strategic Assessment documents. Example of jurisdictions with these distributed objective frameworks include the Commonwealth Government and Western Australia.

Specificity of stated objectives to a fisheries management unit

Stated management-level objectives included those which are replications of legislative objectives at the fishery-level (for example, Commonwealth, New South Wales and South Australian-managed fisheries). This relies on the provision of reference points and performance indicators which are relevant and specific to the fishery in question.

In other jurisdiction, more defined management-level objectives were provided which reflect the interpretation of higher-level legislative objectives, and the relevant fishery characteristics, at the fishery level (for example, Western Australian fisheries in their Harvest Strategy framework).

Table 9. Presence of type of policy documents, stated objectives and other components at different functional levels for Commonwealth-managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	Bycatch Policy; Harvest Strategy Policy and Guidelines; Non-key Commercial Species (byproduct) Policy; Shark Policy and the Chondrichthyan Guide; Managing undercatch and overcatch of quota; Information Disclosure Policy; Quota Administration Policy; Allocation of fishing concessions where management arrangements change; Information and advice for industry members on AFMA committees; Operation of management advisory committees; Operation of resource assessment groups	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Management Act 1991*	Legislative objectives
		Fisheries Administration Act 1991	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Management Plan (fishery-specific)	Management objectives (fishery-specific but replicate the legislative objectives)
	Subsidiary fisheries management policy	Harvest Strategy framework (fishery-specific)	Harvest Strategy operational objectives (fishery-specific)
		Stock Rebuilding Strategy	
		Ecological Risk Management Plan/Strategy	
		Bycatch and Discards Workplan	
		Protected Species Management Strategy	
Fishery-specific references points and performance	Fishery assessment and status reporting	Stock Assessment Report (biological objectives)	Biological performance indicators
		Fishery status report	Biological, ecological and economic performance indicators

indicators	Stock status reporting (SAFS)	Biological performance indicators
	Fisheries economic and financial indicators report	Economic performance indicators
	Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 10. Presence of type of policy documents, stated objectives and other components at different functional levels for New South Wales-managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	NSW Indigenous Fisheries Strategy & Aboriginal Cultural Fishing Regulation Development	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Management Act 1994*	Legislative objectives
		Fisheries Management Regulations 2010	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Regulation (fishery-specific)	
	Subsidiary fisheries management policy	Fishery Management System (fishery-specific)	Management objectives (fishery-specific but replicate the legislative objectives)
		Environmental Impact Statement	
		Protected Species Management Strategy	
		Stock Recovery Program	
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Stock Assessment Report	Biological performance indicators
		Status of Fisheries Resources in NSW	Biological performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 11. Presence of type of policy documents, stated objectives and other components at different functional levels for Northern Territory-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policies and objectives
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	NT Indigenous Fisheries Development Strategy 2012-14; NT Fishery Resource Sharing Framework; NT Recreational Fishing Development Plan; NT Harvest Strategy Policy *(in development)*	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Act 1988*	Legislative objectives
		Fisheries Regulations 1993	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Plan (fishery-specific)	
	Subsidiary fisheries management policy	Harvest decision rule framework	*[Biological operational objectives (fishery-specific)]*
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Fishery Assessment Report	Biological, Ecological, Economic, Social performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 12. Presence of type of policy documents, stated objectives and other components at different functional levels for Queensland-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)		
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Act 1984*	Legislative objectives
		Fisheries Regulation 2008	
		Also, *Great Barrier Reef Marine Park Act 1975*	
		Queensland Marine Parks Act 2004	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Plan (fishery-specific)	*[Management objectives (fishery-specific)]*
	Subsidiary fisheries management policy	Harvest decision rule framework	*[Biological operational objectives (fishery-specific)]*
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Fishery Performance Measurement reports	Biological, Ecological, Economic, Social performance indicators
		Stock assessments	Biological performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 13. Presence of type of policy documents, stated objectives and other components at different functional levels for South Australian-managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	Resource Allocation Policy 2011; Co-management Policy 2013, Harvest Strategy Policy *(draft)*; Cost recovery policy	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Management Act 2007*	Legislative objectives
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Plan, inclusive of harvest strategy (fishery-specific)	Management objectives (fishery-specific); Operational objectives (defined management objectives)
	Subsidiary fisheries management policy		
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	ESD Risk Assessment	Biological, Ecological, Economic, Social performance indicators
		Fishery Stock assessments	Biological performance indicators
		Economic indicator reports	Economic performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 14. Presence of type of policy documents, stated objectives and other components at different functional levels for Tasmanian-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	Resource Management and Planning System 1993	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Living Marine Resources Management Act 1995*	Legislative objectives
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Rules (fishery-specific)	
	Subsidiary fisheries management policy	Fishery Management Policy *(fishery-specific, draft)*	*[Management objectives (fishery-specific); Operational objectives (defined management objectives)]*
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Fishery assessment report	Biological performance indicators
		Social and Economic assessment report	Economic and social performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 15. Presence of type of policy documents, stated objectives and other components at different functional levels for Torres Strait (PZJA)-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	Bycatch Policy; Harvest Stratergy Policy and Guidelines; Non-key Commercial Species (byproduct) Policy; Shark Policy and the Chondrichthyan Guide; Managing undercatch and overcatch of quota; Information Disclosure Policy	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Torres Strait Fisheries Act 1984*	Legislative objectives
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Plan (fishery-specific)	*[Management objectives (fishery-specific); Operational objectives (defined management objectives)]*
	Subsidiary fisheries management policy	Stock Rebuilding Strategy	
		Ecological Risk Management Plan/Strategy	
		Bycatch and Discards Workplan	
		Protected Species Management Strategy	
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Stock Assessment Report (biological objectives)	Biological performance indicators
		Fishery status report	Biological, ecological and economic performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 16. Presence of type of policy documents, stated objectives and other components at different functional levels for Victorian-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)		Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fisheries Act 1995*	Legislative objectives
		Fisheries Regulations 2009	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation		
	Subsidiary fisheries management policy	Fishery Management Plan *(fishery-specific, draft)*	*[Management objectives (fishery-specific); Operational objectives (defined management objectives)]*
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Fishery stock assessment report	Biological performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

Table 17. Presence of type of policy documents, stated objectives and other components at different functional levels for Western Australian-managed fisheries. Italicised text in brackets indicates only provided for a low % (<10%) of managed fisheries.

Policy and objective framework components	Type of policy	Policy document	Policy and objective framework
Broad policy environment	Inter / National policy (general)	National Strategy for Ecologically Sustainable Development 1992	Policy goals
		Australian Cost Recovery Guidelines, National Competition Policy, National Compliance and Enforcement Policy	
	National legislation (general)	*EPBC Act 1999*	Policy goals
Fisheries policy environment	Jurisdictional policy (fisheries)	ESD Fisheries Policy 2002; Integrated Fisheries Management Policy 2009	Policy goals
Fisheries legislative objectives	Primary fisheries management legislation	*Fish Resources Management Act 1994*	Legislative objectives
		Fish Resources Regulations Act 1995	
Fishery-specific high-level management and operational objectives	Subsidiary fisheries management legislation	Fishery Management Plan (fishery-specific)	
	Subsidiary fisheries management policy	Harvest strategy framework (fishery-specific)	*[Management objectives; Harvest operational objectives (fishery-specific)]*
		Stock rebuilding strategy; Protected species strategy; Bycatch mitigation plan	
Fishery-specific references points and performance indicators	Fishery assessment and status reporting	Fishery resources status report	Biological, ecological, economic, social performance indicators
		Stock status reporting (SAFS)	Biological performance indicators
		Fisheries Strategic Assessments (EPBC Act)	Ecological operational objectives and performance indicators

4.2 Commonality in objective themes

The extent of **commonality** in what fisheries are managed for (i.e. the inclusion of similar objectives) reflects the extent of policy consistency nationally for Australia's managed fisheries, the extent of a clear and coherent 'story' about sustainable management for the Australian public, and the potential for conflicts arising from separate management of shared stocks.

Overall, results indicate that:

- Australian fisheries are managed to meet similar, or common, objectives
- The highest extent of commonality is for biological and ecological objectives
- The lowest extent of commonality is for economic, governance and then social objectives
- There is a high level of policy ambiguity or lack of clarity in legislative objectives for fisheries management in some jurisdictions
- Gaps in management objectives at the fishery level make it difficult to assess the extent of commonality or potential conflict across managed fisheries accessing shared stocks

Common themes in fisheries legislative objectives

Thematic analysis of the legislative objects and objectives of each of the nine fisheries management acts found that all stated objectives could be accounted for by a set of generalised or commonly-occurring themes and sub-themes (Table 18).

Table 18. Generalised themes and sub-level themes stated in legislative and high-level management objectives for Australia's managed fisheries.

Policy theme	Objective theme	Objective sub-theme
Biological 	Sustainable resource use	Target species stocks Non-target species stocks
Ecological 	Ecosystem maintenance and protection	Aquatic ecosystem function, structure and diversity Aquatic habitats and communities Protected species, habitats and communities Non-retained species
Economic 	Economic benefits	Viability of commercial fishers Economic efficiency (returns) Economic benefits to broader community Regional development for Traditional owners
Social 	Social benefits	Social benefits for commercial fishing communities Opportunity for recreational users Social benefits to broader community Social benefits for Indigenous cultural fishing communities
Governance	Fisheries administration	Sufficiently informed decision making

		Cost effective and efficient management
		Cost recovery
		Accountability
		Compliance
		Take account of corresponding law
	Good governance	Appropriate access and allocation
		Resource stewardship
		Public consultation
		Stakeholder participation

Governance, economic and social-themed objectives were less common across jurisdictions than biological and ecological-themed objectives. However, all primary acts included at least one objective sub-theme from each of these broad objective themes (Table 19).

This lower level of commonality in governance-themed objectives may reflect the scope of fisheries management act and the function of subsidiary fisheries rules and regulatory legislation.

The lower level of commonality in economic and social objective sub-themes may reflect the different priorities jurisdiction place on the welfare outcomes (or social and economic benefits and beneficiaries) possible from management of a fishery. This is typified in the objective in the South Australian *Fisheries Management Act 2007*, which is to allocate access to the resource in a manner which "achieves optimum utilisation and equitable distribution of those resources to the benefit of the community". A similar objective, referring to 'social and economic benefits' in a generic sense, is provided for the Northern Territory, New South Wales, and Western Australia. The ambiguity of the term 'optimum utilisation' and the generality of 'social and economic benefits' limits further definition or thematic coding of the legislative objectives at the sub-theme (i.e. more defined and specific) level (Figure 6).

Clarity and coherence of objectives of fisheries management for the Australian community

A high level of policy ambiguity was found wherein stated objectives could not be coded at a policy or objective theme level. In a number of cases legislative objectives had to be inferred from the key terms in the text surrounding the objectives in a given policy document (see Table 19 and Figure 6). For example, the *Fisheries Act 1994* for Queensland simply provides an objective of pursuing ecologically sustainable development for fisheries.

Table 19. Presence of objectives corresponding to generalised sub-themes of legislative objectives for Australia's managed fisheries. Dark grey cell = present. Light grey cell = ambiguity (inferred by the presence of an objective at the theme level only). White cell = no objective present.

GENERALSIED OBJECTIVE THEMES		**PRIMARY FISHERIES MANAGEMENT ACTS**								
OBJECTIVE SUB-THEME		**C'wealth**	**New South Wales**	**Northern Territory**	**Queensland**	**South Australia**	**Tasmania**	**Torres Strait (PZJA)**	**Victoria**	**Western Australia**
Sustainable resource use	Target species stocks									
	Non-target species stocks									
Ecosystem maintenance and protection	Aquatic ecosystem function, structure and diversity									
	Aquatic habitats and communities									
	Protected species, habitats and communities									
	Non-retained species									
Economic benefits	Viability and efficiency of commercial fishers									
	Net economic returns									
	Broader community benefits									
	Regional development for Traditional owners									
Social benefits	Benefits for commercial fishing communities									
	Broader community benefits									
	Opportunity for recreational users									
	Indigenous cultural fishing community benefits									

Fisheries administration	Sufficient information for decision making									
	Cost effective and efficient management									
	Cost recovery									
	Accountability									
	Compliance									
	Take account of corresponding law									
Good governance	Appropriate access and allocation									
	Resource stewardship									
	Public consultation									
	Stakeholder participation									

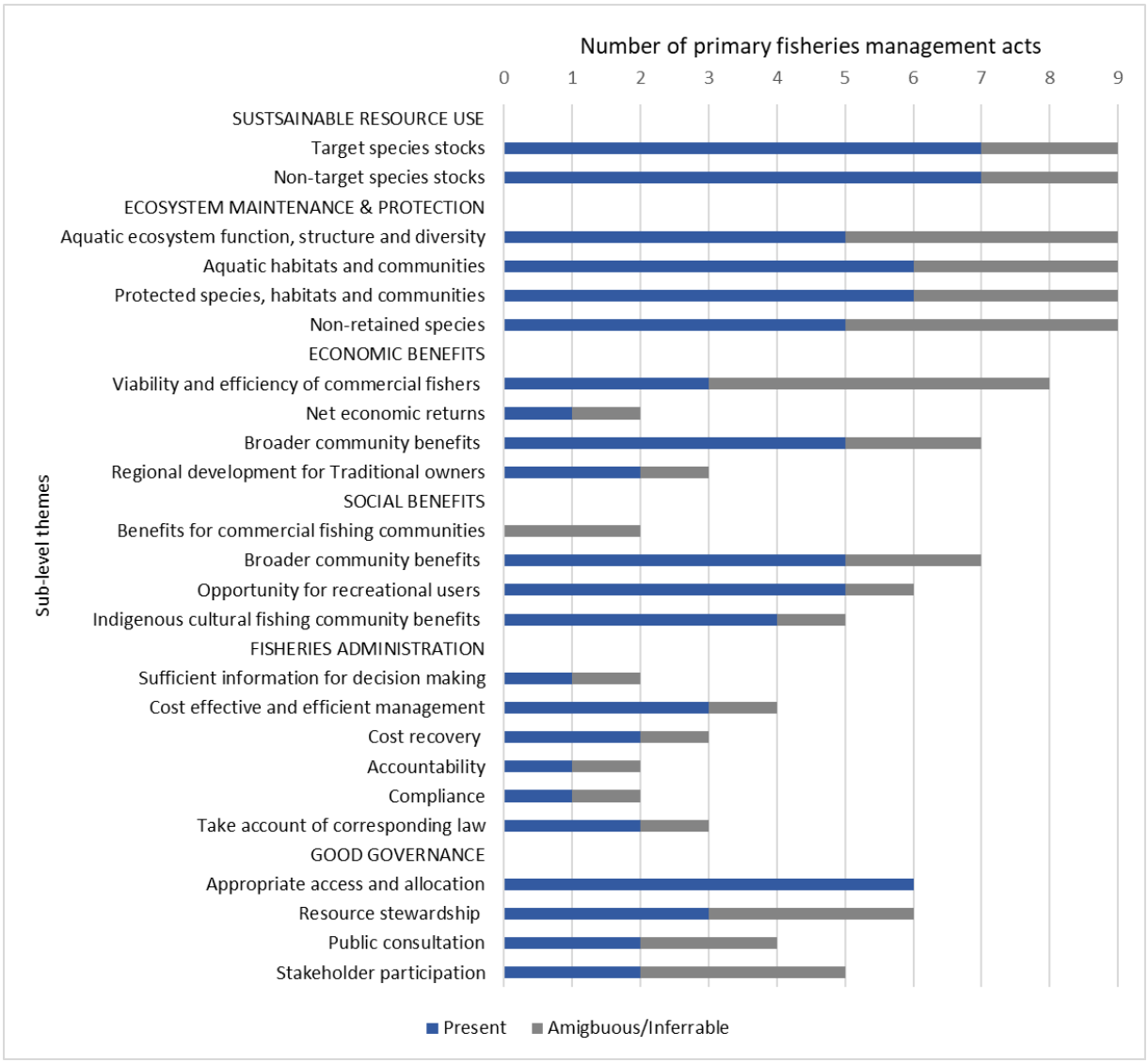

Figure 6. Number of primary fisheries management acts in which objectives are present which specify or infer the generalised objective themes and sub-themes.

Commonality in themes of management objectives for similar fisheries

Results of the analysis of the themes of management objectives for five Rock Lobster fisheries, three scallop and three Spanish Mackerel fisheries in different jurisdictions found a high-level commonality in biological sub-themes of stated objectives across all fisheries. For the lobster fisheries, a high-level commonality of ecological sub-themes was also found, although fewer stated objectives and more inferred or ambiguous objectives were found. Few economic, social and governance-themed objectives were stated, however they were similar in sub-theme across the fisheries. In contrast, for Scallop and Spanish Mackerel fisheries, a higher number of gaps and level of ambiguous or inferred objectives are found across all objective themes. This makes any analysis of the extent of commonality less informative.

Table 20. Presence of stated management-level objectives corresponding to generalised objective themes and sub-level themes for a range of Rock Lobster fisheries, Scallop fisheries and Spanish Mackerel fisheries in different Australian jurisdictions. Dark grey cell = present. Light grey cell = ambiguity (inferred by the presence of an objective at the theme level only). White cell = no objective present.

GENERALSIED OBJECTIVE THEMES		LOBSTER FISHERIES						SCALLOP FISHERIES			MACKEREL FISHERIES		
OBJECTIVE SUB-THEME		Western Rock Lobster Fishery (WA)	Northern Zone Rock Lobster Fishery (SA)	Southern Zone Rock Lobster Fishery (SA)	Rock Lobster Fishery (VIC)	Rock Lobster Fishery (TAS)	Rock Lobster Fishery (NSW)	Shark Bay Scallop Fishery (WA)	Bass Strait Scallop Fishery (C'WEALTH)	Tasmanian Scallop Fishery (TAS)	Spanish Mackerel Fishery (NT)	Torres Strait Finfish (Spanish Mackerel) Fishery (PZJA)	East Coast Spanish Mackerel Fishery (QLD)
Sustainable resource use	Target species stocks												
	Non-target species stocks												
Ecosystem maintenance and protection	Aquatic ecosystem function, structure and diversity												
	Aquatic habitats and communities												
	Protected species, habitats and communities												
	Non-retained species												
Economic benefits	Viability and efficiency of commercial fishers												
	Net economic returns												
	Broader community benefits												
	Regional development for Traditional owners												
Social benefits	Lifestyle and livelihood of commercial fishing communities												
	Broader community benefits												

	Opportunity for recreational users													
	Indigenous cultural fishing community benefits													
Fisheries administration	Sufficient information for decision making													
	Cost effective and efficient management													
	Cost recovery													
	Accountability													
	Compliance													
	Take account of corresponding law													
Good governance	Appropriate access and allocation													
	Resource stewardship													
	Public consultation													
	Stakeholder participation													

4.3 Alignment with community expectations and public value

The extent to which stated objectives are **comprehensive** or inclusive of components valued by the Australian public or within recommended frameworks reflects the extent of alignment of formal fisheries policy and objective goals with community expectations.

Overall, findings indicate that:

- Formal objectives for the management of fisheries are aligned with community expectations and normative public values for the biological sustainability of targeted fish stocks, and the protection of the supporting marine environment from ecological effects of fishing
- The more varied, less specific and consistent interpretation of 'human wellbeing', or social and economic benefits and beneficiaries, found in formal objectives suggests there is less alignment between formal objectives and both public preference and normative public values. However, this is also more difficult to assess.
- Provision of local seafood is a community preference and a normative public value which is not reflected in formal objectives.

Public 'value' and community expectations

The themes and sub-themes of the objectives guiding management of Australia's fisheries largely reflect the components or outcomes of fisheries management which the Australian community deems of value, broadly (Table 21). The strongest degree of alignment concerns biological sustainability of target fish stocks, followed by ecosystem condition and protection. Notable gaps in formal objectives concern the provision of locally-produced seafood that is safe to eat, which is an outcome of fisheries management valued by the Australian community.

Normative or recommended frameworks for policy and management

In contrast, the themes and sub-themes of the objectives guiding management of Australia's are less comprehensive or inclusive than the scope of recommended public policy goals (Table 22), although this is varied across normative pubic values. There is high alignment between the majority of primary fisheries management acts and the normative public values for ecological wellbeing, based on the presence of objectives with equivalent value themes in these acts. However only a minority of acts include stated objectives with themes or sub-themes equivalent to normative public goals for human wellbeing, and the ability to achieve.

The gaps in what normative goals are addressed in Australia's fisheries management objectives may reflect the tendency for the acts to express objectives concerned with human wellbeing in highly ambiguous terms (for example, 'benefits to the community', 'optimum utilisation'). Whereas, the normative goals identified are more specific about the forms of welfare and types of benefits and beneficiaries public management of fisheries should address.

Table 21. Informal public values expressed in National surveys of Australians conducted 2010-15 inclusive for the management of Australia's fisheries, compared with the presence of equivalent thematic codes in legislative objectives for those fisheries. * Statements may contain more than one value term.

Informal public value / community preference	Frequency of value term in statements of community preference (n=24)*	Number of Australian fisheries management acts in which equivalent objective theme/sub-theme is stated (n=9)
Target fish stocks/population	9	8
Marine species (flora and fauna, incl non-target)	8	8
Marine ecosystem/environment	6	8
Listed species and communities	4	6
Ability to manage/effective management	4	5
Locally-produced seafood	3	0
Recreational fishing opportunities	2	5
Marine habitats	2	6
ESD (incl precautionary principle)	2	5
Compliance with fisheries regulations	2	0
Commercial fishery interests	2	7
Industry stewardship	1	1
Recreational fishery interests	1	5
Seafood food safety	1	0
Certainty in fisheries science	1	0
Economic benefits to community from commercial fishing	1	5

Table 22. Normative public policy values recommended for management of Australia's fisheries.

Normative public value			Number of Australian fisheries management acts in which equivalent objective theme/ sub-theme is stated (n=9)
Ecological wellbeing[1]	Retained species wellbeing	Primary species[2, 3]	8
		By-product species[2, 3]	7
	Non-retained species wellbeing	Protected species[1, 2, 3]	5
	General ecosystem wellbeing	Biological community (e.g. trophic structure)[1, 2, 3]	6
		Broader environment[1, 2, 3]	8
Human wellbeing[1]	Indigenous community wellbeing	Income[3]	1
		Employment[3]	1
		Community viability[3]	1
		Cultural values[3]	4
	Industry Community wellbeing	Economic benefits through income[3]	3
		Lifestyle and safety[3]	0
		Employment[3]	0
		Distributed benefits[3]	4
	Dependent Community wellbeing	Employment[3]	0
		Social capital[3]	0
		Indirect economic benefits[3]	1
	National/ Sub-national community wellbeing	Net economic return[3]	1
		Health benefits through seafood consumption and quality[3]	0
		Existence values[3]	0
		Distributed benefits[3]	4
		Intergenerational equity[1]	1
Ability to achieve[1, 3]	Ability to administer	Fisheries administration - Resource allocation[3]	5
		Fisheries administration - Access rights[3]	4
		Fisheries administration - Public consultation[1, 3]	2
		Fisheries administration - correspondence with other laws[3]	2
		Fisheries administration - Reviews, Audits and Reporting[3]	1
	Ability to manage in the public interest	Public management - Industry participation[1, 3]	2
		Public management - Other stakeholder representation[1, 3]	2
		Public management - ensure compliance[3]	0
		Public management - cost effective[1]	2

Sources: 1. National ESD Strategy (COAG 1992); 2. Fisheries Strategic Assessment Guidelines (EPBC Act); 3. National ESD Reporting Framework for Fisheries (Flecther, Chesson et al. 2002)

4.4 Effectiveness in supporting decision making and management at the specific fishery level

The components of an objective framework that support decision making at a fishery-specific management level include: clearly-defined objectives, consistency with higher-level policy, presence of operational components (i.e. reference point or trigger, performance indicator, linked management action for each objective), and, direction as to how to address any conflict between objectives.

Overall, findings indicate that:

- The majority of management-level objectives for specific fisheries are general, rather than defined and specific, and re-state legislative objectives
- There is a high level of consistency between the themes of high-level objectives and those of operational-level objectives designed to enable implementation
- Inconsistencies were detected in the selection of performance indicators which, in some cases, do not indicate the outcome needing to be measured
- Less than half of the fisheries assessed (40%) provide easily accessible defined biological objectives and operational components to support decision making and management of catches of target species
- Biological, governance and to a lesser extent, ecological, objectives are more likely to be defined and have the necessary operational components to support decision making, management and performance assessment. This is likely to reflect the requirements of a number of policy processes and instruments, such as harvest strategy policies and frameworks, and Fisheries Strategic Assessments.
- Social and economic objectives are less likely to be defined and have the necessary operational components to support decision making, management and performance assessment. This is likely to reflect their higher level of goal ambiguity and generality.
- There is a high level of consistency between the themes of high-level objectives and those of operational-level objectives designed to enable implementation
- Inconsistencies were detected in the selection of performance indicators which, in some cases, do not indicate the outcome needing to be measured
- The combination of objectives for different types of social and economic benefits and beneficiaries presents the greatest risk of conflict, due in part to the high level of policy ambiguity and lack of direction for reconciliation.

Clear objectives

As identified in section 4.1, there is a high level of goal ambiguity in the legislative objectives for fisheries management of a number of Australian jurisdictions (Table 19, Figure 6).

The majority of management objectives at the fishery-specific level are also not defined nor specific to the characteristics of a fishery, rather they re-state legislative objectives. For example, such objectives do not state which ecosystem components are at risk and therefore in need of protective measures. Similarly, they do not provide direction as to what types of resource users, social and economic benefits and beneficiaries should be prioritised for a particular fishery.

In some cases, definition and greater specificity of generic management-level objectives can be inferred from the reference points or triggers, performance indicators, and linked management responses provided. These additional components make these objectives effectively 'operational'. However, this interpretative approach remains ambiguous, particularly where multiple performance indicators, triggers and thresholds are provided for a single high-level objective (see Table 24). For example, in the Management Plan for South Australia's Abalone Fishery (2012), the high-level objective to achieve "optimum economic utilisation and equitable distribution of the abalone resource" is further defined by the strategies to "maintain a flow of economic benefit from the fishery to the broader community" and "maintain a flow of economic benefit from the fishery to the broader community". Performance indicators range from indicators of commercial operator financial performance through to indirect economic contributions to the state of South Australia. They include: Gross Value of Product (GVP); Gross Operating Surplus (GOS); Profit at full equity; Licence value; Value of quota units; Economic rent; Return on capital. The reference point is a negative trend in one or more economic or financial performance indicator for more than consecutive 3 years. Based on this direction, decision making by managers for this fishery could result in a range of very different economic outcomes for private and public interests.

A third tier of clearly defined objectives to support decision making for harvest or effort levels (i.e. biological, and potentially integrating some ecological, economic and social objectives) is provided by harvest strategies, in some cases. For these fisheries, there are both high-level management and well as operational objectives (for example, see the harvest strategies for the Western Rock Lobster in Western Australia, and the Pipi sub-fishery within the Lakes and Coorong fishery in South Australia).

Consistent with policy

Coding of themes and sub-themes of stated objectives at different functional levels by fishery found a generally high level of thematic consistency between levels. This indicates that high-level policy goals and objectives are being translated into operational level objectives to guide decision making for specific fisheries. However, the capacity to fully assess the consistency of policy translation was limited by the high level of policy ambiguity and the number of gaps in operational objectives to carry through the intent of higher-level objectives.

Inconsistencies were detected in the selection of performance indicators which reflect the outcome needing to be assessed. For example, GVP is included as a performance indicator of the generation of economic benefits or the economic viability in many cases. However, it only consistent to include it if the objective is to maintain or increase the level of revenue raised through increased catches or beach price, irrespective of the cost of fishing. Similarly, for fisheries where the economic objective is to maximise economic returns, indicators of levels of direct employment were found (for example, Western Rock Lobster fishery). In both these cases, this demonstrates the tendency to include a range of performance indicators for which changes in performance may have no direct bearing on fisheries management decision making. Rather, such indicators serve more as state of the fishery indicators rather than indicators of management performance against objectives.

Complete objective frameworks

As identified in section 4.1 and 4.2, legislative objectives are provided for fisheries management in all Australian jurisdictions (Table 9-17).

In the majority of jurisdictions, management-level and operational objectives are not provided for the majority of fisheries (Table 23). In these cases, the presence of publicly-available performance indicators for a range of performance areas indicates the existence of implicit (i.e. unstated) objectives being used to guide fisheries management.

Biological, governance and to a lesser extent, ecological, objectives are more likely to be defined and have the necessary operational components to support implementation and performance assessment (Table 24). This is likely to be attributable to the presence of formal or additional reporting requirements. Where operational components are present for stock-related objectives (i.e. defined operational objectives, reference points etc.), those objectives are commonly located within a harvest strategy framework which requires this level of detail to provide rules for decision making. Similarly, where objectives concern fisheries administration they are likely to reflect the performance indicators of the management agency itself, which it is required to report against annually. And where objectives concern ecological performance, the level of definition and presence of operational components is likely to reflect the requirements of Fisheries Strategic Assessments under the EPBC Act.

In contrast, fewer economic and social objectives are supported by operational components (Table 24). This is particularly the case with regard to reference points, wherein much lower proportions of economic and social objectives provide reference points relative to the provision of a performance indicator. This is likely to reflect the high level of goal ambiguity in economic and social objectives generally, with the exception of the objective to maximising economic returns. Defining a reference point, and indeed identifying a performance indicator, requires identifying the specific type of benefit to be generated.

Other differences included the types of reference points used. For biological or stock-related objectives approximately half were conceptual (i.e. BMSY, BMEY) while the remainder were empirical reference points using trends in catch-related indicators as proxies). Reference points provided for ecological objectives were based on thresholds of acceptable impact measured using proxy indicators, such as percentage of fishing activity interacting with listed species, for example, or proportion of fishing footprint to total available fishing area. Governance objectives had reference points that referred to intermediate outcomes, such as the provision of services or completion of processes. Economic objectives used MEY as a conceptual target reference point in some cases, while in others both economic and social objectives provided trigger points based on the extent or rate of change in a performance indicator, such recreational fisher satisfaction, contribution to Gross Regional Product, or the cost of entry into the fishery relative to economic returns.

Comparison across similar fisheries

A more in-depth examination of effectiveness of objective frameworks was undertaken using three types of fisheries as case studies: scallop (three jurisdictions); Rock Lobster, various spp. (five management units in four jurisdictions); and mackerel (three jurisdictions). In each case, the fisheries target similar, or the same, stocks but under different jurisdictional arrangements.

Contrasting levels of completeness of objective frameworks (measured by the presence of stated objectives at all three functional levels) were found in all three cases (Figure 7). While these fisheries share similarities in the themes of the objectives guiding their management, this difference in the extent to which objectives are operational is likely to result in divergent management decisions and outcomes for each with regard to particular objectives (for

example, pursuing an economic objective to maximise returns for the Commonwealth Bass Strait scallop fishery is – in theory – likely to result in more conservative harvest settings in contrast, to the Tasmanian scallop fishery with which it shares stocks.

Table 23. Comparison of completeness of objective frameworks. Dark orange shading indicates the presence of the relevant component in the majority of fisheries, light orange in a minority of fisheries and white indicates the component is not present for any fishery in that jurisdiction.

Objective framework component	C'wealth	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Torres Strait - PZJA	Victoria	Western Australia
Management-level (fishery specific)	All fisheries (replicate legislative objectives)	All fisheries (replicate legislative objectives)	None	Some fisheries	All fisheries (replicate legislative objectives)	None	Some fisheries (replicate legislative objectives)	Some fisheries	Some fisheries
Operational-level (fishery specific)	All fisheries - Harvest objectives ONLY	All fisheries (defined management objectives)	Some fisheries - Harvest objectives ONLY	Some fisheries - Harvest objectives ONLY	All fisheries (defined management objectives)	Some fisheries - Harvest objectives ONLY	Some fisheries	Some fisheries	Some fisheries
Reference points (fishery specific)	All fisheries - Harvest objectives ONLY	All fisheries (trigger points)	Some fisheries - Harvest objectives ONLY	Some fisheries	All fisheries (trigger points)	Some fisheries	Some fisheries	Some fisheries	Some fisheries
Performance indicators (fishery specific)	All fisheries	All fisheries	All fisheries	Some fisheries	All fisheries (multiple PIs for single objectives in many cases)	All fisheries	All fisheries	Some fisheries	All fisheries

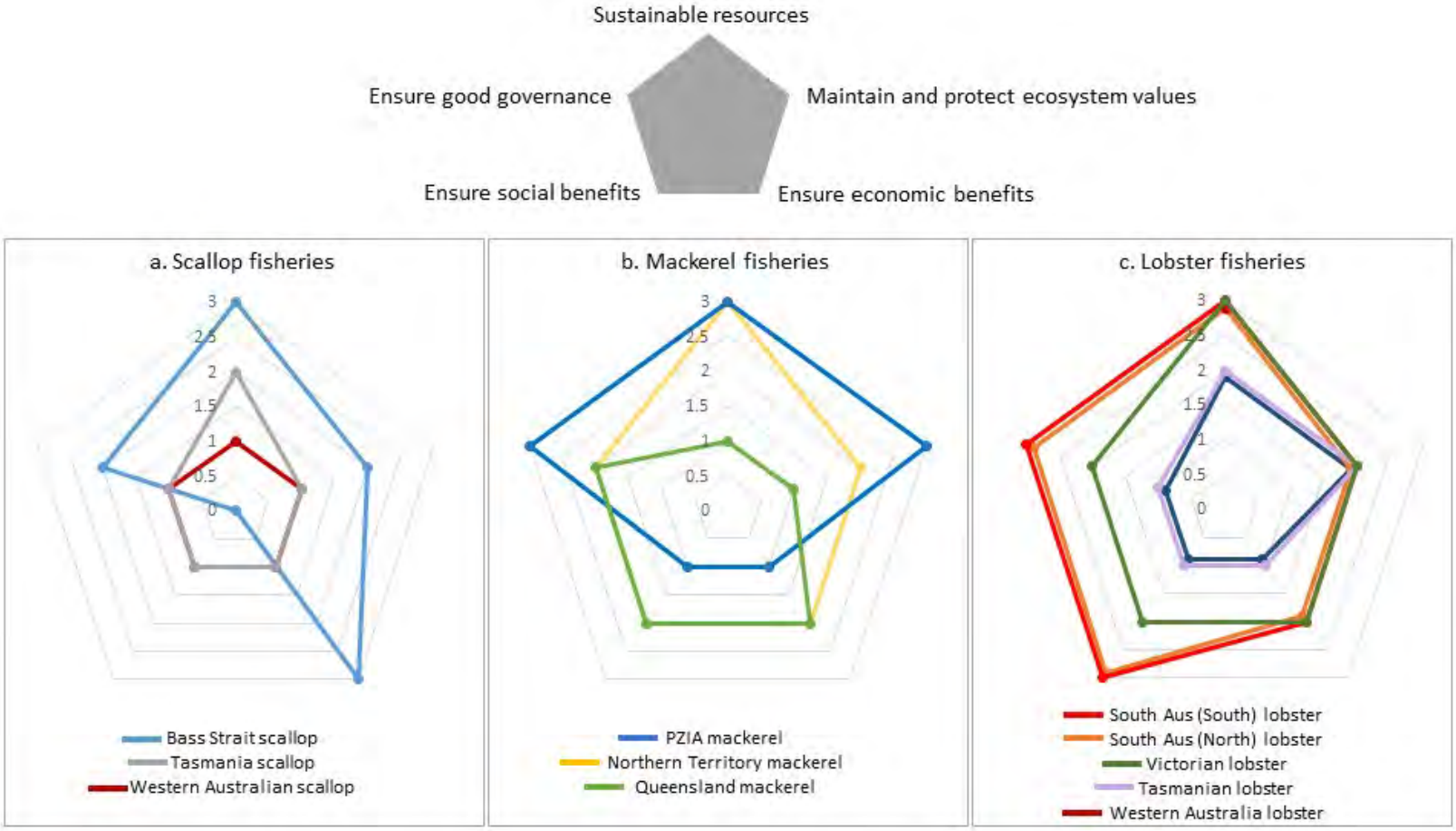

Figure 7. Completeness of objective frameworks in case study fisheries, where 0 indicates no stated objective at any functional level, and 3 indicates that a stated objective is present at all functional levels for that objective theme. Note that 'Fisheries management and 'Good governance' were combined for this analysis under 'Ensure good governance'.

Table 24. Presence of performance measures and performance indicators linked to stated objectives.

Objective theme	Sub-theme	Provision of an Objective (No. instances, can be multiple for same fishery)	% where Reference Point / Performance Measure provided	No. stated Reference Points / Performance Measures in use	% where Performance Indicator provided	No. stated Performance Indicators in use
Sustainable resource use	Target species stocks	72	98%	209	100%	211
	Non-target species stocks	28	90%	25	93%	26
Maintain and protect ecosystems	Protected species, habitats and communities	48	67%	19	63%	19
	Aquatic habitats and communities	17	100%	15	100%	15
	Aquatic ecosystem function, structure and diversity	15	47%	5	53%	5
	Non-retained species	30	73%	18	90%	20
Ensure economic benefits	Viability of commercial fishers	35	89%	18	100%	15
	Economic efficiency (returns)	26	58%	6	65%	5
	Economic benefits to broader community	4	25%	1	100%	3
	Regional development for Traditional owners	3	0%	0	0%	0
Ensure social benefits	Opportunity for recreational users	13	46%	6	46%	6
	Social benefits to broader community	9	78%	5	89%	8
	Social benefits for commercial fishing communities	2	50%	1	100%	2
	Social benefits for Indigenous cultural fishing communities	6	67%	5	67%	5
Ensure fisheries administration	Sufficiently informed decision making	23	96%	3	96%	3
	Cost effective and efficient management	36	89%	4	92%	4
	Cost recovery	23	100%	2	100%	2
	Accountability	11	100%	1	100%	1

	Compliance	26	96%	3	96%	3
	Take account of corresponding law	14	100%	2	100%	2
Ensure good governance	Appropriate access and allocation	14	86%	2	86%	2
	Resource stewardship	0	0%	0	0%	0
	Public consultation	27	100%	4	100%	4
	Stakeholder participation	17	88%	2	88%	2

Coherence with other objectives

Objectives being pursued within a set of management-level objectives for a fishery have the potential to be countervailing with other objectives due to the scarce and public nature of fisheries resources being accessed for private interests (see Hilborn 2007, Symes and Phillipson 2009). For example, the biological and economic objective to harvest targeted fish to a level that leaves a minimum of 20% of the virgin biomass unfished (i.e. a maximum sustainable yield limit) may be countervailing with the ecological objective to sustainability of non-target species, in cases where these species are co-occurring and at higher risk of unsustainable levels of fishing mortality.

A range of these potentially countervailing combinations of objectives have been identified for Australian fisheries management objectives (Table 25). Broadly, the principle of ecologically sustainable development gives clear precedence by constraining the level of exploitation of fish stocks to only those levels which are consistent with ecological and stock sustainability objectives. However, as Borthwick (2012) noted in his review of Commonwealth-managed fisheries, the weightings given to potentially countervailing objectives are not clearly provided in policies or high-level objectives nor the necessary assessment and justification of trade-offs in decision-making presented in publicly accessible material.

Some examples of the ways in which some potentially countervailing conditions are identified and addressed in legislative objectives for Australian fisheries management are presented in Table 26.

Table 25. Potentially countervailing objectives. The full version of Table 25 *Potentially countervailing objectives* is available as a separate file which can be downloaded from the project page on the FRDC website. It is also available via the following link: Countervailing objectives - matrix.

		2. Ensure sustainable resource use		3. Maintain & protect affected ecosystems				4.
		2.1 Sustainable target spp stocks	2.2 Sustainable non-target spp stocks	3.1 Protect aquatic ecosystems, ecological processes and	3.2 Protect aquatic habitats and communities	3.3 Protect listed species, habitats and communities	3.4 Minimise impacts on bycatch (i.e. non-retained) species	4.1 Ena econor efficie viabili comme
2. Ensure sustainable resource use	2.1 Sustainable target spp stocks		Countervailing Conditions: where no incentives to protect non-	Countervailing Conditions: where MSY targeted, higher effort and	Countervailing Conditions: where MSY targeted, higher effort and	Countervailing Conditions: where MSY targeted, higher effort and	Countervailing Conditions: where MSY targeted, higher effort and	* Coun Conditi where targete can be
	2.2 Sustainable non-target spp stocks	Countervailing Conditions: where no incentives to						Counte Conditi where targete

The combination of objectives for different types of social and economic benefits and beneficiaries presents the greatest risk of conflict, due in part to the high level of policy ambiguity and lack of direction for reconciliation. An example of this is the objective of the New South Wales *Fisheries Management Act 1994*, in which simultaneously management of a fishery is intended to pursue economically viable commercial fishing, quality recreational fishing opportunities, and social and economic benefits for the wider community.

This is likely to present the need to trade off harvest levels which are optimal for the commercial fishery with those that are optimal for recreational fishing satisfaction (i.e. higher

catch rates than is optimal for commercial fishing). Similarly, viability for commercial fisheries could be defined as economically efficient commercial fisheries, in which case employment levels decrease and the main remaining mechanism for potential wider community benefit is via the so-called trickle-down effect from higher commercial fisher returns.

Table 26. Presence of stated policy direction for reconciling potentially countervailing objectives

Type of conflict	Type of direction provided for reconciliation	Example
Ensure maintenance and protection of ecosystem (ecological objective) V Ensure economic benefits from resource use and extraction (economic objective)	Precedence: ecological objective has precedence	FMA 2007 (SA): (1) (a) proper conservation and management measures are to be implemented to protect the aquatic resources of the State from over-exploitation and ensure that those resources are not endangered
	Threshold condition: generation of economic benefits from resource use and extraction may only occur to the extent that a maximum level of allowable impact on ecosystems is not exceeded	
Ensure protection of listed species (ecological objective) V Ensure cultural rights and values for Traditional Owners (social objective)	Precedence: ecological objective has precedence	TSFA 1984 (PZJA/C'WEALTH): (c) to adopt conservation measures necessary for the conservation of a species in such a way as to minimise any restrictive effects of the measures on traditional fishing
	Implementation condition: design and implementation of conservation measures to minimise negative effects on cultural rights and rights	
Ensure economically viable commercial fisheries (economic objective) V Ensure quality recreational fishing opportunities (social objective)	Trade off: neither objective has precedence	FMA 1994 (NSW): (d) to promote viable commercial fishing; (e) to promote quality recreational fishing opportunities; (g) to provide social and economic benefits for the wider community of New South Wales
	Trade off condition: trade-off between benefits and beneficiaries much not result in no benefits being generated for the wider community	FMA 2007 (SA): (d) recreational fishing and commercial fishing activities are to be fostered for the benefit of the whole community

4.5 Resources to support better objective design

Gaps and underperformance in policy and objective design identified in sections 4.1 - 4.4 included a number that are due to structural factors, such as the design of policy processes and instruments (e.g. management plan design and what it includes), or the lack of such processes and instruments for an agency. These gaps can be partly addressed by adoption of nationally consistent frameworks, such as the *National Guidelines for Harvest Strategy Development* (Sloan, Smith et al. 2014). These types of initiatives are policy-level decisions in themselves and require the coordination of the AFMF in addition.

Key gaps which can be addressed by fisheries policy staff for objective design for specific fisheries include: the lack of stated objectives, especially at the fishery-specific and operational levels; the high level of goal ambiguity (or lack of definition) of objectives that are stated; the lack of reference points and performance indicators to make objectives operational; and the lack of direction in reconciling countervailing objectives.

The resources developed to address these types of gaps are as follows:

- *Database of stated management objectives for Australian fisheries*. The Microsoft Access database can be downloaded from the project page on the FRDC website. It is also available via the following link: Objectives database.
- *Selecting and reviewing objectives for fisheries management – Options and Checklist* (Appendix G) is available as a separate file which can be downloaded from the project page on the FRDC website.
- The matrix of *Potentially countervailing objectives* (Table 25) is available as a separate file which can be downloaded from the project page on the FRDC website.

5. Discussion and conclusion

While legislative objectives for managing Australia's fisheries are largely aligned with community expectations, there is an opportunity to better demonstrate this alignment at the fishery level by providing objectives, where they are implicit and unstated, and by making policy and objectives for all aspects (i.e. economic, social as well as biological and ecological, at both strategic policy and operational levels) more readily accessible in single locations.

The individual fishery level, Australian public, fishers and fisheries management agencies themselves are currently under serviced by the objectives provided to guide management. At the management-level, strategic objectives provide the conditions under which:

- the principle of ecological sustainable development can be regarded and demonstrated as met, and
- the criteria and checks for selecting management instruments based on the extent to which legal and administrative provisions are met, and the generation and sharing of intended benefits occurs.

Because of the gaps in stated and defined objectives at this level, sustainability is harder to demonstrate, specific benefits are not being realised in all cases and additional burdens are potentially being experienced (see section 5.2 below). This is particularly the case for fisheries management in a number of Australian jurisdictions.

The greatest gains are to be made at the fishery level. There is a great opportunity to adapt and further apply tools which require fishery-specific management objectives to be better defined and supported by operational components in those jurisdictions without clearly stated objectives. At the strategic objective level these include the National ESD Guidelines and ESD framework for wild capture fisheries, resource sharing frameworks, and Indigenous fishing strategies. At the operational and harvest objective level these include Fisheries Strategic Assessments and harvest strategy policies.

There remains the need, however, to provide the detail of objective frameworks in single formats to support better public communication and accountability. Insights shared by policy and management staff from fisheries management agencies concerning enabling and disabling conditions are considered in the following discussion of these challenges and opportunities.

5.1 Demonstrating alignment with community expectations and public values

While there is broad alignment of policy and community expectations, the more substantial challenge is demonstration of this policy at the fishery level. This takes the forms of stated objectives for a fishery which demonstrate that sustainability considerations are used as checks on how fisheries are managed and their performance. The under provision and specification of objectives at the fishery level therefore compounds this challenge. The extensive investment in assessment frameworks nationally to demonstrate sustainability holistically need to be supported by clear articulation of sustainability policy and guiding objectives.

The provision of safe, locally produced seafood and the broader distribution of economic and social benefits are areas of community expectation and public values not as clearly included within fisheries policy and objective frameworks.

5.2 Making implicit objectives explicit

As stated, meeting best practice for the design of objective frameworks for Australian fisheries management requires that implicit objectives become formally stated and publicly available. Fisheries managers expressed concern that formalising more specific objectives for a fishery removes the short-term flexibility and discretion managers have to interpret legislative objectives in such a way that they retain the ability to adjust management settings to changing conditions, priorities and re-interpretations. This is particularly the case for economic and social objectives.

However, the loss of transparency from failing to make management objectives explicit from a public policy perspective is significant. Moreover, policy ambiguity has other forms of hidden, longer term costs that managers may not be taken into account (see section 5.2). In addition, delineating the scope of what a fishery is being managed for can reduce the risk of the cumulative effects of a series of smaller-scale short-term decisions being made without the direction of stated objectives that have a major influence on how the fishery performs over strategic time frames. The potential loss of flexibility can be addressed through administratively, in part at least. The Productivity Commission (2016) report made recommendations concerning delegation of a range of fisheries management decisions to managers.

5.3 Defining the direction of benefits

Greater definition and specification of what types of social, economic and cultural benefits and for whom (resource users, the regional community, the wider community) would allow these aspects of sustainable management to be publicly demonstrated. It would provide fisheries management agencies with the guidance needed to assess and evaluate trade offs and choose and adjust management instruments and settings that more effectively meet the general objective to ensure “social and economic benefits for the wider community”.

Fisheries managers noted both the challenge of trying to infer what “optimum benefits” or “benefits” should be pursued where such objectives where so generally defined, as well as the challenge of drafting objectives which did define the type and direction of benefits. This highlights the public policy nature of this challenge, and suggest it is a task requiring input from policy staff from a range of policy areas (such as regional development) as well as fisheries managers.

5.4 Policy design tools

In addition to assessment framework development, there has been considerable work underway to expand harvest strategy frameworks to encompass ecological, economic and social objectives and performance (see FRDC project 2015-013: *Developing triple bottom line harvest strategies that include all environmental aspects for multi-sector fisheries*). This mechanism offers potential to define and specific objectives that are directly linked to harvest settings. Examples include of recreational fishing quality, and local availability of fish for Traditional Owners when combined with spatial management settings.

However, these steps need to be supported by clarity at the fishery-specific policy level of the public policy objectives of management and the relative weightings given to these. While tools exist, such as the National ESD Guidelines and the ESD risk assessment framework, they are not fisheries nor policy oriented respectively.

Furthermore, not all objectives need to be technically specified to the level harvest settings (Sainsbury 2008) and not all objectives are directly linked to harvest settings.

Similarly, extensive resources exist to specify social objectives and economic objectives once the intended types of benefits and beneficiaries (i.e. the public policy question) has been resolved. See Developing and testing social objectives for fisheries management (Triantafillos, Brooks et al. 2014) and Building economics into fisheries management decision making - to utilise a suite of SA case studies (Morison 2016) for such resources.

5.5 Policy design capacity

The requirements of various legal and broader policy settings within each jurisdiction need to be acknowledged, and the constraints these apply to policy principles and required policy assessment frameworks (for example, cost-benefit principles). For this reason, this report does not conclude with a recommendation for national harmonisation of fishery-level management objectives beyond the requirement of best practice attributes of the design of objective frameworks.

There is the will and intent to do a better job of designing and providing objectives at the fishery management level for Australian fisheries. Opportunities arise in the form of the processes of undertaking fishery management plan reviews and the development of resource sharing and harvest strategy policy frameworks in some jurisdictions. The public policy nature of these next steps suggests that further work on ESD guidelines for fishery policy design is warranted.

6. Implications

The intermediate outcomes of project for fisheries management agencies and staff are:

- Improved understanding of the effects of implicit and under defined objectives
- Improved understanding of community expectations and recommended public values in relation to objectives of fisheries management
- Improved capacity to develop and define objectives to improve management performance
- Additional transaction costs for in the short term to review and address gaps in objective frameworks and their performance

The project is therefore anticipated to have the following longer-term implications and impacts, post project:

- Improved ecological wellbeing from the increased specification of ecological objectives and with the greater ability to review and adapt management settings to achieve those objectives (Australian public)
- Reduced transaction costs of management from lower levels of conflict concerning, and mistrust in, the sustainability of fisheries management and decision-making (fisheries management agencies)
- Reduced social cost to commercial fishers from increased clarity of the economic objectives of management, and the implications of these on fleet size, efficiency, regional focus (commercial fishers)
- Increased total net benefit (social and economic) from fisheries management, in which the types of benefits and beneficiaries are those sought by fisheries policy goals and achieved through policy-appropriate management measures (Australian public)

7. Recommendations

Development of national ESD fishery policy design guidelines is recommended, under the auspices of the Australian Fisheries Management Forum and Fisheries Management Sub-committee. This would complement the National Guidelines for Harvest Strategy Development and integrate the National ESD Guidelines and the National ESD framework for Wild Capture Fisheries. It would extend these existing guidelines by focusing on design principles.

8. Extension and Adoption

Presentations of project results:

- SAFS committee, July 2013
- Australian Seafood CRC Bioeconomics workshop, February 2015
- SAFS committee, May 2015
- AFMF Fisheries Management Sub-committee, November 2016

Workshops with Australian fisheries managers:

- Project workshop, October 2014
- Fisheries Queensland Managers Workshop, February 2016
- AFMF Fisheries Management Sub-committee workshop, October 2017
- Fisheries Queensland, Social and Economic Indicators workshop, December 2017

Conferences:

- International Political Science Association conference, July 2018
- Seafood Directions, October 2015

9. Glossary

Goal ambiguity: the level of clarity and/or complexity of a policy goal. A goal can be ambiguous because it is vague (i.e. not specific), or(and) it can include multiple conflicting parts. Therefore performance against the achievement of the goal cannot be measured.

High-level management objective: Also referred to as Aspirational or Conceptual Objective. These apply the broad objects or objectives of fisheries legislation and policy at the fishery-specific level (often they are the same). Their function is to 'guide' management of individual fisheries, consistent with the overarching legislation

Objective setting: The design of the objective framework and the selection of specific objectives.

Objective: a more concrete aim to achieve an outcome that contributes to attainment of a policy goal.

Objective framework: A way to organise objectives for a managed fishery by level or function. The top level in a framework are the high-level objects found in fisheries legislation. The next level is those in a management plan or policy for a fishery. The lowest level are the 'operational' objectives, used in either management plans or harvest strategies. Also referred to as an objective hierarchy.

Operational objective: An objective that is defined in such a way that it enables direct and interpretable implementation. Operational management objectives are very precise and are formulated in such a way that the extent to which they have been achieved during a specified period should be easily measured. An operational objective requires a 'package' of elements to make it fully operational: a performance indicator, a performance measure; and a linked management response.

Performance indicator: A performance indicator is a quantity that can be measured and used to track changes with respect to achieving an operational objective. Performance indicators can be a direct measurement of performance or a surrogate.

Performance measure: Performance is measured by comparing where a performance indicator sits in relation to a reference point. It defines progress against a management objective.

Policy framework: A policy framework is document that sets out a set of procedures or goals, which might be used in negotiation or decision-making to guide a more detailed set of policies, or to guide ongoing maintenance of an organization's policies.

Policy goal: Theses are general abstract aims of policy. They reflect the most general macrolevel statement of government aims and ambitions in a specific policy area.

Policy translation: Policy translation refers to the interpretation and alignment of broad policy goals in the design and setting of specific management-level objectives and operational components.

Public values: Public values concern "(1) the rights, benefits, and prerogatives to which citizens should (and should not) be entitled; (2) the obligations of citizens to society, the state, and one another; and (3) the principles on which governments and policies should be

based". They are identified on the basis of some level of normative consensus within a public sphere. Public value is more than the collective private value (Bozeman, 2007, p. 13)

Public interest: the welfare or well-being of a social collective constructed as a public.

Reference point: A reference point is a particular value of a fisheries indicator corresponding to a situation that is important to management. Reference points are essentially 'benchmarks' of performance and are linked to defining acceptable levels of biological impact on a stock or the desired social and/or economic outcomes. The situation that is of importance to management could be a desirable outcome (giving a target reference point), an undesirable outcome (giving a limit reference point) or the initiation through a decision rule of a pre-determined management response (giving a trigger reference point). The operational objectives and reference points need to be explicitly linked.

Reporting: The system of fisheries performance measurement, monitoring, assessment, evaluation and reporting. Important components include: performance indicators, benchmarks or reference points, triggers or thresholds for management response, and reporting platforms (i.e. fishery assessment and status reports).

(Sources: Barber and Taylor 1990, FAO 2002, Fletcher, Chesson et al. 2002, Bozeman 2007, Sainsbury 2008, Howlett 2009, Pascoe, Proctor et al. 2009, Sloan, Smith et al. 2014 Rainey and Jung 2015)

10. Project materials developed

Farmery, A. K., E. Ogier, C. Gardner and J. Jabour (2019). "Incorporating ecologically sustainable development policy goals within fisheries management: An assessment of integration and coherence in an Australian context." *Journal of Environmental Management* 249: 109230.

Database of stated management objectives for Australian fisheries. The Microsoft Access database can be downloaded from the project page on the FRDC website. It is also available via the following link: Objectives database.

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11. References

Australian Fisheries Management Forum (2017). National Statement of Intent on Fisheries and Aquaculture AFMF. Darwin, Australia: Department of Primary Industry and Fisheries.

Australian Government (2007). *Guidelines for the ecologically sustainable management of fisheries - Edition 2.* Canberra, Australia: Department of the Environment and Water Resources.

Barber, W. E. and J. N. Taylor (1990). "The Importance of Goals, Objectives, and Values in the Fisheries Management Process and Organization: A Review." North American Journal of Fisheries Management **10**(4): 365-373.

Benson, A. J. and R. L. Stephenson (2018). "Options for integrating ecological, economic, and social objectives in evaluation and management of fisheries." Fish and Fisheries **19**(1): 40-56.

Borthwick, D. (2012) Review of Commonwealth Fisheries: Legislation, Policy and Management. Report to the Minister for Agriculture, Fisheries and Forestry. Canberra, Australia.

Bozeman, B. (2007). Public Values and Public Interest: Counterbalancing Economic Invidualism. Washington, USA: Georgetown University Press.

Bozeman, B. and J. Johnson (2014). "The Political Economy of Public Values: A Case for the Public Sphere and Progressive Opportunity." The American Review of Public Administration **45**(1): 61-85.

Brooks, K. (2009). *Understanding Government and environmental Non Government Organisations' perceptions and attitudes toward the South East Trawl fishing industry.* FRDC Report No. 2008/316. Canberra, Australia: Fisheries Research & Development Corporation.

Brooks, K., J. Schirmer, S. Pascoe, L. Triantafillos, E. Jebreen, T. Cannard and C. M. Dichmont (2015). "Selecting and assessing social objectives for Australian fisheries management." Marine Policy **53**: 111-122.

Caddy, J. F. and R. Mahon (1995). *Reference points for fisheries management*. FAO Fisheries Technical Paper No. 347. Rome, Italy: Food and Agriculture Organization.

Cochrane, K. L. (2017). "An integrated view of fisheries: tunnelling between silos." ICES Journal of Marine Science **74**(3): 625-634.

Cochrane, K. L., J. Joyner, W. H. H. Sauer and J. Swan (2015). "An evaluation of the Marine Living Resources Act and supporting legal instruments as a framework for implementation of an ecosystem approach to fisheries in South Africa." African Journal of Marine Science **37**(4): 437-456.

Council of Australian Governments (1992). *National Strategy for Ecologically Sustainable Development.* Canberra, Australia: Ecologically Sustainable Development Steering Committee.

De Young, C., A. Charles and A. Hort (2008). *Human dimensions of the ecosystem approach to fisheries: an overview of context, concepts, tools and methods*. FAO Fisheries Technical Paper. No. 489. Rome, Italy: Food and Agriculture Organisation.

Emery, T. J., C. Gardner, K. Hartmann and I. Cartwright (2017). "Beyond sustainability: is government obliged to increase economic benefit from fisheries in the face of industry resistance?" Marine Policy **76**: 48-54.

Emery, T. J., C. Gardner, K. Hartmann and I. Cartwright (2017). "Beyond sustainability: is government obliged to increase economic benefit from fisheries in the face of industry resistance?" Marine Policy **76**: 48-54.

FAO (1988). Report of the Council of FAO, Ninety-fourth Session. CL 94/REP. Rome, Itlay: Food and Agricultural Organisation of the United Nations.

FAO (1995). Code of Conduct for Responsible Fisheries Management. Rome, Italy: Food and Agricultural Organisation of the United Nations.

FAO (2002). *A fisheries managers' guidebook: Management measures and their applications.* Fisheries Technical Paper 424. Rome, Italy: Food and Agriculture Organization.

FAO (2003). *The ecosystem approach to fisheries.* FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl. 2. Rome, Italy: Food and Agriculture Organisation.

Fisher, E., C. P. Slade, D. Anderson and B. Bozeman (2010). "The public value of nanotechnology?" Scientometrics **85**: 29–39.

Fletcher, W. (2012). *National Application of Sustainability Indicators for Australian Fisheries-Part 2: Ecosystem based frameworks for aquaculture, multi-fishery and international applications*. FRDC Report - Project 2000/145 Part 2 & Fisheries Research Report No. 235, Western Australia, Australia: Department of Fisheries.

Fletcher, W. J. and G. Bianchi (2014). "The FAO – EAF toolbox: Making the ecosystem approach accessible to all fisheries." Ocean & Coastal Management **90**: 20-26.

Fletcher, W. J., J. Chesson, F. M., S. K.J., T. Hundloe, A. D. M. Smith and B. Whitworth (2002). *National ESD Reporting Framework for Australian Fisheries: The 'How To' Guide for Wild Capture Fisheries.* FRDC Project 2000/145. Canbeera, Australia: Fisheries Research & Development Corporation.

Fletcher, W. J., J. Shaw, S. J. Metcalf and D. J. Gaughan (2010). "An Ecosystem Based Fisheries Management framework: the efficient, regional-level planning tool for management agencies." Marine Policy **34**(6): 1226-1238.

Flood, M., I. Stobutzki, J. Andrews, C. Ashby, G. Begg, R. Fletcher, C. Gardner, L. Georgeson, S. Hansen, K. Hartmann, P. Hone, P. Horvat, L. Maloney, B. McDonald, A. Moore, A. Roelofs, K. Sainsbury, T. Saunders, T. Smith, C. Stewardson, J. Stewart and B. e. Wise (2014). *Status of key Australian fish stocks reports 2014.* Canberra, Australia: Fisheries Research and Development Corporation.

Garcia, S. (1996). *Indicators for Sustainable Development of Fisheries*. Brisbane, Australia: Workshop on Fisheries Sustainability Indicators.

Garcia, S. M. and A. T. Charles (2008). "Fishery systems and linkages: Implications for science and governance." Ocean and Coastal Managment **51**: 505-527.

Grafton, R. Q., T. Kompas, R. McLoughlin and N. Rayns (2007). "Benchmarking for fisheries governance." Marine Policy **31**(4): 470-479.

Gullet, W. (2008). *Fisheries law in Australia*. Chatswood, Australia: LexisNexis Butterworths.

Hilborn, R. (2007). "Defining success in fisheries and conflicts in objectives." Marine Policy **31**(2): 153-158.

Howlett, M. (2009). "Governance modes, policy regimes and operational plans: A multi-level nested model of policy instrument choice and policy design." Policy Sciences **42**(1): 73-89.

Lee, E 2019, *'Wave to Plate': Establishing a market for cultural fisheries in Tasmania*, Swinburne University of Technology, Melbourne, and University of Tasmania, Hobart, Report to FRDC, May 2019.

Lowi, T. J. (1972). "Four Systems of Policy, Politics, and Choice." Public Administration Review **32**(4): 298-310.

McClanahan, Tim, Edward H. Allison, and Joshua E. Cinner. "Managing fisheries for human and food security." Fish and Fisherie*s* 16.1 (2015): 78-103.

McCormack, F. (2017). "Sustainability in New Zealand's quota management system: A convenient story." Marine Policy **80**: 35-46.

OECD (2016). "A new framework for policy coherence for sustainable development", *in Better Policies for Sustainable Development 2016: A New Framework for Policy Coherence*. Paris, France: OECD Publishing.

Pascoe, S., C. Dichmont, K. Brooks, R. Pears and E. Jebreen (2013). "Management objectives of Queensland fisheries: Putting the horse before the cart." Marine Policy **37**: 115-122.

Pascoe, S., W. Proctor, C. Wilcox, J. Innes, W. Rochester and N. Dowling (2009). "Stakeholder objective preferences in Australian Commonwealth managed fisheries." Marine Policy **33**(5): 750-758.

Pierre, J. and Peters, B. (2005). *Governing complex societies: Trajectories and scenarios*. New York, USA: Palgrave MacMillan.

Productivity Commission (2016). Marine Fisheries and Aquaculture, Final Report. Canberra, Australia: Australian Government.

Rainey, H. G. and C. S. Jung (2015). "A Conceptual Framework for Analysis of Goal Ambiguity in Public Organizations." Journal of Public Administration Research and Theory **25**(1): 71-99.

Rice, J. (2011). "Managing fisheries well: delivering the promises of an ecosystem approach." Fish and Fisheries **12**(2): 209-231.

Rice, J. and M. Rochet (2005). "A framework for selecting a suite of indicators for fisheries management." ICES Journal of Marine Science **62**(3): 516-527.

Ridge Partners (2009). *Evaluating the Performance of Australian Marine Capture Fisheries.* Canberra: Australia: Fisheries Research and Development Corporation.

Said, A., J. Tzanopoulos and D. MacMillan (2016). "Bluefin tuna fishery policy in Malta: The plight of artisanal fishermen caught in the capitalist net." Marine Policy **73**: 27-34.

Sainsbury, K. J. (2008). *Best Practice Reference Points for Australian Fisheries*. R2001/0999. Canberra, Australia: AustralianFisheries Management Authority.

Schnierer, S. and H. Egan (2015). Indigenous Cultural Fishing and Fisheries Governance. Final Report for project 2012/216. Canberra, Australia: Fisheries Research and Development Corporation.

Sloan, S. R., A. D. M. Smith, C. Gardner, K. Crosthwaite, L. Triantafillos, B. Jeffries and N. Kimber (2014). National Guidelines to Develop Fishery Harvest Strategies. Canberra, FRDC Report – Project 2010/061 and Primary Industries and Regions, South Australia, Adelaide.

Stephenson, R. L., A. J. Benson, K. Brooks, A. Charles, P. Degnbol, C. M. Dichmont, M. Kraan, S. Pascoe, S. D. Paul, A. Rindorf and M. Wiber (2017). "Practical steps toward integrating economic, social and institutional elements in fisheries policy and management." ICES Journal of Marine Science **74**: 1981-9.

Stephenson, R. L., S. Paul, M. Wiber, E. Angel, A. J. Benson, A. Charles, O. Chouinard, M. Clemens, D. Edwards, P. Foley, L. Jennings, O. Jones, D. Lane, J. McIsaac, C. Mussells, B. Neis, B. Nordstrom, C. Parlee, E. Pinkerton, M. Saunders, K. Squires and U. R. Sumaila (2018). "Evaluating and implementing social-ecological systems: A comprehensive approach to sustainable fisheries." Fish and Fisheries **19(5)**: 853-73.

Sullivan, H. (2016) "Interpretivism and Public Policy Research' in Interpreting Governance, High Politics, and Public Policy" in *Interpreting Governance, High Politics, and Public Policy* Turnbull, N. (ed.). pp. 184-204. New York, UAS: Routledge.

Symes, D. and J. Phillipson (2009). "Whatever became of social objectives in fisheries policy?" Fisheries Research **95**(1): 1-5.

Triantafillos, L., K. Brooks, J. Schirmer and S. Pascoe (2014). *Managing the social dimension of fishing: Part 2 Implementing social objectives and indicators in fisheries management*. Adelaide, Australia: Primary Industries and Regions SA, Fisheries and Aquaculture.

World Commission on Environment and Development (1987). Our Common Future. Oxford, UK: Oxford University Press.

Young, O. R., D. G. Webster, M. E. Cox, J. Raakjaer, L. O. Blaxekjaer, N. Einarsson, R. A. Virginia, J. Acheson, D. Bromley, E. Cardwell, C. Carothers, E. Eythorsson, R. B. Howarth, S. Jentoft, B. J. McCay, F. McCormack, G. Osherenko, E. Pinkerton, R. van Ginkel, J. A. Wilson, L. Rivers, 3rd and R. S. Wilson (2018). "Moving beyond panaceas in fisheries governance." Proceedings of the National Academy of Sciences USA **115**(37): 9065-9073.

Appendix A: List of researchers and project staff

Researcher staff:

Emily Ogier (IMAS)

Tim Emery (IMAS, ABARES)

Anna Farmery (IMAS, ANCORS)

Matthew Flood (ABARES, DAWE)

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Julia Jabour (PIRSA)

Simon Nicol (ABARES)

Sean Sloan (PIRSA, DPI NSW)

Ilona Stobutzki (ABARES)

Project staff:

Madeleine Brasier (IMAS)

Appendix B: Policy material for each jurisdiction and fishery

Table 27. Types of policy documents used in the analysis for each sub-national jurisdiction.

Fishery Name	Primary Act (legislation)	Regulations (legislation)	Resource Sharing (policy)	Harvest Strategy (policy)	Bycatch (policy)	Co- mgt (policy)	Indigenous FishDev (policy)	Cost Recovery (policy)	Binding Mgt Plan (non- legislative)	Non Binding Mgt Plan (non- legislative)	Decision Framework (non-legislative)	Harvest Strategy (non- legislative)	Stock Rebuilding Strategy (non-legislative)	Bycatch Risk Assess Plan (non- legislative)	TEP Risk Assess Plan (non-legislative)	Other Risk Assess Plan (non- legislative)	Other Mgt Arrangements (non-legislative)	Stock Ass Model (assessments)	Fish Status Report (assessments)	Fish Assessment Export Approval (assessments)	MSC Certification (assessments)
COMM Bass Strait Central Zone Scallop Fishery	Y	Y		Y	Y	Y		Y	Y			Y		Y		Y		Y			
COMM Eastern Tuna and Billfish Fishery	Y	Y		Y	Y	Y		Y	Y			Y		Y	Y	Y		Y			
COMM Northern Prawn Fishery	Y	Y		Y	Y	Y		Y	Y			Y		Y		Y		Y			
COMM Australian Southern Bluefin Tuna Fishery	Y	Y		Y	Y	Y		Y	Y		Y		Y		Y	Y		Y			
COMM Coral Sea Fishery	Y	Y		Y	Y	Y		Y	Y			Y						Y			
COMM Small Pelagic Fishery	Y	Y		Y	Y	Y		Y	Y			Y		Y		Y		Y			
COMM SESSF - Commonwealth Trawl Sector (CTS)	Y	Y		Y	Y	Y		Y	Y			Y	Y	Y	Y	Y		Y			
COMM Southern Squid Jig Fishery	Y	Y		Y	Y	Y		Y	Y			Y				Y		Y			
COMM Western Tuna and Billfish Fishery	Y	Y		Y	Y	Y			Y			Y		Y		Y		Y			
COMM SESSF - Gillnet Hook and Trap Sector (GHATS)	Y	Y		Y	Y	Y		Y	Y			Y	Y	Y	Y	Y		Y			
COMM SESSF - Great Australian Bight Trawl Sector (GABTS)	Y	Y		Y	Y	Y		Y	Y			Y	Y	Y	Y	Y		Y			
NSW Abalone Fishery	Y	Y					Y		Y	Y	Y				Y	Y			Y	Y	
NSW Estuarine General Fishery	Y	Y					Y		Y	Y					Y	Y			Y	Y	
NSW Estuary Prawn Trawl Fishery	Y	Y					Y		Y	Y					Y	Y			Y	Y	
NSW Ocean Haul Fishery	Y	Y					Y		Y	Y					Y	Y			Y	Y	
NSW Ocean Trap and Line Fishery	Y	Y					Y		Y	Y					Y	Y			Y	Y	
NSW Ocean Trawl Fishery	Y	Y					Y		Y	Y					Y	Y			Y	Y	
NSW Rock Lobster Fishery	Y	Y					Y		Y	Y					Y	Y		Y	Y	Y	

NT Barramundi Fishery	Y	Y	Y		Y		Y												Y				
NT Coastal Line Fishery	Y	Y	Y		Y														Y				
NT Demersal Fishery	Y	Y	Y		Y			Y										Y	Y	Y			
NT Mud Crab Fishery	Y	Y	Y		Y		Y											Y	Y	Y			
NT Offshore Net and Line Fishery	Y	Y	Y		Y													Y	Y	Y			
NT Spanish Mackerel Fishery	Y	Y	Y		Y		Y											Y	Y	Y			
NT Timor Reef Fishery	Y	Y	Y		Y			Y										Y	Y	Y			
PZJA Torres Strait Finfish Fishery (Spanish Mackerel)	Y		Y		Y		Y					Y				Y							
PZJA Torres Strait Prawn Fishery	Y		Y		Y		Y			Y		Y				Y							
PZJA Torres Strait Tropical Rock Lobster Fishery	Y		Y		Y		Y							Y	Y	Y							
QLD Blue Swimmer Crab Fishery	Y	Y						Y											Y				
QLD Coral Reef Fin Fish Fishery	Y	Y						Y	Y										Y				
QLD East Coast Inshore Fin Fish Fishery	Y	Y						Y								Y			Y				
QLD East Coast Spanish Mackeral Fishery	Y	Y																	Y				
QLD East Coast Trawl Fishery	Y	Y						Y											Y				
QLD Gulf of Carpentaria Developmental Fin Fish Trawl Fishery	Y	Y						Y											Y				
QLD Gulf of Carpentaria Inshore Fin Fish Fishery	Y	Y						Y											Y				
QLD Gulf of Carpentaria Line Fishery	Y	Y						Y											Y				
QLD Mud Crab Fishery	Y	Y						29											Y				
QLD Fin Fish (Stout Whiting) Trawl Fishery	Y	Y																	Y				
QLD Spanner Crab Fishery	Y	Y						Y											Y				
QLD Tropical Rock Lobster Fishery	Y	Y						Y											Y				
SA Abalone Fishery	Y	Y	Y		Y		Y	Y			Y			Y		Y	Y	Y	Y	Y		Y	
SA Blue Swimmer Crab Fishery	Y	Y	Y		Y		Y	Y			Y			Y		Y	Y	Y	Y	Y		Y	
SA Giant Crab Fishery	Y	Y	Y		Y		Y	Y								Y			Y		Y	Y	
SA Gulf of St Vincent Prawn Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	
SA Lakes and Coorong Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	Y
SA Marine Scalefish Fishery	Y	Y	Y		Y		Y				Y		Y	Y		Y	Y	Y	Y	Y	Y	Y	
SA Lakes and Coorong Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	Y
SA Northern Zone Rock Lobster Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	
SA Southern Zone Rock Lobster Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	
SA Sardine Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	
SA Spencer Gulf Prawn Fishery	Y	Y	Y		Y		Y				Y			Y		Y	Y	Y	Y	Y	Y	Y	Y
SA West Coast Prawn Fishery	Y	Y	Y		Y		Y	Y			Y					Y	Y	Y	Y	Y	Y	Y	
TAS Rock Lobster Fishery	Y	Y							Y			Y				Y	Y	Y	Y	Y	Y	Y	
TAS Abalone Fishery	Y	Y														Y			Y		Y	Y	
TAS Giant Crab Fishery	Y	Y											Y			Y	Y	Y	Y	Y	Y	Y	

TAS Scallop Fishery	Y	Y										Y					Y		Y	Y	
TAS Scalefish Fishery	Y	Y								Y	Y						Y	Y	Y		
VIC Abalone Fishery	Y	Y							Y			Y	Y					Y	Y	Y	
VIC Rock Lobster Fishery	Y	Y							Y		Y		Y						Y	Y	
VIC Bait Fishery	Y	Y																			
VIC Bay and Inlet Fishery	Y	Y																	Y		
VIC Giant Crab Fishery	Y	Y							Y		Y								Y	Y	
VIC Inshore Trawl Fishery	Y	Y																			
VIC Ocean Purse Seine Fishery	Y	Y																			
VIC Ocean Fishery	Y	Y																			
VIC Ocean Scallop	Y	Y																		Y	
VIC Port Philip Bay Dive Scallop	Y	Y																			
WA West Coast Rock Lobster Managed Fishery	Y	Y	Y									Y			Y			Y	Y	Y	Y
WA Abrolhos Islands and Mid West Trawl Managed Fishery	Y	Y																	Y	Y	
WA Broome Prawn Managed Fishery	Y	Y																	Y	Y	
WA Cockburn Sound Crab Managed Fishery	Y	Y																	Y		
WA Cockburn Sound (Fish Net) Managed Fishery	Y	Y																	Y		
WA Abalone Managed Fishery	Y	Y																	Y	Y	
WA Exmouth Gulf Prawn Managed Fishery	Y	Y										Y		Y					Y	Y	Y
WA Gascoyne Demersal Scalefish Managed Fishery	Y	Y											Y					Y	Y	Y	
WA Kimberley Prawn Managed Fishery	Y	Y																	Y	Y	
WA Kimberly Gillnet and Barramundi Managed Fishery	Y	Y																	Y		
WA Mackerel Managed Fishery	Y	Y																	Y	Y	
WA Nickol Bay Prawn Managed Fishery	Y	Y																	Y	Y	
WA Northern Demersal Scalefish Managed Fishery	Y	Y																Y	Y	Y	
WA Northern Shark Fishery (WA-JA)	Y	Y																	Y		
WA Onslow Prawn Managed Fishery	Y	Y																	Y	Y	
WA Pilbara Fish Trawl Interim Managed Fishery	Y	Y																Y	Y	Y	
WA Pilbara Line Fishery	Y	Y																Y	Y		
WA Pilbara Trap Managed Fishery	Y	Y																	Y		
WA Shark Bay Beach Seine and Mesh Net Managed Fishery	Y	Y																	Y		
WA Shark Bay Crab Managed Fishery	Y	Y																	Y	Y	
WA Shark Bay Prawn Managed Fishery	Y	Y										Y		Y					Y	Y	Y
WA Shark Bay Scallop Managed Fishery	Y	Y											Y						Y	Y	
WA South Coast Crustacean Managed Fishery	Y	Y																	Y	Y	
WA South Coast Estuarine Managed Fishery	Y	Y																	Y		
WA South Coast Purse-seine Managed Fishery	Y	Y																	Y	Y	

WA South Coast Salmon Managed Fishery	Y	Y				Y	Y
WA South Coast Trawl Fishery	Y	Y				Y	Y
WA South Coast Open Access Line and Net Fishery	Y	Y				Y	
WA South West Coast Salmon Managed Fishery	Y	Y				Y	Y
WA South West Trawl Managed Fishery	Y	Y				Y	
WA Southern Demersal Gillnet and Demersal Longline Managed Fishery (WA-Joint Authority)	Y	Y				Y	Y
WA South-west Beach Seine Fishery	Y	Y				Y	
WA West Coast (Beach Bait Fish Net) Managed Fishery	Y	Y				Y	
WA West Coast Deep Sea Crustacean Managed Fishery	Y	Y		Y		Y	Y
WA West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery	Y	Y				Y	Y
WA West Coast Demersal Scalefish (Interim) Managed Fishery	Y	Y	Y			Y	
WA West Coast Estuarine (Peel-Harvey Blue Swimmer Crab) Managed Fishery	Y	Y		Y		Y	
WA West Coast Purse-seine Managed Fishery	Y	Y				Y	
WA Mud Crab Fishery	Y	Y				Y	
WA West Coast Estuarine (Peel-Harvey Fin Fish) Managed Fishery	Y	Y		Y		Y	
WA North Coast Shark Fishery	Y	Y				Y	

Appendix C: Fisheries and their key characteristics

Table 28. Policy-relevant characteristics of fisheries included in the study, current to the end of 2015.

Fishery Name	Target Species	Multi-jurisdictional	Highly migratory / straddling stocks	Customary / cultural / traditional	Multi-species	Data-poor	Fluctuating / naturally highly	Multi-gear	ITQs	Ecologically important species	Developmental / exploratory	Recovering from overfishing /	Third party certified	Formal allocation between sectors
COMM Australian Southern Bluefin Tuna Fishery	Finfish	Y	Y					Y	Y	Y		Y		
COMM Bass Strait Central Zone Scallop Fishery	Molluscs								Y					
COMM Coral Sea Fishery	Finfish	Y			Y	Y		Y						
COMM Eastern Tuna and Billfish Fishery	Finfish	Y	Y		Y			Y	Y	Y			Y	
COMM Northern Prawn Fishery	Crustacean	Y			Y		Y			Y			Y	
COMM SESSF - Commonwealth Trawl Sector (CTS)	Finfish	Y	Y		Y	Y	Y	Y	Y	Y		Y		
COMM SESSF - Gillnet Hook and Trap Sector (GHATS)	Shark								Y					
COMM SESSF - Great Australian Bight Trawl Sector (GABTS)	Finfish								Y					
COMM Small Pelagic Fishery	Finfish	Y	Y		Y		Y	Y	Y					
COMM Southern Squid Jig Fishery	Molluscs	Y				Y	Y			Y				
COMM Western Tuna and Billfish Fishery	Finfish	Y	Y		Y			Y	Y	Y			Y	
NSW Abalone Fishery	Molluscs			Y					Y			Y		
NSW Estuarine General Fishery	Finfish		Y	Y	Y	Y	Y	Y		Y				
NSW Estuary Prawn Trawl Fishery	Crustacean				Y	Y	Y							
NSW Ocean Haul Fishery	Finfish	Y	Y	Y	Y		Y	Y		Y				
NSW Ocean Trap and Line Fishery	Finfish	Y	Y		Y			Y		Y				
NSW Ocean Trawl Fishery	Crustacean	Y	Y		Y		Y	Y		Y				
NSW Rock Lobster Fishery	Crustacean	Y		Y					Y					

NT Barramundi Fishery	Finfish			Y	Y		Y									
NT Coastal Line Fishery	Finfish			Y	Y			Y	Y		Y	Y				
NT Demersal Fishery	Finfish	Y			Y			Y	Y		Y					
NT Mud Crab Fishery	Crustacean			Y			Y									
NT Offshore Net and Line Fishery	Shark	Y			Y			Y		Y						
NT Spanish Mackerel Fishery	Finfish							Y								Y
NT Timor Reef Fishery	Finfish	Y			Y			Y	Y		Y					
PZJA Torres Strait Finfish Fishery (Spanish Mackerel)	Finfish	Y		Y	Y	Y		Y								Y
PZJA Torres Strait Prawn Fishery	Crustacean	Y		Y	Y		Y									
PZJA Torres Strait Tropical Rock Lobster Fishery	Crustacean	Y	Y	Y			Y	Y								Y
QLD Blue Swimmer Crab Fishery	Crustacean															
QLD Coral Reef Fin Fish Fishery	Finfish								Y							
QLD East Coast Inshore Fin Fish Fishery	Finfish				Y	Y		Y								
QLD East Coast Spanish Mackeral Fishery	Finfish					Y			Y							
QLD East Coast Trawl Fishery	Crustacean				Y	Y										
QLD Fin Fish (Stout Whiting) Trawl Fishery	Finfish					Y										
QLD Gulf of Carpentaria Developmental Fin Fish Trawl Fishery	Finfish				Y	Y					Y					
QLD Gulf of Carpentaria Inshore Fin Fish Fishery	Finfish				Y	Y		Y								
QLD Gulf of Carpentaria Line Fishery	Finfish				Y	Y										
QLD Mud Crab Fishery	Crustacean			Y												
QLD Spanner Crab Fishery	Crustacean								Y							
QLD Tropical Rock Lobster Fishery	Crustacean								Y							
SA Abalone Fishery	Molluscs								Y							Y
SA Blue Swimmer Crab Fishery	Crustacean								Y							Y
SA Giant Crab Fishery	Crustacean	Y				Y										
SA Gulf of St Vincent Prawn Fishery	Crustacean						Y						Y			
SA Lakes and Coorong Fishery	Molluscs					Y	Y		Y	Y				Y		Y
SA Lakes and Coorong Fishery	Finfish				Y	Y	Y	Y		Y				Y		Y
SA Marine Scalefish Fishery	Finfish				Y	Y	Y	Y	Y	Y	Y	Y				Y

SA Northern Zone Rock Lobster Fishery	Crustacean	Y								Y									Y
SA Sardine Fishery	Finfish						Y			Y		Y							Y
SA Southern Zone Rock Lobster Fishery	Crustacean	Y								Y									Y
SA Spencer Gulf Prawn Fishery	Crustacean						Y											Y	Y
SA West Coast Prawn Fishery	Crustacean						Y												Y
TAS Abalone Fishery	Molluscs									Y									
TAS Giant Crab Fishery	Crustacean														Y				
TAS Rock Lobster Fishery	Crustacean									Y		Y							Y
TAS Scalefish Fishery	Finfish				Y		Y		Y		Y			Y	Y				
TAS Scallop Fishery	Molluscs						Y												
VIC Abalone Fishery	Molluscs									Y					Y				
VIC Bait Fishery	Finfish				Y		Y		Y										
VIC Bay and Inlet Fishery	Finfish				Y				Y										
VIC Giant Crab Fishery	Crustacean						Y			Y									
VIC Inshore Trawl Fishery	Crustacean				Y		Y												
VIC Ocean Fishery	Finfish				Y		Y		Y										
VIC Ocean Purse Seine Fishery	Finfish				Y														
VIC Ocean Scallop	Molluscs						Y		Y			Y			Y				
VIC Port Philip Bay Dive Scallop	Molluscs						Y												
VIC Rock Lobster Fishery	Crustacean									Y									
WA Abalone Managed Fishery	Molluscs									Y									
WA Abrolhos Islands and Mid West Trawl Managed Fishery	Mollusc						Y								Y				
WA Broome Prawn Managed Fishery	Crustacean						Y												
WA Cockburn Sound (Fish Net) Managed Fishery	Finfish						Y								Y				
WA Cockburn Sound Crab Managed Fishery	Crustacean						Y								Y				
WA Exmouth Gulf Prawn Managed Fishery	Crustacean																	Y	
WA Gascoyne Demersal Scalefish Managed Fishery	Finfish									Y									
WA Kimberley Prawn Managed Fishery	Crustacean						Y												

WA Kimberly Gillnet and Barramundi Managed Fishery	Finfish					Y							
WA Mackerel Managed Fishery	Finfish								Y				
WA Mud Crab Fishery	Crustacean			Y		Y							
WA Nickol Bay Prawn Managed Fishery	Crustacean					Y							
WA North Coast Shark Fishery	Shark												
WA Northern Demersal Scalefish Managed Fishery	Finfish												
WA Northern Shark Fishery (WA-JA)	Shark	Y	Y		Y	Y				Y		Y	
WA Onslow Prawn Managed Fishery	Crustacean					Y							
WA Pilbara Fish Trawl Interim Managed Fishery	Finfish				Y								
WA Pilbara Line Fishery	Finfish				Y								
WA Pilbara Trap Managed Fishery	Finfish				Y								
WA Shark Bay Beach Seine and Mesh Net Managed Fishery	Finfish				Y	Y							
WA Shark Bay Crab Managed Fishery	Crustacean											Y	
WA Shark Bay Prawn Managed Fishery	Crustacean												Y
WA Shark Bay Scallop Managed Fishery	Molluscs						Y					Y	
WA South Coast Crustacean Managed Fishery	Crustacean				Y	Y							
WA South Coast Estuarine Managed Fishery	Finfish				Y	Y	Y			Y			
WA South Coast Open Access Line and Net Fishery	Finfish				Y	Y		Y					
WA South Coast Purse-seine Managed Fishery	Finfish								Y	Y		Y	
WA South Coast Salmon Managed Fishery	Finfish					Y							
WA South Coast Trawl Fishery	Mollusc				Y	Y	Y						
WA South West Coast Salmon Managed Fishery	Finfish					Y							
WA South West Trawl Managed Fishery	Mollusc				Y	Y							
WA Southern Demersal Gillnet and Demersal Longline Managed Fishery (WA-Joint Authority)	Shark				Y			Y		Y		Y	
WA South-west Beach Seine Fishery	Finfish				Y	Y		Y		Y			
WA West Coast (Beach Bait Fish Net) Managed Fishery	Finfish				Y	Y							

WA West Coast Deep Sea Crustacean Managed Fishery	Crustacean	Y	Y			Y				Y	
WA West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery	Shark	Y					Y		Y		
WA West Coast Demersal Scalefish (Interim) Managed Fishery	Finfish	Y							Y		Y
WA West Coast Estuarine (Peel-Harvey Blue Swimmer Crab) Managed Fishery	Crustacean		Y	Y						Y	
WA West Coast Estuarine (Peel-Harvey Fin Fish) Managed Fishery	Finfish	Y	Y							Y	
WA West Coast Purse-seine Managed Fishery	Finfish	Y	Y				Y		Y		
WA West Coast Rock Lobster Managed Fishery	Crustacean					Y			Y	Y	Y

Appendix D: Technical workshops

i. Fisheries Managers Workshop 1

Objective Setting for Fisheries Management – National Technical Workshop

The Vibe Savoy, 630 Little Collins St, Melbourne

21st – 22nd October 2014

Participants

Ian Cartwright (Chair), Emily Ogier (IMAS), Caleb Gardner (IMAS), Matthew Flood (ABARES, DA), Terri McGrath (DA), Brodie MacDonald (AFMA), Darren Reynolds (DPI, NSW), Michelle Winning (DAFF, QLD), Andrew Thwaites (DAFF, QLD), David McKey (DPI&F, NT), Tim Nicholas (DoF WA), Joanne Kennedy (DoF WA), Annabel Jones (PIRSA), Bill Lussier (DPI, VIC), Melissa Schubert (DPI, VIC), Hilary Revill (DPIPWE, TAS), David Jarvis (DPIPWE, TAS), Patrick Sachs (AFMA/ARFF).

Apologies: Bryan MacDonald (DPI&F, NT), Sean Sloan (PIRSA), Julia Jabour (PIRSA), Stephan Schnierer (USC).

ii. Management Agency Workshop series 2

Meetings with management staff within each fisheries management agency to confirm types of policies, fishery characteristics preliminary results, and to discuss barriers to selecting and reviewing management objectives.

Dept. Fisheries WA	4th Nov 2015
EcoDev VIC	9th Nov 2015
Primary Industry and Regions SA	23rd Nov 2015
Australian Fisheries Management Authority C'WEALTH	26th Nov 2015
Department of Agriculture, Fisheries and Forestry C'WEALTH	26th Nov 2015
Dept Primary Industry NT	30th Nov 2015
Dept. Primary Industries, Parks, Water and the Environment TAS	7th Dec 2015
Dept Primary Industry NSW	24th Feb 2016
Fisheries Queensland	10th March 2016

iii. Expert Workshop 3

Technical Workshop on developing guidance for defining and operationalising objectives for fisheries management

Theodore Flynn room (level 2) – IMAS Salamanca

Wednesday 8th March 2017

Participants

Ian Cartwright (FRDC, AFMA), Caleb Gardner (IMAS), Tony Smith (CSIRO), Keith Sainsbury (IMAS, CSIRO), Jeremy Lyle (CSIRO), Rob Stephenson (DFO Canada), Anna Farmery (IMAS), Emily Ogier (IMAS)

Appendix E: Legislative objectives for fisheries by jurisdiction

Table 29. Legislative objectives of fisheries management acts by Australian jurisdiction, 2015

	A : Title (primary legislation)	B : Purpose (primary legislation)	C : Objectives (primary legislation)
1: C'wealth of Australia	Fisheries Management Act 1991		1(a) implementing efficient and cost-effective fisheries management on behalf of the Commonwealth; and
			1(b) ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development (which include the exercise of the precautionary principle), in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment; and
			1(c) maximising the net economic returns to the Australian community from the management of Australian fisheries; and
			1(d) ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources; and
			1(e) achieving government targets in relation to the recovery of the costs of AFMA.
			2(a) ensuring, through proper conservation and management measures, that the living resources of the AFZ are not endangered by over-exploitation; and
			2(b) achieving the optimum utilisation of the living resources of the AFZ; and
			2(c) ensuring that conservation and management measures in the AFZ and the high seas implement Australia's obligations under international agreements that deal with fish stocks; and
			2(d) to the extent that Australia has obligations: (i) under international law; or (ii) under the Compliance Agreement or any other international agreement; in relation to fishing activities by Australian-flagged boats on the high seas that are additional to the obligations referred to in paragraph (c)—ensuring that Australia implements those first-mentioned obligations; but must ensure, as far as practicable, that measures adopted in pursuit of those objectives must not be inconsistent with the preservation, conservation and protection of all species of whales.
2: New South Wales	Fisheries Management Act 1994	conserve, develop and share the fishery resources of the State for the benefit of present and future generations	(a) to conserve fish stocks and key fish habitats and
			(b) to conserve threatened species populations and ecological communities of fish and marine vegetation and
			(c) to promote ecologically sustainable development including the conservation of biological diversity and, consistently with those objects:

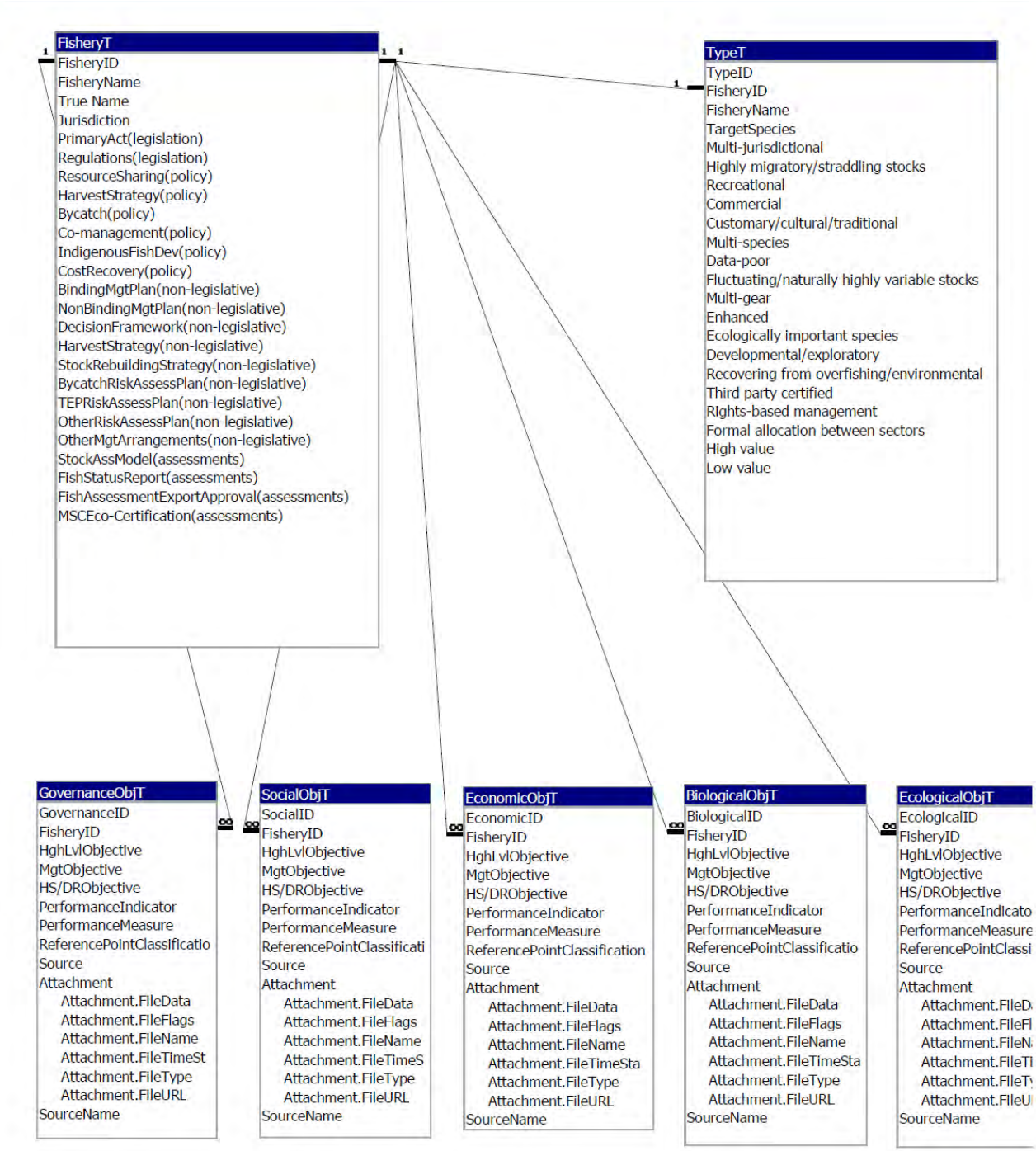
			(d) to promote viable commercial fishing and
			(e) to promote quality recreational fishing opportunities, and
			(f) to appropriately share fisheries resources between the users of those resources, and
			(g) to provide social and economic benefits for the wider community of New South Wales, and
			(h) to recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect, and promote the continuation of, Aboriginal cultural fishing
3: Northern Territory	Fisheries Act 1988	the regulation, conservation and management of fisheries and fishery resources so as to maintain their sustainable utilisation, to regulate the sale and processing of fish and aquatic life, and for related purposes	(a) to manage the aquatic resources of the Territory in accordance with the principles of ecologically sustainable development, whether managing a single fish species or an ecosystem, to ensure the promotion of appropriate protection of fish and fish habitats;
			(b) to maintain a stewardship of aquatic resources that promotes fairness, equity and access to aquatic resources by all stakeholder groups, including: (i) indigenous people; (ii) commercial operators and aquaculture farmers; (iii) amateur fishers; and (iv) others with an interest in the aquatic resources of the Territory; and
			(c) by means of a flexible approach to the management of aquatic resources and their habitats, to promote the optimum utilisation of aquatic resources to the benefit of the community
4: Queensland	Fisheries Act 1994	provide for the use, conservation and enhancement of the community's fisheries	(1) (a) apply and balance the principles of ecologically sustainable development; and
			(b) promote ecologically sustainable development.
			(3) Despite the main purpose of this Act, a further purpose of this Act is to reduce the possibility of shark attacks on humans in coastal waters of the State adjacent to coastal beaches used for bathing.
5: South Australia	Fisheries Management Act 2007	protect, manage, use and develop the aquatic resources of the State in a manner that is consistent with ecologically sustainable development	(1) (a) proper conservation and management measures are to be implemented to protect the aquatic resources of the State from over-exploitation and ensure that those resources are not endangered;
			(b) access to the aquatic resources of the State is to be allocated between users of the resources in a manner that achieves optimum utilisation and equitable distribution of those resources to the benefit of the community;
			(c) aquatic habitats are to be protected and conserved, and aquatic ecosystems and genetic diversity are to be maintained and enhanced;
			(d) recreational fishing and commercial fishing activities are to be fostered for the benefit of the whole community;

			(e) the participation of users of the aquatic resources of the State, and of the community more generally, in the management of fisheries is to be encouraged.
			(3) A further object of this Act is that the aquatic resources of the State are to be managed in an efficient and cost effective manner and targets set for the recovery of management costs
6: Tasmania	Living Marine Resources Management Act 1995	promote the sustainable management of living marine resources, to provide for management plans relating to fish resources, to protect marine habitats sustainable development of living marine resources	(1) (a) increase the community's understanding of the integrity of the ecosystem upon which fisheries depend; and
			(b) provide and maintain sustainability of living marine resources; and
			(c) take account of the community's needs in respect of living marine resources; and
			(d) take account of the community's interests in living marine resources.
7: Torres Strait	Torres Strait Fisheries Act 1984		(a) to acknowledge and protect the traditional way of life and livelihood of traditional inhabitants, including their rights in relation to traditional fishing
			(b) to protect and preserve the marine environment and indigenous fauna and flora in and in the vicinity of the Protected Zone
			(c) to adopt conservation measures necessary for the conservation of a species in such a way as to minimise any restrictive effects of the measures on traditional fishing
			(d) to administer the provisions of Part 5 of the Torres Strait Treaty (relating to commercial fisheries) so as not to prejudice the achievement of the purposes of Part 4 of the Torres Strait Treaty in regard to traditional fishing
			(e) to manage commercial fisheries for optimum utilisation
			(f) to share the allowable catch of relevant Protected Zone commercial fisheries with Papua New Guinea in accordance with the Torres Strait Treaty
			(g) to have regard, in developing and implementing licensing policy, to the desirability of promoting economic development in the Torres Strait area and employment opportunities for traditional inhabitants
8: Victoria	Fisheries Act 1995	provide a modern legislative framework for the regulation, management and conservation of Victorian fisheries including aquatic habitats	(a)to provide for the management, development and use of Victoria's fisheries, aquaculture industries and associated aquatic biological resources in an efficient, effective and ecologically sustainable manner;
			b) to protect and conserve fisheries resources, habitats and ecosystems including the maintenance of aquatic ecological processes and genetic diversity;

			c) to promote sustainable commercial fishing and viable aquaculture industries and quality recreational fishing opportunities for the benefit of present and future generations;
			d) to facilitate access to fisheries resources for commercial, recreational, traditional and non-consumptive uses;
			e) to promote the commercial fishing industry and to facilitate the rationalisation and restructuring of the industry;
			f) to encourage the participation of resource users and the community in fisheries management.
9: Western Australia	Fish Resources Management Act 1994	to conserve, develop and share the fish resources of the State for the benefit of present and future generations.	(a) to conserve fish and to protect their environment;
			(b) to ensure that the exploitation of fish resources is carried out in a sustainable manner;
			(c) to enable the management of fishing, aquaculture and associated industries, aquatic eco-tourism and other tourism reliant on fishing;
			(d) to foster the development of commercial and recreational fishing and aquaculture including the establishment and management of aquaculture facilities for community or commercial purposes;
			(e) to achieve the optimum economic, social and other benefits from the use of fish resources;
			(f) to enable the allocation of fish resources between users of those resources;
			(g) to provide for the control of foreign interests in fishing, aquaculture and associated industries;
			(h) to enable the management of fish habitat protection areas and the Abrolhos Islands reserve.

Appendix F: Objectives database

The Microsoft Access database is available at:
https://www.dropbox.com/sh/ov0qz44po0jilo2/AABoPhufqrJtDauLRPqWiEDHa?dl=0
The structure of the database is provide below.



Appendix G: Selecting or reviewing objectives for fisheries management – Options and Checklist

Selecting and reviewing objectives for fisheries management – Options and Checklist is also available as a separate file which can be downloaded from the project page on the FRDC website.

The resource includes reference to the matrix of *Potentially countervailing objectives* (Table 25) which is available as a separate file which can be downloaded from the project page on the FRDC website.

Selecting or reviewing objectives for fisheries management

Tools and Resources

FRDC project 2013-204 Meeting Sustainability Expectations:

Policy Translation, Objective Setting and Reporting for Australian Fisheries

Overview

- Objectives for fisheries management:
  - Are organised in hierarchies or frameworks according to their level, function and generality
  - Inform different types of decisions at different levels (i.e. strategic decisions about access arrangements through to intra seasonal tactical or operational decisions) – see Figure 1

- Across Australian jurisdictions, objectives for fisheries management are:
  - Developed and used for management systems that vary considerably
  - Most commonly presented in fisheries management legislation, management plans or polices (fishery specific), and harvest strategies (fishery specific) - see Figure 2
  - Informed to varying extents by the National ESD Framework for Wild-Capture Fisheries (Fletcher et al. 2002)

- Developing or reviewing objectives requires:
  - A process for identifying objective preferences (for example, the ESD risk assessment)
  - Identifying all the elements in an objective 'package' (including an indicator and way of measuring performance)
  - Considering the interactions between selected objectives in a policy, plan or strategy

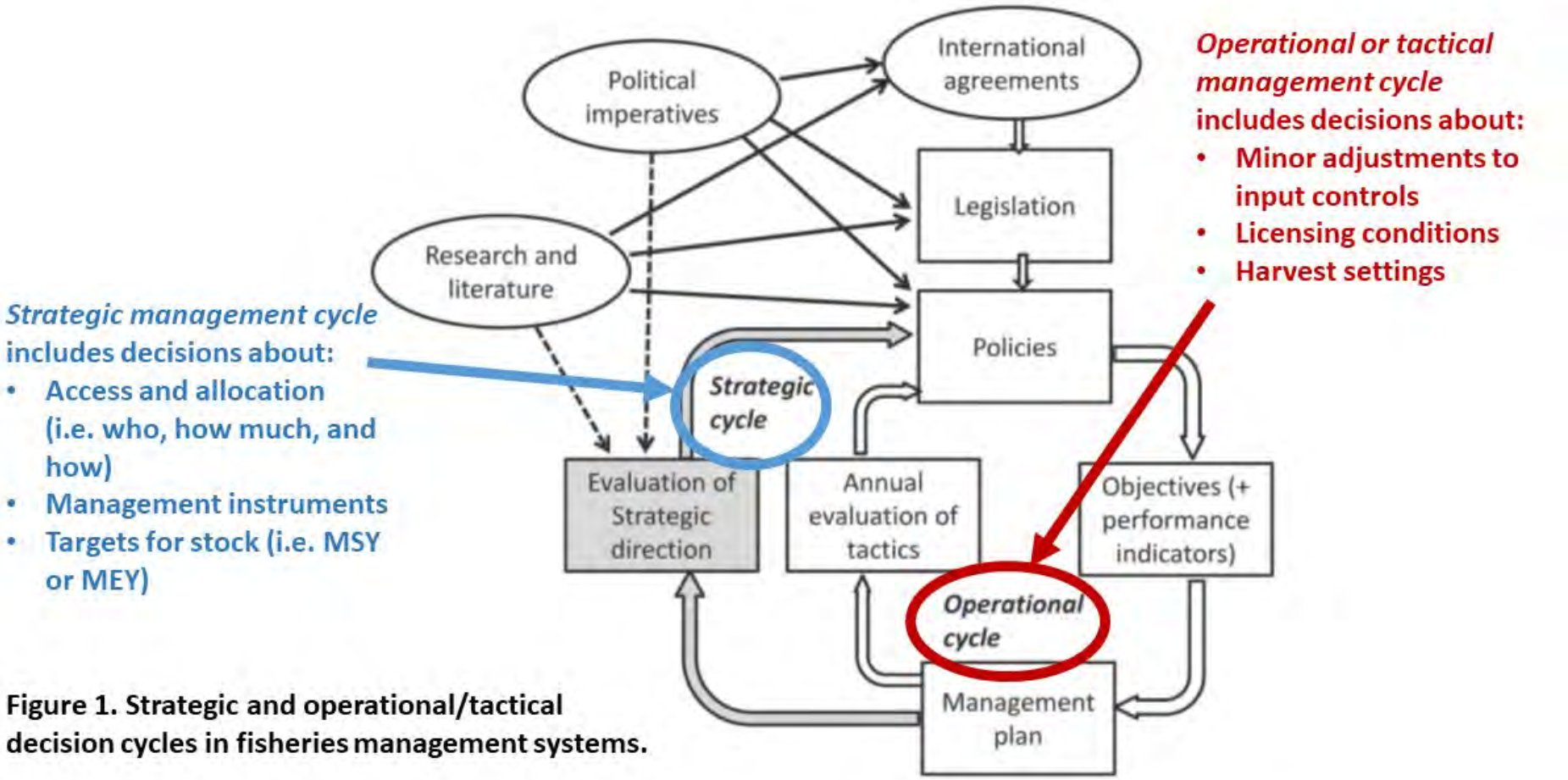


Figure 1. Strategic and operational/tactical decision cycles in fisheries management systems.

Stephenson et al. 2017 Practical steps toward integrating economic, social and institutional elements in fisheries policy and management *ICES Journal of Marine Science* (2017), doi:10.1093/icesjms/fsx057

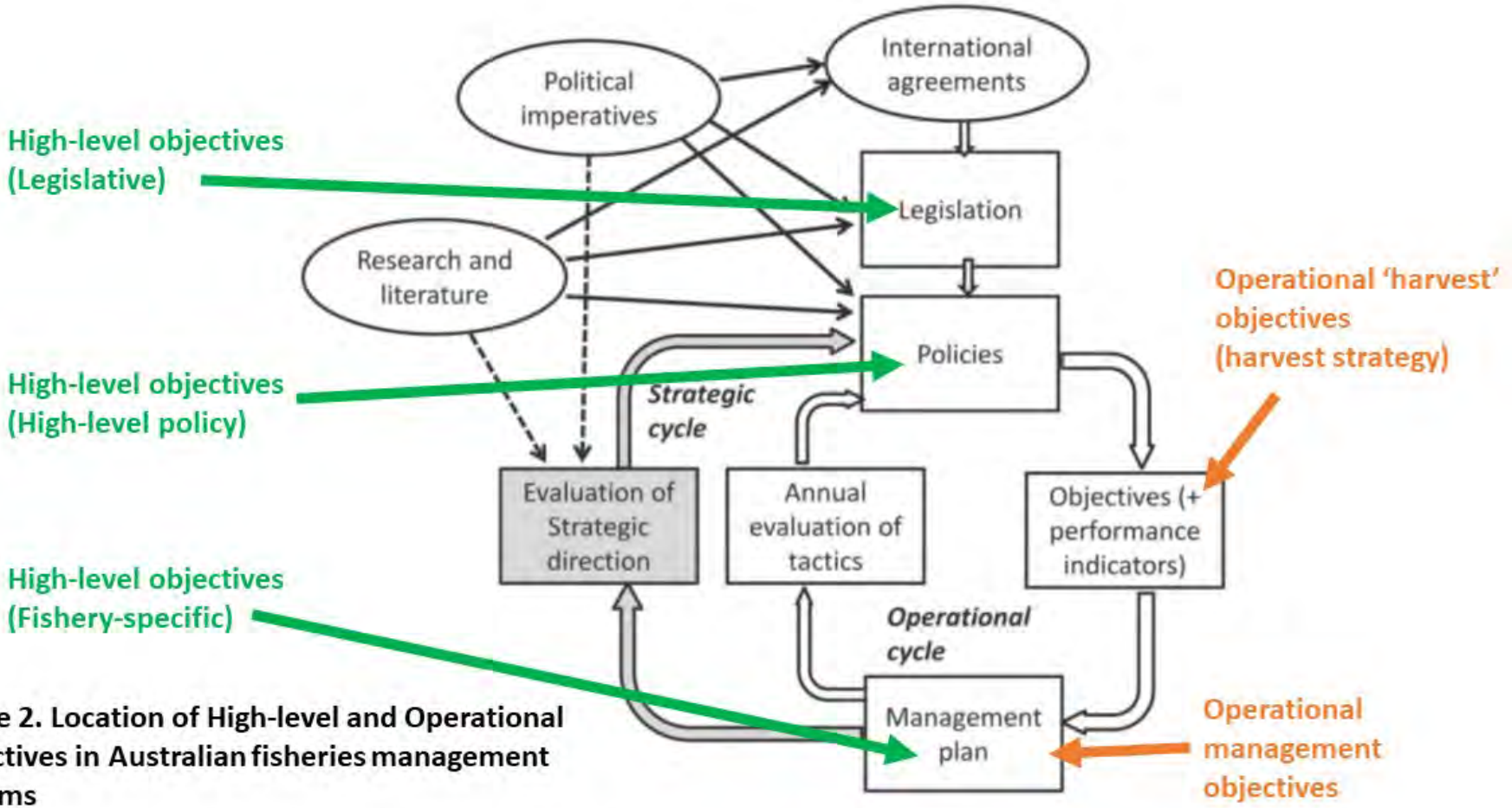


Figure 2. Location of High-level and Operational Objectives in Australian fisheries management systems

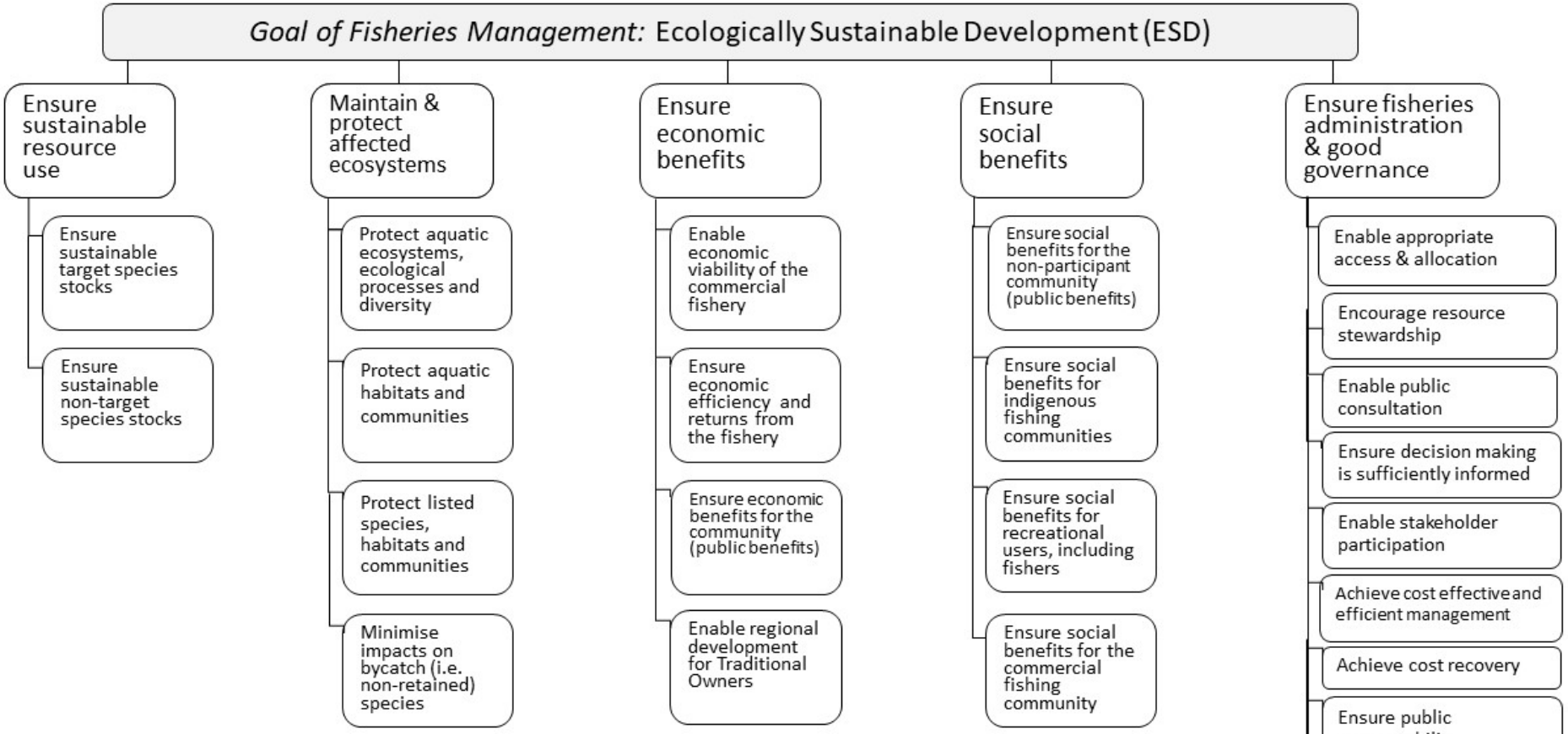
Adapted from: Stephenson et al. 2017 Practical steps toward integrating economic, social and institutional elements in fisheries policy and management *ICES Journal of Marine Science* (2017), doi:10.1093/icesjms/fsx057

Key terms

Term	Definition
High-level objective	Also referred to as Aspirational or Conceptual Objective. These apply the broad objects or objectives of fisheries legislation and policy at the fishery-specific level (often they are the same). Their function is to 'guide' management of individual fisheries, consistent with the overarching legislation
Objective hierarchy	A way to organise objectives for a managed fishery by level or function. The top level of a hierarchy are the high-level objects found in fisheries legislation. The next level are those in a management plan or policy for a fishery. The lowest level are the 'operational' objectives, used in either management plans or harvest strategies.
Operational objective	An objective that is defined in such a way that it enables direct and interpretable implementation. Operational management objectives are very precise and are formulated in such a way that the extent to which they have been achieved during a specified period should be easily measured. An operational objective requires a 'package' of elements to make it fully operational: a performance indicator, a performance measure ; and a lined management response.
Performance indicator	A performance indicator is a quantity that can be measured and used to track changes with respect to achieving an operational objective. Performance indicators can be a direct measurement of performance or a surrogate.
Performance measure	Performance is measured by comparing where a performance indicator sits in relation to a reference point. It defines progress against a management objective.
Reference point	A reference point is a particular value of a fisheries indicator corresponding to a situation that is important to management. Reference points are essentially 'benchmarks' of performance and are linked to defining acceptable levels of biological impact on a stock or the desired social and/or economic outcomes. The situation that is of importance to management could be a desirable outcome (giving a target reference point), an undesirable outcome (giving a limit reference point) or the initiation through a decision rule of a pre-determined management response (giving a trigger reference point). The operational objectives and reference points need to be explicitly linked.

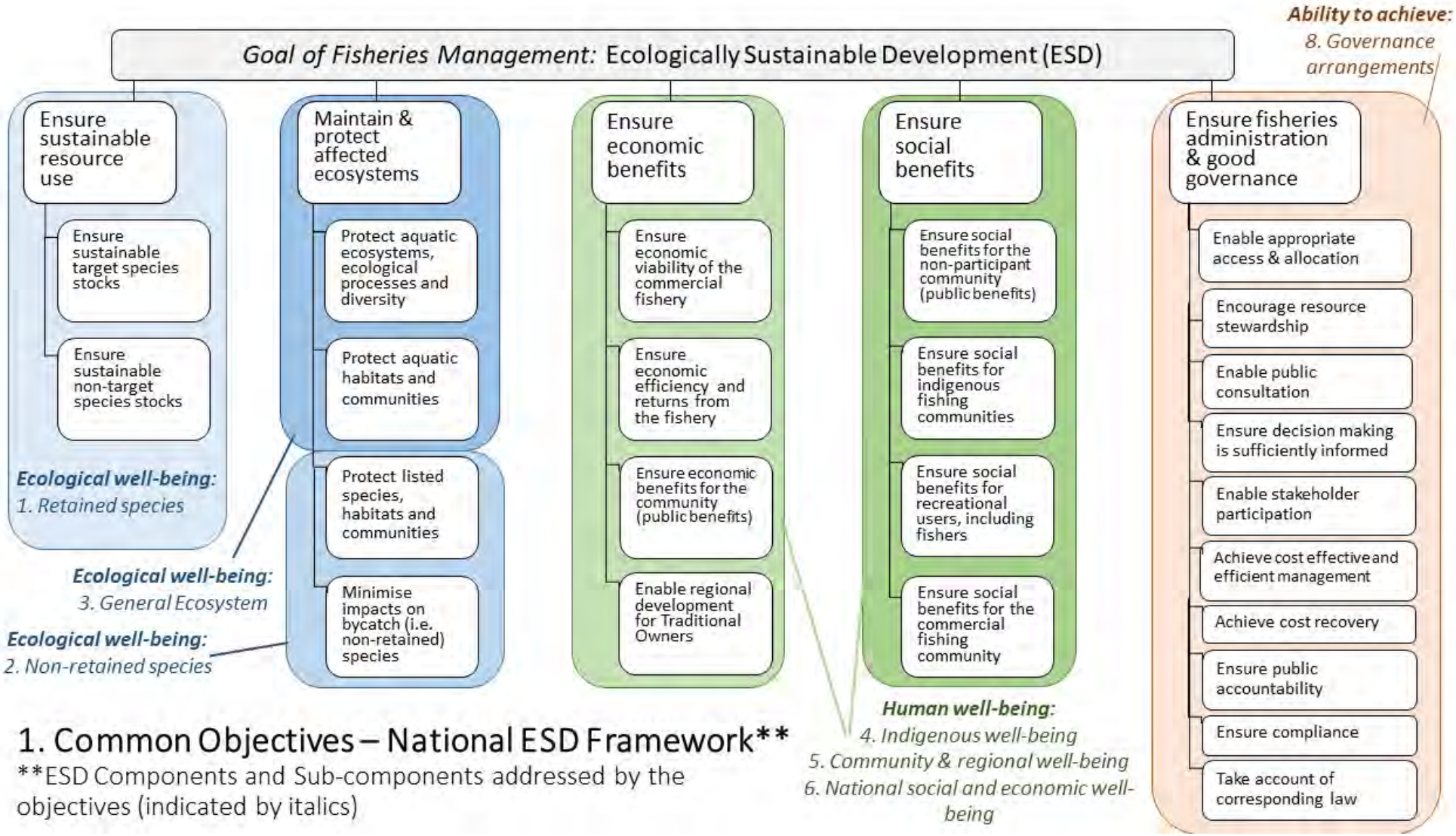
Selecting or reviewing objectives for fisheries management

1. **Common Objectives** and how they fit the National ESD Framework
2. **Objective options**
   - Common objectives (by theme – 2.1 Harvest, 2.2 Ecological, 2.3 Economic, 2.4 Social, 2.5 Governance)
   - Further resources (by objective theme)
   - Checklist for selected individual objectives (by theme)
     - Is it Clearly-defined?
     - Is it Consistent (vertically)?
     - Is it Complete (can it inform management and can performance be communicated)?
3. **Checklist for combined objectives**
   - Are they Comprehensive (relevant ESD components and sub-components included)?
   - Are they Common? (with other policy and with management objectives for shared stocks)
   - Are they Coherent (internally)?



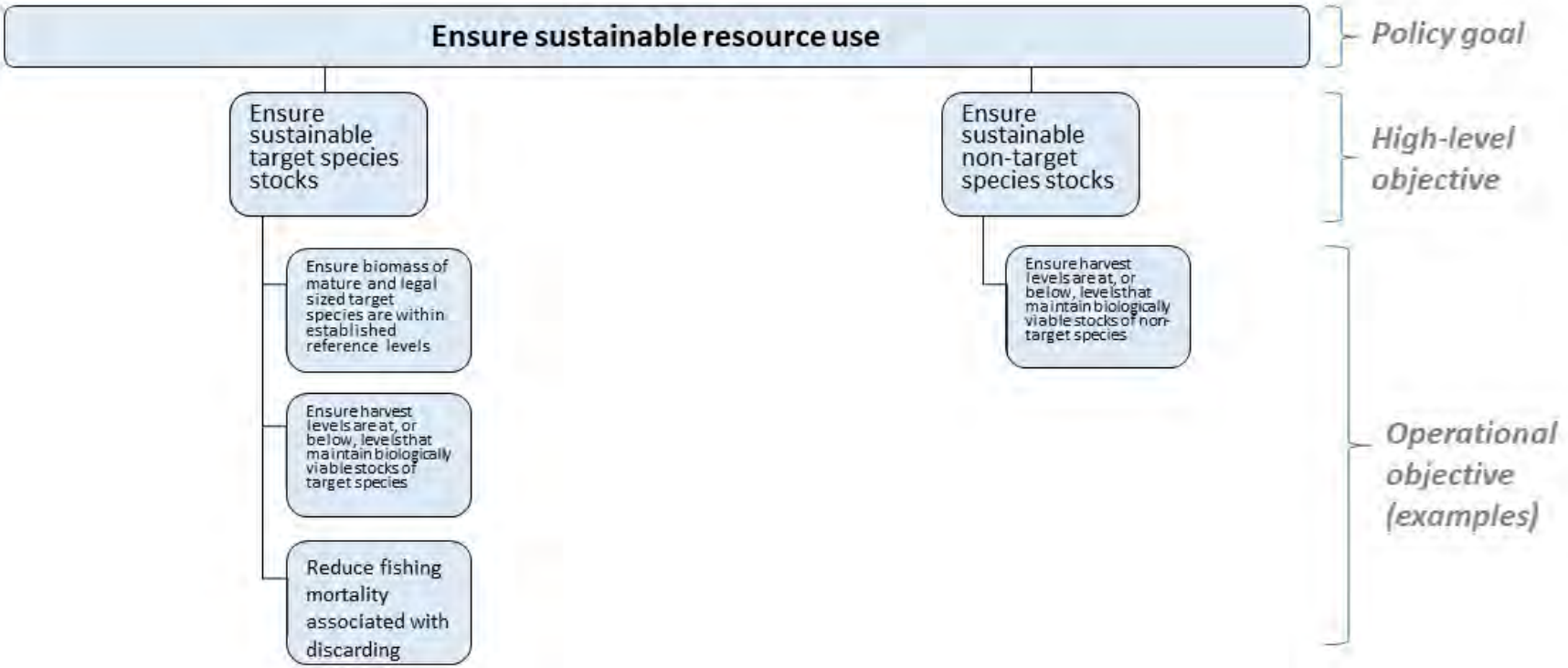
1. Common Objectives – Australian Fisheries*

*Generalised objectives identified as the most frequently and representative of objectives stated in policy documents of 107 fisheries



1. Common Objectives – National ESD Framework**

**ESD Components and Sub-components addressed by the objectives (indicated by italics)



2.1 Common Objectives – Options for Resource Use objectives

2.1 *Ensure sustainable resource use*: Examples of Objective 'packages'

Fishery Name	MgtObjective	Operational Objective	PerformanceIndicator	PerformanceMeasure	ReferencePointClassification
WA Abalone Managed Fishery	To ensure that the exploitation of fish resources is carried out in a sustainable manner	Maintenance of breeding stocks	Fishing effort	Fishing effort trends	Effort range to stay between 907 - 1,3339 diver days
QLD Blue Swimmer Crab Fishery	Provide for the use conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to (a) apply and balance the principles of ecologically sustainable development; and (b) promote ecologically sustainable development	To ensure that stocks of target species are maintained or improved	Standardised catch per unit effort (CPUE)	CPUE trends	Limit: annual commercial standardised pot catch rate falls outside the upper or lower deciles for the whole fishery and specified regional divisions
NT Barramundi Fishery	To manage the aquatic resources of the Territory in accordance with the principles of ecologically sustainable development, whether managing a single fish species or an ecosystem, to ensure the promotion of appropriate protection of fish and fish habitats	To maintain the sustainability of the barramundi fishery resource	Catch (kgs)	Catch trends	Limit: Catch by any sector, or the fishery as a whole, increase or decrease by 20% each year for two consecutive years
NSW Abalone Fishery	To promote ecologically sustainable development, including the conservation of biological diversity	Maintain or increase the biomass of mature and legal sized abalone (i.e. Abalone that is not a prohibited size fish)	Biomass	Biomass trends in any area to which a total allowable catch applies	Limit: a review is triggered if the biomass of mature or legal sized abalone in an area in which a total allowable catch (TAC) applies falls below the 1994 benchmark by more than 15% or there is more than a 50% chance of this occuring in the next 5 years if the TAC is unchanged
TAS Scalefish Fishery	Provide and maintain sustainability of living marine resources	To maintain fish stocks at sustainable levels by restricting the level of fishing effort directed at scalefish, including the amount and types of gear that can be used	Age composition	Age composition trends	Limit: significant change in the abundance of a year class (or year classes) from size/age structure monitoring, with particular importance on prerecruit year classes
VIC Rock Lobster Fishery	To provide for the management, development and use of Victoria's fisheries, aquaculture industries and associated aquatic biological resources in an efficient, effective and ecologically sustainable manner	Sustainability of the rock lobster resource	Exploitable biomass	Exploitable biomass trends	Target: above 40% of exploitable biomass in 1951 with a 50% probability Limit: calculated above 20% of exploitable biomass in 1951 with a 75% probability
COMM Bass Strait Central Zone Scallop Fishery	Ecologically sustainable development	Keep stocks within the fishery at ecologically sustainable levels and, within that context, maximise the economic returns to the Australian community	Discard rate of undersized scallops	Discard rate of undersized scallops (as a proxy for density of size classes)	Target: an area or scallop bed containing at least 1500 tonnes biomass of high density scallops with a minimum size of 85mm. Limit: the discard rate exceeds 20 per cent of scallops less than 85mm.

2.1 *Ensure sustainable resource use*: Further resources

- Sainsbury, K. J. (2008). *Best Practice Reference Points for Australian Fisheries*. R2001/0999. Canberra, Australian Fisheries Management Authority.
- Sloan, S. R., et al. (2014). *National Guidelines to Develop Fishery Harvest Strategies*. Canberra, FRDC Report – Project 2010/061 and Primary Industries and Regions, South Australia, Adelaide.
- Zhou, S., et al. (2013). *Quantitatively defining biological and economic reference points in data poor fisheries*. Final Report on FRDC Project 2010/044. Canberra, Australia.
- Australian fisheries management objectives: Database (2015)
- Dowling, N., et al. *FishPath tool* – FRDC project: https://www.frdc.com.au/project/2017-125 & website https://fishpath.org/Questionnaire

2.1 *Ensure sustainable resource use*: Checklist
Is it Clearly-defined?

- Does your objective specify the individual species/stock and the fishery management unit to which it applies?
- Does your objective clearly state the conceptual limit reference points for:
  - For target species?
  - For non-target retained (secondary) species?
- If your fishery is data poor, are empirical reference points provided?

2.1 *Ensure sustainable resource use*: Checklist
Is it Consistent?

- Does the selected performance indicator directly measure performance against the objective?
- If your objective includes a conceptual target reference point, is it consistent with your fisheries legislation?
  (e.g. where maximising net economic returns is the objective the TRP is MEY)
  - If your legislation does not give direction for a conceptual target reference point, can it be inferred from other high-level policy (i.e. fisheries policy, harvest strategy framework policy)?
  - If it cannot be inferred, can it be determined 'bottom up' for your fishery?
    See Objective Preferences: Methods

2.1 *Ensure sustainable resource use*: Checklist Is it Complete?

- Are the following elements specified for selected objectives?
  1. Performance indicator
  2. Reference points (conceptual or empirical as appropriate): Limit, Target and/or Trigger
  3. Linked management response

See 2.1 Ensure sustainable resource use: Examples of Object...

2.1 *Ensure sustainable resource use*: Checklist
Is it Complete?

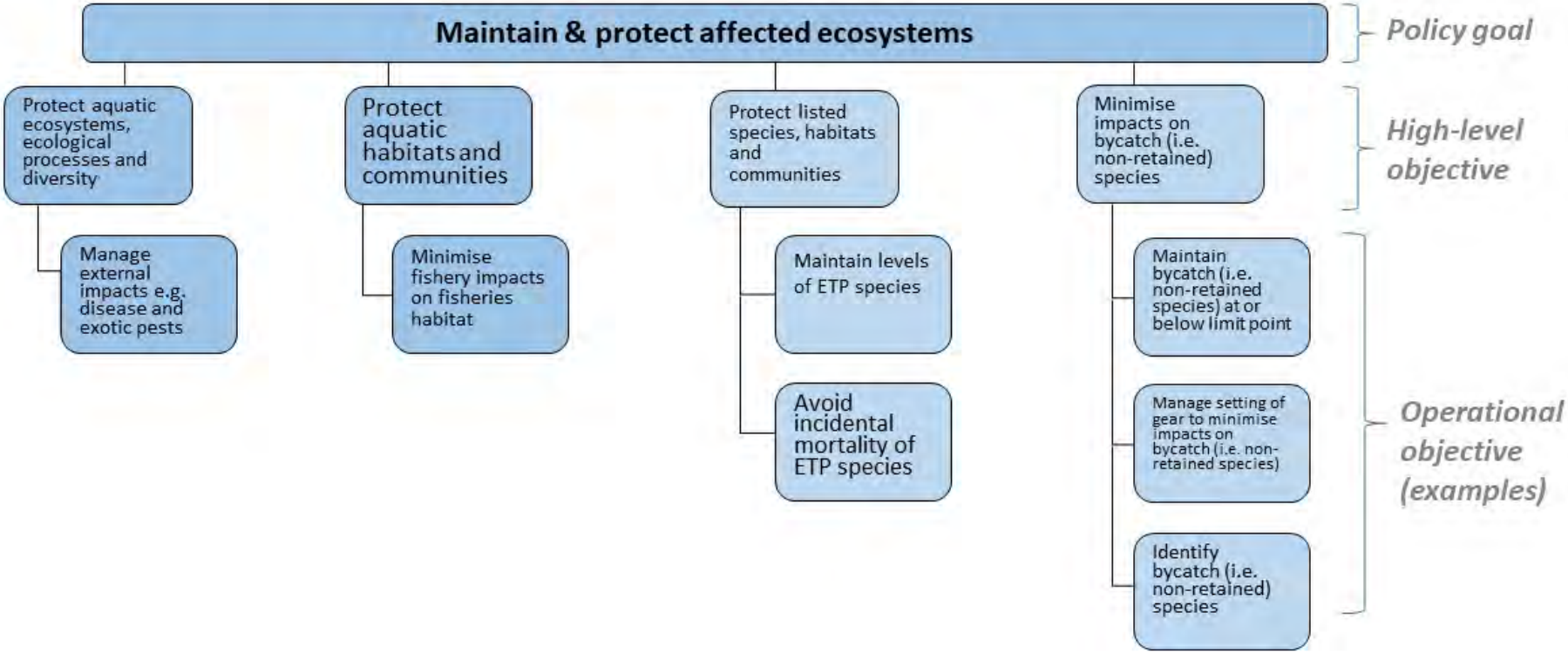
Example:

Box 1: Example of the linkage between 'high-level' legislative objectives, 'conceptual' fishery management objectives and 'operational' management objectives for the South Australian Pipi Fishery

TIER 1-High level legislative objective (South Australian *Fisheries Management Act 2007*)
-To protect, manage, use and develop the aquatic resources of the State in a manner that is consistent with ecologically sustainable development

TIER 2-Conceptual fishery management objective (Lakes and Coorong Fishery Management Plan)
-Ensure the Lakes and Coorong Fishery resources are harvested within ecologically sustainable limits

TIER 3-Operational management objective for Pipi Fishery (Lakes Coorong Fishery Management Plan)
-Maintain a target Pipi relative biomass above 10 kg/ 4.5 m^2 and not less than 8 kg/ 4.5 m^2
-Ensure the Pipi relative biomass does not drop below 4 kg/ 4.5 m^2.
-Maximise Fishery Gross Margin



2.2 Common Objectives – Options for Ecological objectives

2.2 *Maintain & protect affected ecosystems:* Examples of Objective 'packages'

Fishery Name	Mgt Objective	Operational Objective	PerformanceIndicator	PerformanceMeasure	ReferencePointClassification
COMM SESSF - Gillnet Hook and Trap Sector (GHATS)	Ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ESD (which include the exercise of the precautionary principle), in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment	To significantly reduce the ecological risk the Southern and Eastern Scalefish and Shark Fishery poses to Australian sea lions and enable their recovery	Listed species interactions	Number of sea lion interactions	Trigger: varies by management zone but an overall bycatch of 15 animals per year from all management zones would be sufficiently precautionary
WA Exmouth Gulf Prawn Managed Fishery	To conserve fish and to protect their environment	To ensure the effects of fishing do not result in serious or irreversible harm to habitat structure and function	Habitat effects	Area fished	Target: The total area trawled is < 50 % of the permitted trawl area. Threshold: The total area trawled is > 60 % of the permitted trawl area; or There is an increase in the level of risk to sensitive habitat types from fishery activities. Limit: The total area trawled is 70 % of the entire fishery area; or Fishery impacts on sensitive habitat types are now at an unacceptable risk level (i.e. high risk or above).
WA Shark Bay Scallop Managed Fishery	To conserve fish and to protect their environment		Listed species interactions	Number of interactions and percentage mortality	Limit: 90% of turtles captured from non-bycatch reduction device nets returned alive
QLD Gulf of Carpentaria Developmental Fin Fish Trawl Fishery	Provide for the use conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to (a) apply and balance the principles of ESD; and (b) promote ESD	Minimise effects of fishing operations on benthic habitat	Habitat effects	Catch (kgs) trends	Limit: annual percentage weight of benthos in the fishery total landed catch increases above the 2003 level of 10%
QLD East Coast Inshore Fin Fish Fishery	Provide for the use conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to (a) apply and balance the principles of ESD; and (b) promote ESD	Enhance survival of released protected species in the net and line gears in the fishery	Listed species interactions	Percentage mortality	Limit: percentage of each category of protected species released alive does not exceed 90%
SA Lakes and Coorong Fishery	Aquatic habitats are to be protected and conserved, and aquatic ecosystems and genetic diversity are to be maintained and enhanced	Minimise fishery impacts on by catch species and the ecosystem	Catch composition	Trend in the relationship between the catch of retained and non-retained (by-catch) species	Trigger: the amount of by-catch (discards) in commercial mesh net fishing operations, relative to the total catch of retained species is greater than 20% (in weight) in any given year
TAS Scalefish Fishery	Provide and maintain sustainability of living marine resources	To maintain fish stocks at sustainable levels by restricting the level of fishing effort directed at scalefish, including the amount and types of gear that can be used	Pollution	Occurrence of pollution event	Limit: occurrence of a pollution event that may produce risks to fish stocks, the health of fish habitats or to human health

2.2 *Maintain & protect affected ecosystems:* Further resources

- Sainsbury, K. J. (2008). *Best Practice Reference Points for Australian Fisheries*. R2001/0999. Canberra, Australian Fisheries Management Authority.
- AFMA (2017). *Guide to AFMA's Ecological Risk Management. Canberra, Australian Government.*
- [Steve Kenelly's report on Bycatch Indicators – when finalised]
- Fletcher, W., et al. (2002) National ESD Framework for Wild-Capture Fisheries
- Australian fisheries management objectives: Database (2015)

2.2 *Maintain & protect affected ecosystems:* Checklist Is it Clearly-defined?

- Does your objective state the ecological sub-component/s to which it applies?
  - Discarded species;
  - Threatened, Endangered or Protected (TEP) species;
  - Food-webs and trophic interactions;
  - Habitats; and
  - Community structure
- Does your objective clearly state the scope (i.e. trophic level), scale (i.e. region) and impact (i.e. fishing activity) being addressed?
- Does your objective clearly state the limits of acceptable impact on specific sub-components? (i.e. limit reference points)
- If your fishery is data poor, does your objective:
  - Identify recognised proxy or indirect indicators of performance?
  - Address the need to collect targeted data?

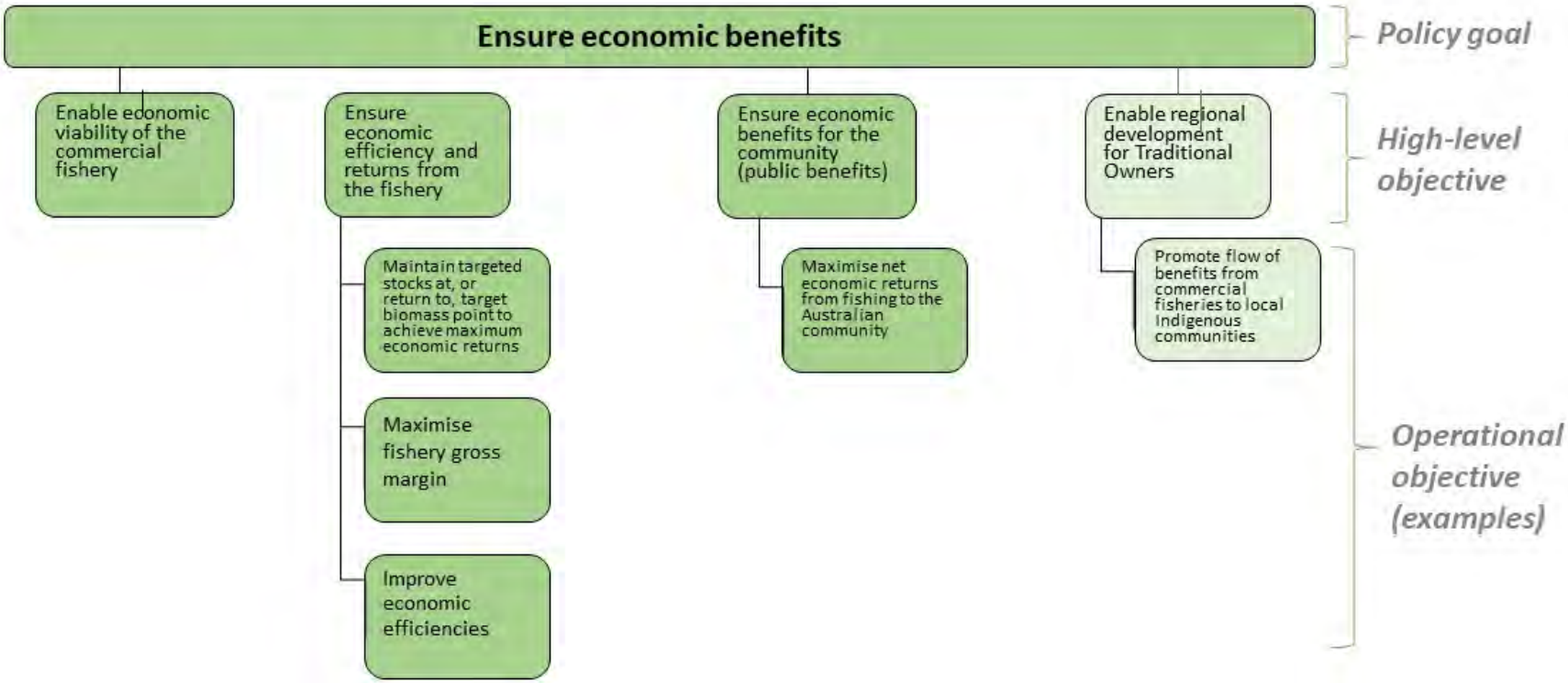
2.2 *Maintain & protect affected ecosystems:* Checklist Is it Consistent?

- Is the objective selected consistent with your fisheries legislation?
  - Does your fisheries legislation or high-level policy specifically identify ecological sub-components to be managed?
  - Does your fisheries legislation or high-level policy specifically identify conceptual limits of acceptable impact on ecological sub-components? If not, have limit or trigger reference points been developed using recognised ecological risk assessment processes?
- Does the selected performance indicator directly measure performance against the objective?

2.2 *Maintain & protect affected ecosystems:* Checklist Is it Complete?

- Are the following elements specified for selected objectives?
  1. Performance indicator
  2. Reference points (conceptual or empirical as appropriate): Limit and Trigger
  3. Linked management response

See 2.2 Maintain & protect affected ecosystems: Examples of...



2.3 Common Objectives – Options for Economic objectives

2.3 *Ensure economic benefits*: Examples of Objective 'packages'

Fishery Name	MgtObjective	Operational Objective	PerformanceIndicator	PerformanceMeasure	ReferencePointClassification
COMM SESSF - Commonwealth Trawl Sector (CTS)	AFMA will pursue the objective of maximising the net economic returns to the Australian community from the management of the fishery	Once BMSY is reached, pursue the biomass level which aims to maximise net economic returns, currently 48 per cent of unfished spawning biomass (BMEY)	Virgin spawning biomass		Target: 48% of virgin spawning biomass as a proxy for MEY
WA West Coast Deep Sea Crustacean Managed Fishery	To achieve the optimum economic, social and other benefits from the use of fish resources	To provide flexible opportunities to ensure fishers can maintain or enhance their livelihood, within the constraints of ecological sustainability	Standardised catch per unit effort (CPUE)	CPUE trends	Target: Provide the option to increase the TAC subject to the following ecological conditions being met: • Catch rate of legally-retainable crabs is ≥ 2.54 kg / trap lift; and • Catch rates of sublegal and berried female crabs are ≥ 2.57 and 1.74 crabs / trap lift Threshold: Fisheries management actions are constraining access to livelihood opportunities for reasons other than ecological sustainability. Limit: Fisheries management actions are constraining access to livelihood opportunities for reasons other than ecological sustainability, for more than two consecutive years.
WA West Coast Rock Lobster Managed Fishery	To achieve the optimum economic, social and other benefits from the use of fish resources	Once the Sustainability Objective has been satisfied, TACCs for the Fishery shall use MEY to determine an optimal range of Legal Proportion Harvested (LPH) that would optimise the economic performance of the Fishery by achieving optimal stock abundance and catch rates, and thereby providing high economic returns and greater amenity to the Fishery and the WA community	Net Present Value [NPV]	Optimal legal proportion harvested range will be determined by 99% MEY	
QLD Fin Fish (Stout Whiting) Trawl Fishery	Provide for the use conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to (a) apply and balance the principles of ecologically sustainable development; and (b) promote ecologically sustainable development	Maintain or improve the economic viability of the fishery	Catch (kgs)	Catch trends	Limit: if the proportion of the set total allowable commercial catch used in a season falls below 60%
NSW Abalone Fishery	To promote viable commercial fishing and aquaculture industries	Ensure that the fishery remains economically viable	Fishery share value	Value of shares in the fishery relative to 1999	A review is triggered if the value of share packages for a fishing period decreases by >10% from 1999 benchmark
NSW Estuarine General Fishery	To promote viable commercial fishing and aquaculture industries	Contribute, in conjunction with other fishing regulatory controls, to promoting viable commercial fishing	Gross value of product (GVP) for commercial fisheries	Gross value of product (GVP) trends	A review is triggered if the gross value of production of the fishery has not exceeded the sum of indicative industry operational costs and government management costs relevant to the fishery for 3 consecutive years
SA Blue Swimmer Crab Fishery	Allocate access to Blue Swimmer Crab resources to achieve optimum utilisation and equitable distribution to the benefit of the community	Maintain a flow of economic benefit from the fishery to the broader community	1. Level of full-time employment provided by fishery. 2. Total Gross State Product		
SA Marine Scalefish Fishery	Optimum utilisation and equitable distribution of Marine Scalefish Fishery resources	Improve economic efficiencies and financial returns with in the constraints of sustainability imperatives	Gross operating surplus	Trends in gross operating surplus	Trigger: downward trends

2.3 *Ensure economic benefits*: Further resources

- Pascoe, S., et al. (2015) *Setting economic target reference points for multiple species in mixed fisheries*. FRDC Project No 2011/200 - CSIRO Oceans and Atmosphere Flagship, Brisbane.
- Pascoe, S. et al.(2014) Estimating Proxy Economic Target Reference Points in Data-Poor Single-Species Fisheries, *Marine and Coastal Fisheries*, 6:1, 247-259
- Australian fisheries management objectives: Database (2015)
- [*Guidelines for incorporating economic information in harvest strategies and decision making processes.* EconSearch FRDC project 2016-213 – when complete]

2.3 *Ensure economic benefits*: Checklist
Is it Clearly-defined?

- Is direction provided in your Act or high-level policy to clearly define which economic benefits?
  - If not, can it be inferred from non-fishery high-level policy (i.e. regional and development, ESD)?
  - If not, can it be determined 'bottom up' for your fishery?
    See Objective Preferences: Methods
- Does your objective clearly state which economic benefits management of your fishery is intended to ensure?
  - who are meant to be the primary beneficiaries; and
  - how they are to be distributed?

See 2.3 Economic Benefits & Beneficiaries: Typology

2.3 Economic Benefits & Beneficiaries: Typology

Sub-component	Who is to receive the benefit	Type of benefit	Example performance indicator and / or measure
Economic benefits – commercial fishing community	Commercial fishers (harvesters)	Industry surplus (profit)	Profit indicators (fleet-wide) Economic efficiency measures e.g. CPUE (inferred)
	Commercial fishers (owners of quota units/ITQ privileges)	Economic returns	Net Economic Returns
Economic benefits – Jurisdictional community	Region into which fish landed	Contributions to various domains of community well-being	Various (contribution to regional/state Gross Domestic Product through value-add; Employment)
	Region where owners of quota units/ITQ privileges participate in further economic activity	Trickle-down benefits associated with expenditure or investment of NER	Net Economic Returns
Economic benefits – Indigenous cultural fishing communities	Indigenous cultural fishing communities	Flow-on benefits	Employment, other value-add measures

2.3 *Ensure economic benefits*: Checklist
Is it Consistent?

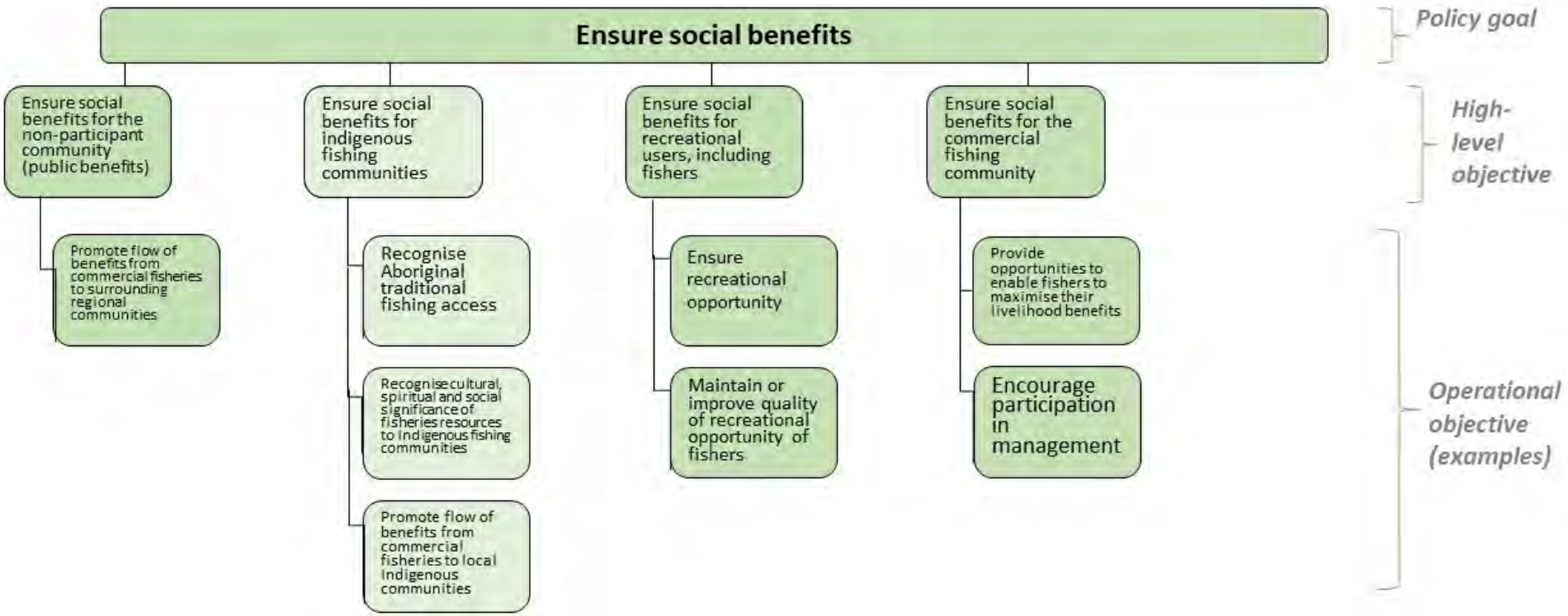
- Does your objective apply the intent of your fisheries legislation and other high-level policy?
  - Does it identify the same types of economic benefits and beneficiaries as are identified in your fisheries legislation?
  - Are reference points specified in the objective consistent with any direction for conceptual economic reference points (i.e. maximum net economic returns infers a conceptual TRP of BMEY) provided in legislation or policy?
  - Or, if your legislation doesn't define which economic benefits or provide direction for conceptual target reference points, is your interpretation consistent with relevant policies?
- Does the selected performance indicator directly measure the creation/maintenance of the types of economic benefits intended in your objective?

2.3 *Ensure economic benefits*: Checklist
Is it Complete?

- Are the following elements specified for selected objectives?
  1. Performance indicator appropriate to the type of economic benefit?
  2. Reference points (conceptual or empirical as appropriate): Limit, Target and/or Trigger
  3. Linked management response

See:

- *2.3 Ensure economic benefits: Examples of Objective 'pa...*
- *2.3 Ensure economic benefits: Further resources*



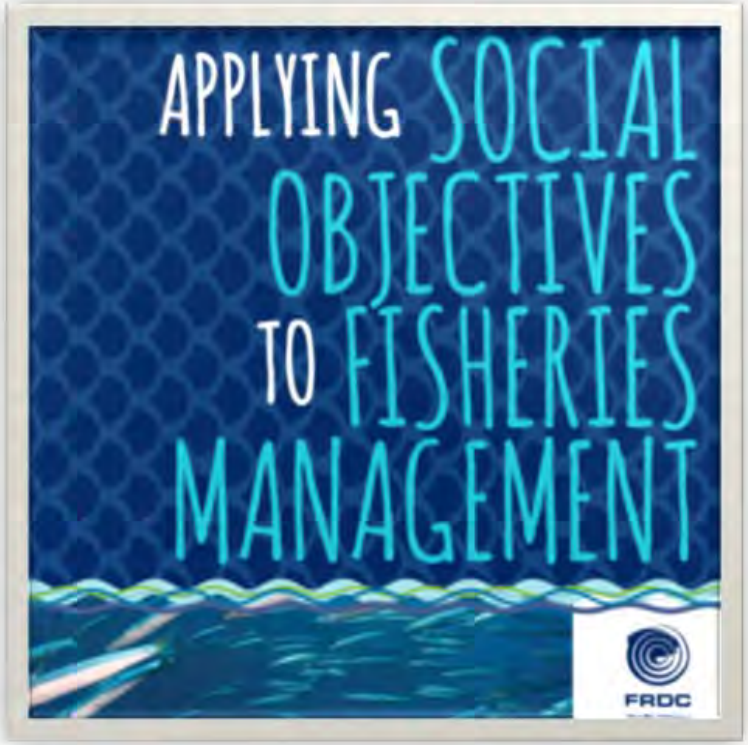
2.4 Common Objectives – Options for Social Objectives

2.4 *Ensure social benefits*: Examples of Objective 'packages'

Fishery Name	Mgt Objective	Operational Objective	PerformanceIndicator	PerformanceMeasure	ReferencePointClassification
WA West Coast Rock Lobster Managed Fishery	To achieve the optimum economic, social and other benefits from the use of fish resources		Recreational catch per unit effort (CPUE)	CPUE trends	Average recreational pot and diving diary-adjusted catch rates were 1.2 and 2.1 lobsters per person per fishing day
SA Southern Zone Rock Lobster Fishery	Provide equitable public access and recreational fishing opportunities		Recreational catch (kgs)		Trigger: >15% increase in catch above allocation over 5 years
SA Northern Zone Rock Lobster Fishery	Provide equitable Aboriginal traditional fishing access		Catch (kgs)		Trigger: Aboriginal traditional fishers don't have access to the fishery
SA Marine Scalefish Fishery	Optimum utilisation and equitable distribution of Marine Scalefish Fishery resources	Ensure equitable treatment and access for fishers	Equity in management decisions	How equitable/fair fishers feel the processes and outcomes of fisheries management are (fishery survey)	Trigger: >50% of fishers believe they are treated unfairly on more than one of the relevant survey questions
SA Marine Scalefish Fishery	Optimum utilisation and equitable distribution of Marine Scalefish Fishery resources	Provide flexible opportunities to ensure fishers can maintain or enhance their livelihood	Livelihood change	Provision of a livelihood opportunity: How is the ability of fishers to access livelihood changing	Trigger: cost of entry and of maintaining access have risen relative to returns from the fishery for more than one year
SA Lakes and Coorong Fishery	Maintain equitable levels of commercial access and the regional development nature of the commercial fishery.		Number of owner-operators	Trend in the number of owner-operators in the commercial fishery	
NT Barramundi Fishery	Maintain and enhance quality fishing experiences for recreational fishers into the future		Recreational fisher satisfaction	Recreational fisher satisfaction trends	Limit: more than 20% of participants in stakeholder fishing surveys or clients state that they are unsatisfied with their barramundi fishing experience

2.4 *Ensure social benefits*: Further resources

- Brooks, K. (2015). Selecting and assessing social objectives for Australian fisheries management. *Marine Policy* 53 (2015) 111–122
- Triantafillos, L. et al. (2014) *Developing and testing social objectives for fisheries management.* FRDC project 2010-040. Canberra.
- Australian fisheries management objectives: Database (2015)



2.4 *Ensure social benefits*: Checklist
Is it Clearly-defined?

- Is direction provided in your fisheries legislation or high-level policy to clearly define which social benefits?
  - If not, can it be inferred from non-fishery high-level policy (i.e. regional and development, ESD)?
  - If not, can it be determined 'bottom up' for your fishery?
    See Objective Preferences: Methods
- Does your objective clearly state which social benefits management of your fishery is intended to ensure? Specifically, does it define:
  - Who is meant to be the primary beneficiary/s and What are meant to be the primary social benefits?
    See 2.4 Social Benefits & Beneficiaries: Typology

2.4 Social Benefits & Beneficiaries: Typology

Sub-component	Who is to receive the benefit	Types of benefit	Example performance indicator and / or measure
Social benefits – commercial fishing community	Commercial fishers (harvesters)	Opportunity to pursue livelihood through provision of access	Access is allocated in accordance with resource sharing policy
		Flexibility in pursuing livelihood strategy	Extent to which input controls constrain flexibility
Social benefits – Jurisdictional community	Region into which fish landed	Contributions to various domains of community well-being	Various (see Voyer et al 2016)
	Australian/local consumers	Consumer surplus – availability of seafood in local markets	% sold locally/domestically
Social benefits – Recreational fishers	Recreational users	Recreational opportunity	Access is allocated in accordance with resource sharing policy
		Quality of recreational amenity	CPUE of recreational fishers or strike rate
Social benefits – Indigenous cultural fishing communities	Indigenous fishing communities	Cultural value arising from primacy, access, harvesting, spiritual values	Various – via proxies

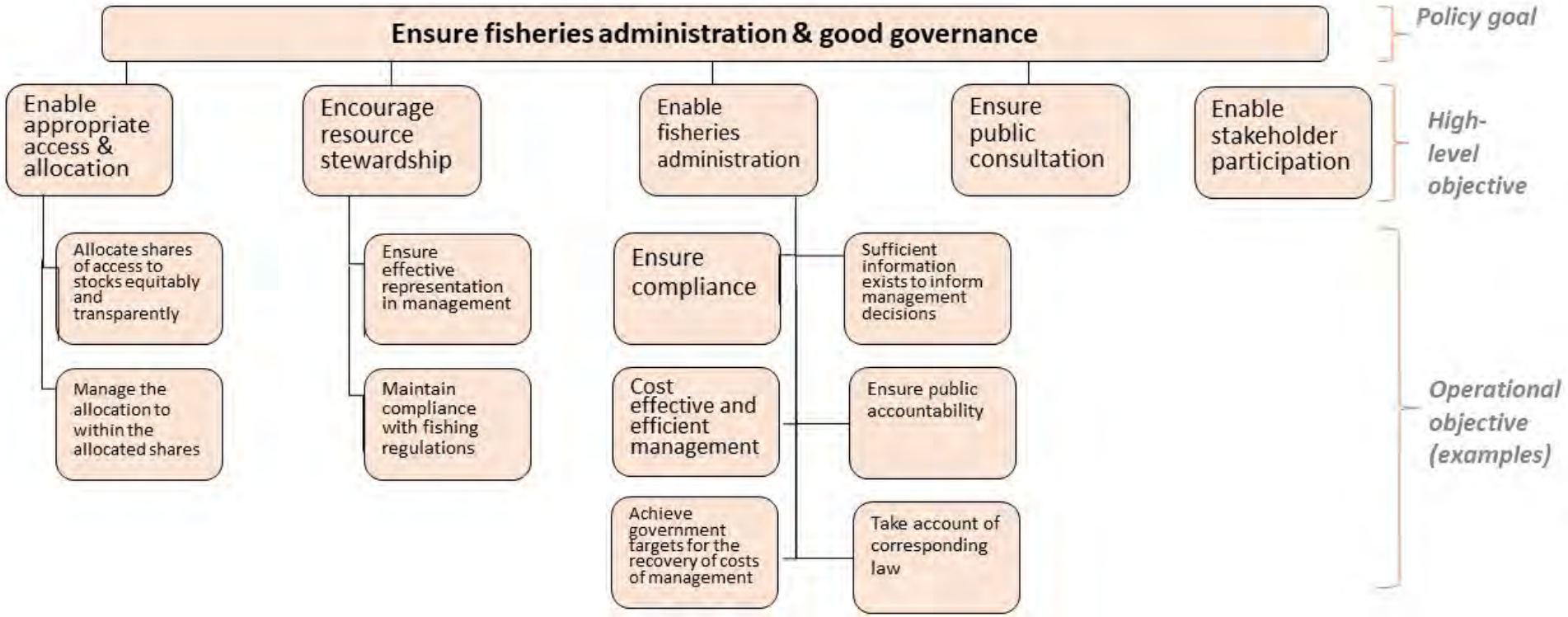
2.4 *Ensure social benefits*: Checklist
Is it Consistent?

- Does your objective apply the intent of your Act and other high-level policy?
  - Does it identify the same types of social benefits and beneficiaries as are identified in your Act?
  - Or, if your Act doesn't define which social benefits, is your interpretation consistent with relevant policies?
- Does the selected performance indicator directly measure the creation/maintenance of the types of social benefits intended in your objective?

2.4 *Ensure social benefits*: Checklist
Is it Complete?

- Are the following elements specified for selected objectives?
  1. Performance indicator appropriate to the type of social benefit?
  2. Reference points (conceptual or empirical as appropriate): Limit, Target and/or Trigger
  3. Linked management response

See 2.4 Ensure social benefits: Examples of Objective 'packa...



2.5 Common Objectives – Options for Governance Objectives

2.5 *Ensure good governance*: Examples of Objective 'packages'

Fishery Name	Mgt Objective	Operational Objective	PerformanceIndicator	PerformanceMeasure	ReferencePointClassification
SA Abalone Fishery	Cost effective and participative management of the fishery	Management arrangements complied with	Compliance level	Number of prosecutions	Limit: increasing trend in prosecutions over three year period
SA Marine Scalefish Fishery	Cost effective and participative management of the Marine Scalefish fishery	Ensure appropriate mechanisms exist for fisher involvement in the development of management advice	Communication protocol objectives	Deliver against communication protocol objectives	Trigger: failure to meet timelines within communication protocol and harvest strategies
SA Spencer Gulf Prawn Fishery	Industry participation in management through cooperative arrangements		Management committee membership		Trigger: membership of committees are not maintained and positions not filled
NSW Rock Lobster Fishery	Ensure appropriate research and monitoring in relation to the fishery		Data availability	Necessary data is available for assessment of eastern rock lobster stocks	A review is triggered if insufficient data is available for the purpose of setting the total allowable catch for eastern rock lobster
QLD Mud Crab Fishery	To ensure community confidence in management arrangements.		Number of offences	Compliance levels	Limit: the rate of compliance falls below 92.5% in the commercial fishery and/or 92.5% in the recreational fishery
WA South Coast Salmon Managed Fishery	To administer a consultation process that is in accordance with the requirements of the FRMA and allows for the best possible advice from all relevant stakeholders to be provided to the decision maker (Minister/ED) in a timely manner		Frequency of industry and public meetings held. Publication of the status of the fishery.		Industry meetings held annually. Public meeting regarding this fishery and other fisheries held annually. Publishing the State of the Fisheries Report each year
COMM SESSF - Commonwealth Trawl Sector (CTS)	To ensure AFMA's accountability to the fishing industry and to the Australian community in managing the resources of the fishery		Data collection		That data is collected, verified (if necessary) and analysed to enable: (i) timely evaluation of the effectiveness of the measures implemented to maintain the resources of the fishery at, or rebuild those resources to, an acceptable level; and (ii) timely modification of those measures
COMM Western Tuna and Billfish Fishery	Ensure cooperative, efficient and cost effective management of the Fishery		Management costs. Completion of review.		That the range and cost of AFMA's services to the fishery are reviewed annually and; (i) the review is published; and (ii) the management of the fishery has been carried out cost-effectively;

2.5 *Ensure good governance*: Further resources

- Fletcher, W., et al. (2002) National ESD Framework for Wild-Capture Fisheries
- FAO Code of Conduct for Responsible Fisheries
- Australian fisheries management objectives: Database (2015)
- Best practice guidelines for Australian fisheries management agencies (FRDC project 2015-203)

2.5 *Ensure good governance*: Checklist
Is it Clearly-defined?

- Is direction provided in your fisheries legislation to clearly define which activities and desired outcomes public management of fisheries is intended to achieve?
- Does your objective clearly state what activity it concerns and the outcome desired?
  - If not, can it be inferred from other high-level policy (environmental, resource management or other policies concerning public administration)?
  - If not, can it be determined 'bottom up' for your fishery? (fishery-level)
    See *Objective Preferences: Methods*

2.5 *Ensure good governance*: Checklist
Is it Consistent?

- Does your objective take account of other relevant policies and legislation?

See Coordination with other Acts/Policies: Checklist

- Does your objective address the same specific activity or desired outcome as stated in any higher-level objective?
- Does the selected performance indicator measure the specific activity or desired outcome stated in your objective?

2.5 *Ensure good governance*: Checklist
Is it Complete?

- Are the following elements specified for selected objectives?
  1. Performance indicator appropriate to the type of management activity and desired outcome?
  2. Trigger reference points or thresholds?
  3. Linked management response

3. Checklist for combined objectives: Are they Comprehensive?

- Do your combined objectives clearly make provision for who and what has standing within the scope and purpose of your fishery policy?
- Do selected objectives reflect those ESD/EBFM components and sub-components identified in:
  - Fisheries legislation?
  - Other relevant high-level policy/legislation?
  - The management goals for your fishery?

*See 1. Common Objectives – National ESD Framework** **ESD Comp...*

3. Checklist for combined objectives: Is there Commonality?

- What relevant International, National and State/Territorial conventions, legislation and high-level policies, exist?
  - Does your set of selected objectives take these into account?
  - How aligned are your selected set of objectives with similar fisheries in other Australian jurisdictions?
  - If commonality is limited, is there a policy position which justifies this?

See Coordination with other Acts/Policies: Checklist.

Coordination with other Acts/Policies: Checklist

Related Acts / Policies	Are selected objectives consistent with this legislation or policy? (Y, N or n/a)
International conventions	
UNESCO (various conventions concerning Indigenous customary fishing)	
UN Convention of the Law of the Sea	
Conventions for migratory species (various)	
Conventions for shared fish stocks (various)	
National legislation and policies	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	
National Strategy for Ecologically Sustainable Development 1992	
National Competition Policy 1995	
State and Territory legislation and policies	
Administrative legislation (various)	
Marine Protected Area and Farming Legislation	
Resource Sharing Policy	
Harvest Strategy Policy	
Bycatch Policy	
Regional development policy	

3. Checklist for combined objectives: Are they Coherent?

- Are there interactions between selected objectives which could be countervailing?
  - Refer to tool: Countervailing Objectives: Matrix
- If yes, is direction provided for how to address any potential conflicts between selected objectives?
  - Does the selected objective framework clearly state which objectives (or, components and sub-components) have preference or precedence?
  - Refer 'Addressing Countervailing Objectives' tables (Addressing Countervailing Objectives: Principles & Examples)

3. Checklist for combined objectives: Countervailing Objectives Matrix

- Key for interactions between objectives:

= Synergistic (i.e. mutually supporting, no conflict expected and no trade off required)

= Potentially countervailing (i.e. in conflict) under certain conditions. Conditions described in text in box. Otherwise, where conditions NOT present, synergistic.

= Countervailing (i.e. in conflict and trade off required)

- *See Countervailing Objectives Matrix on the project page on the FRDC website for the downloadable Excel spreadsheet*

		2. Ensure sustainable resource use		3. Maintain & protect affected ecosystems				4. Ensure economic benefits		5. Ensure social benefits			
		2.1 Sustainable target spp stocks	2.2 Sustainable non target spp stocks	3.1 Protect aquatic ecosystems, ecological processes and diversity	3.2 Protect aquatic habitats and communities	3.3 Protect listed species, habitats and communities	3.4 Minimise impacts on bycatch (i.e. non retained) species	4.1 Enable economic efficiency and profitability of the commercial fishery	4.2 Ensure economic benefits for the community (public benefits)	5.1 Ensure social benefits for the non participant community (public benefits)	5.2 Ensure social benefits for indigenous fishing communities	5.3 Ensure social benefits for recreational users, including fishers	5.4 Ensure social benefits for the commercial fishing community
2. Ensure sustainable resource use	2.1 Sustainable target spp stocks		Countervailing Conditions: where [illegible]	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact	Countervailing Conditions: where MSY targeted, higher effort and likelihood of	* Countervailing Conditions: where MSY targeted, fishing can become inefficient and			Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where MSY targeted, fishing can become unviable due to low
	2.2 Sustainable non target spp stocks	Countervailing Conditions: where [illegible]						Countervailing Conditions: where MSY targeted, fishing can become inefficient due to			Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where constraining effort to reduce catch of non target spp.
3. Maintain & protect affected ecosystems	3.1 Protect aquatic ecosystems, ecological processes and diversity	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact						Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: where prefered community benefits are in the form of resource			Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods
	3.2 Protect aquatic habitats and communities	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact						Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: where prefered community benefits are in the form of resource			Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods
	3.3 Protect listed species, habitats and communities	Countervailing Conditions: where MSY targeted, higher effort and likelihood of impact						Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: where prefered community benefits are in the form of resource		Countervailing Conditions: where these are traditionally harvested	Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods
	3.4 Minimise impacts on bycatch (i.e. non retained) species	Countervailing Conditions: where MSY targeted, higher effort and likelihood of						Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: where prefered community benefits are in the form of resource			Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods
4. Ensure economic benefits	4.1 Enable economic efficiency and profitability of the commercial fishery	* Countervailing Conditions: where MSY targeted, fishing can become inefficient and	Countervailing Conditions: where MSY targeted, fishing can become inefficient due to	Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase	Countervailing Conditions: Pursuit of lower costs and higher catch rate may increase		Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered social benefits to the community are	Countervailing Conditions: where fishing rights and operations are not owned/operated by		
	4.2 Ensure economic benefits for the community (public benefits)			Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered community benefits are in the form of resource			Countervailing Conditions: where fishing rights and operations are not owned/operated by	Countervailing Conditions: where prefered community benefits are those arising	Countervailing Conditions: where prefered community benefits are in the form of resource
5. Ensure social benefits	5.1 Ensure social benefits for the non participant community (public benefits)							Countervailing Conditions: where prefered social benefits to the community are			Countervailing Conditions: where beneficiaries are not Indigenous people/communitie	Countervailing Conditions: where prefered community benefits are those arising	Countervailing Conditions: where prefered community benefits are in the form of greater
	5.2 Ensure social benefits for indigenous fishing communities	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates			Countervailing Conditions: where these are traditionally harvested		Countervailing Conditions: where fishing rights and operations are not owned/operated by	Countervailing Conditions: where fishing rights and operations are not owned/operated by	Countervailing Conditions: where beneficiaries are not Indigenous people/communitie		Countervailing Conditions: where [illegible]	Countervailing Conditions: where [illegible]
	5.3 Ensure social benefits for recreational users, including fishers	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where MSY targeted, higher effort and lower catch rates	Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where access and opportunity limited, loss of utility (short	Countervailing Conditions: where access and opportunity limited, loss of utility (short		Countervailing Conditions: where prefered community benefits are those arising	Countervailing Conditions: where prefered community benefits are those arising	Countervailing Conditions: where [illegible]		Countervailing Conditions: where [illegible]
	5.4 Ensure social benefits for the commercial fishing community	Countervailing Conditions: where MSY targeted, fishing can become unviable due to low	Countervailing Conditions: where constraining effort to reduce catch of non target spp.	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods	Countervailing Conditions: where constraining effort to reduce impacts, fishing livelihoods		Countervailing Conditions: where prefered community benefits are in the form of resource	Countervailing Conditions: where prefered community benefits are in the form of greater	Countervailing Conditions: where [illegible]	Countervailing Conditions: where [illegible]	

Key for interactions between objectives:

= Synergistic (i.e. mutually supporting, no conflict expected and no trade off required)

= Potentially countervailing (i.e. in conflict) under certain conditions. Conditions described in text in box. Otherwise, where conditions NOT present, synergistic.

= Countervailing (i.e. in conflict and trade off required)

See the project page on the FRDC website for the downloadable Excel spreadsheet

3. Checklist for combined objectives:
Addressing Countervailing Objectives – Principles & Examples

Countervailing Objectives Example 1 (I3):
Ensure economic benefits to commercial fishers (short term benefits) vs Ensure sustainable target species stocks (stock rebuilding)

Countervailing conditions	*Definition of countervailing components*	*Mechanisms for reconciling*			
		Precedence (priority or weighting)	*Threshold of acceptable impact*	*Trade offs*	*Examples*
Where high discount rates among fishers drive pursuit of short-term economic (profit) and social (employment) benefits that either cause continued stock depletion or no improvement in stock condition. Where there is a requisite or policy objective to pursue biological sustainability (e.g. B_{TARG}) but the timeframe for rebuilding will reduce fishing effort and fleet size in the short to long term.	Level of conservation status targeted (e.g. B_{TARG}) The role of the species being recovered in the food chain (predator or prey species), which may affect catch of other species and therefore profitability of other fisheries Importance of the fish stock for domestic and local markets (food security and consumption benefit to public) Desired speed/rate of stock building occurs, which affects how much catch is initially constrained Fishers inherent discount rates. High discount rates may occur under input controlled and open access fisheries or in developing countries with non-alternative employment opportunities for fishers.	Option 1. Full precedence given to maximising catch in the short and long-term in pursuit of MSY target Option 2. Full precedence given to rebuilding the stock in the short-term, whereby at some point in the future the stock recovers to a point (e.g. B_{TARG}) where maximising catch can become the higher priority objective Option 3. Precedence given to rebuilding the stock over the long-term, with a slow rate (time horizon) of stock rebuilding.	Threshold may be the limit reference point for biological sustainability (B_{LIM})	Option 1: Rebuild at the discount rate of the commercial fishery (annual gain in stock = annual discount rate) Option 2. Maximum catch allowed to re-build in a biologically-determined time frame (e.g. within two life cycles of spp.) Option 3. No catch until recovered impacting on economic and social benefits	Option 1. Option 2. Option 3.

3. Checklist for combined objectives:
Addressing Countervailing Objectives – Principles & Examples

Countervailing Objectives Example 2 (J9): *Enable economic efficiency and profitability of the commercial fishery vs Ensure economic benefits for the community (public benefits)*					
Countervailing conditions:	*Definition of countervailing components*	*Mechanisms for reconciling:*			
		Precedence (priority or weighting)	*Threshold of acceptable impact*	*Trade off options*	*Examples*
Where the pursuit of economic efficiency reduces employment (fleet size, or regional distribution of fleet, processing, expenditure in local communities) Where precedence is given in other policies for regional development /community benefit arising from use of common property resources. Where regulations to promote employment (e.g. subsidies to fishers) reduce the economic efficiency of the fleet	Underspecified objectives Beneficiaries of efficiency – owners of ITQ privileges/units or harvesters? Beneficiaries of inefficiency - sections of the fleet and input markets (including labour) which would be negatively impacted by the pursuit of economic efficiency.	Option 1. Full precedence given to efficiency (e.g. economically-pure ITQ systems) in pursuit of MEY target Option 2. Full precedence given to employment and maximising fleet size in pursuit of MSY target.	Option 1. Maximum fleet level size that achieves MEY Option 2. Minimum level fleet size	• Implement input controls to constrain efficiency to keep fleet at a desired size • Regionally-allocated quota • Maximum quota holdings per vessel • Residency requirements • Skipper aboard requirements • Indigenous-allocated community quota/license systems (allocative inefficiency, but not technical) • Non-transferable quota (allocative inefficiency, but not technical) Alternative option: Resource rent captured then re-distributed to meet desired outcomes for regional community benefits. Efficiency then pursued unconstrained.	Option 1. Option 2.

Objective preferences: Methods

'Bottom-up' methods for determining objective preferences are used when there is no direction given for objective preferences from high-level fisheries legislation or policy, or relevant policy in other policy domains.

Objective preferences (i.e. what objectives should be included, and which have precedence and priority over others) can be systemically determined using a variety of methods. These include:

- Analytic hierarchy process (AHP)
- Multi-criteria Decision Analysis (MCDA)
- Co-viability analysis
- Goal-oriented programming

Further resources and examples to follow are available as follows:

- Stakeholder objective preferences in Australian Commonwealth managed fisheries (Pascoe et al. 2009)
- Management objectives of Queensland fisheries (Pascoe et al. 2013)
- Identifying management objectives hierarchies and weightings for four key fisheries in South Eastern Australia (Jennings et al. 2013)
- Co-viability in the Australian Northern Prawn Fishery (Gourget et al. 2015)