Fitzroy Partnership for River Health
Review of Stewardship Measures

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Executive Summary

This report documents a review of stewardship reporting undertaken to support the development of the first Fitzroy report card of waterway health. The report card is being developed by the Fitzroy Partnership for River Health (the Partnership) collaboration between resources and energy companies, Queensland, Australian and local governments, resources and energy companies, agricultural industries and other key stakeholders.

Unlike biophysical and ecological measures of waterway health, stewardship reporting is not well established. The concept of stewardship is poorly defined. Different jurisdictions have interpreted stewardship in different ways. For the purposes of the Fitzroy Partnership, stewardship has been defined as follows:

"Waterway stewardship is the responsible planning and actions taken by individuals, organisations and sectors to minimise impacts on the region's waterways and protect or restore the ecological health of Fitzroy Basin rivers, wetlands, estuaries and coastal/marine environments. "

Stewardship actions thus include:

- Practices adopted by individual resource managers that will reduce impacts, protect or restore waterways e.g. adoption of zero till cropping, fencing to land type, mine site management
- Industry or sector-based initiatives that reduce impacts, protect or restore waterways e.g. adoption of grains best management practice, commitment to reef guardian councils program, reduction of discharges to waterways and how waste might be treated
- Government initiatives that reduce impacts, protect or restore waterways e.g. incentives programs such as Reef Rescue, regulation of mine site discharges, land use zoning
- Community engagement and educational activities that reduce impacts, protect or restore waterways e.g. waterway monitoring, riparian restoration

Through stewardship reporting, the report card seeks to inform the public, policy makers and resource managers of the current standards of resource management and implications for waterway health. The objectives of stewardship reporting as part of the Fitzroy Partnership report card are:

1. To report aggregated data on the adoption of practices by resource managers
2. To use, develop and apply robust metrics to communicate the relative benefits of different practices, and
3. To showcase significant stewardship initiatives.

This review examined catchment, regional or sector-based reporting initiatives that incorporate stewardship components. The review collected information about the context and purpose of stewardship reporting, how it is defined, data collected, assessment and reporting methods. The review is not exhaustive but sufficient to inform the development of the Fitzroy report card stewardship components.

Over 60 reporting initiatives from Australia and overseas were reviewed. The review found that stewardship reporting is poorly developed, with no consistent definition or established framework. Six approaches to stewardship reporting were identified through this review:

1. *Conceptual models* are used to synthesise and communicate understanding of system behaviour. None of the report cards reviewed presented conceptual models – but these would be required to underpin any robust stewardship assessment and are also potentially useful communication products in their own right.
2. *Current practices* involve reporting the level of adoption of practices identified to have a water quality impact or benefit. One example is the reporting of levels of adoption of ABCD management practices as part of the Great Barrier Reef report card.
3. *Case studies* provide examples of the benefits of adopting particular practices. The review of the South East Queensland Healthy Waterways Partnership report card recommended the adoption of a case study approach to monitor and evaluate management interventions.
4. *Qualitative assessment* involves 'expert judgement' informed by available evidence, of some criteria developed to assess 'stewardship'. The Gippsland Lakes report card uses a 2-step system that scores generic stewardship criteria (e.g. planning, implementation etc) for regional assets.
5. *Natural Resource Management (NRM) statistics* involves reporting available data on NRM initiatives. This data is typically provided to NRM investors, and reported in State of the Environment reports e.g. the Great Lakes report card.
6. *Tiered performance standards* refer to the use of a framework that rates different management practices according to their impact/benefit on waterways. The GBR ABCD management practices framework is an example. Similarly, many international certification schemes, such as the International Water Stewardship standard, use tiered performance standards.

This review recommends the adoption of a case study approach to reporting stewardship I the short term. Case studies should be drawn from the priority sectors and showcase stewardship actions implemented in the Fitzroy. Case studies should be able to demonstrate actual or anticipated impact on waterway health and contribute to defining good or leading stewardship practices for the Fitzroy region (and potentially wider).

In the longer term, the development of a framework for the reporting of industry performance against tiered performance standards is recommended. This would be consistent with the ABCD management practices framework developed for assessing the stewardship of agricultural industries in Great Barrier Reef catchments. One promising lead is the emerging International Water Standard that seeks to provide a consistent approach to assessing site and catchment-based water stewardship standards across sectors. The standard is underdevelopment, and was recently piloted in the dairy industry in Victoria.

The development of a set of sector-based water stewardship standards for the Fitzroy Basin is a substantial task that would need to closely involve scientists and industry stakeholders in its development. Given the undeveloped state of stewardship reporting, such an approach could potentially have wider application in Australia and internationally.

Introduction

Background

The Fitzroy Partnership for River Health (the Partnership) was formally established in February 2012. Twenty-three organisations are members of the Partnership, including Queensland, Australian and Local Governments, resource companies, agricultural industry bodies and research institutions. The FBA provides secretariat support to the Partnership, as well as being a member organisation.

The purpose of the Partnership is to develop and implement an integrated waterway monitoring program that will report publicly on waterway health at the catchment scale, and support improved water resource management by all sectors. The scope of these activities includes groundwater, rivers, off-stream wetlands and estuaries in the Fitzroy Basin and near-shore coastal and marine environments.

Partnership report card

One of the initial priorities for the Partnership is to develop the first Fitzroy waterway report card, planned for release in June 2013. The objectives are to report on

- The ecological health of waterways (to understand the condition of the asset)
- Threats to the ecological health of waterways (to understand the pressures or threats to the asset), and
- Management responses to reduce the threats and restore waterways (to understand how practices are adapting)(Anon, 2011a).

The program design is based upon the Driving forces-Pressures-State-Impacts-Responses (DPSIR) framework, as adopted by the Queensland Government for State of Environment reporting. The framework articulates clear linkages from management actions to the ecological health of waterways, recognising the influence of natural climate cycles and broader anthropogenic impacts (Figure 1).

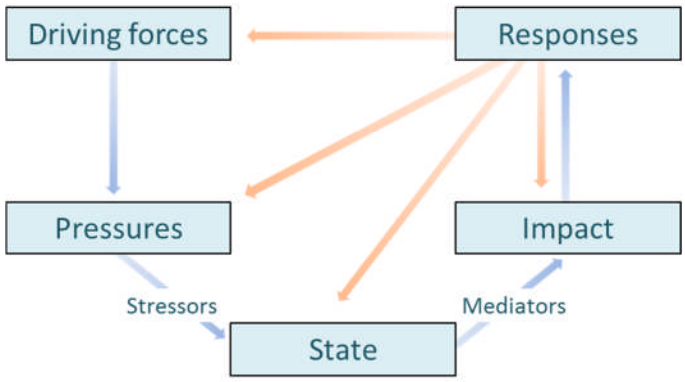

Figure 1. Partnership monitoring and reporting program design framework

The monitoring design (Anon, 2011a) describes the following *monitoring* program components and objectives:

Catchment program

- Reference sub-program - to improve the capacity to assess waterway health by improving our knowledge of parameter variability in time and space.
- Condition assessment sub-program - to directly monitor waterway health and priority stressors. It has four components – riverine, refugia, groundwater and habitat monitoring.

Estuarine and marine program

- Estuarine sub-program - to monitor water quality (and potentially waterway health) in the Fitzroy River Estuary.
- Marine sub-program - to assess the current condition of the GBR within the Fitzroy Basin's zone of influence using water quality and biological indicators.

Threats and management response program

- Prediction sub-program - using remote sensing and modelling activities to assess the level of threats or pressures on aquatic ecological health. There are four components to the prediction sub-program – land use monitoring, groundcover monitoring, flow modelling and event modelling.
- Management response - assessed using available data and existing frameworks of 'good practice'. Management response will be reported across four sectors (agriculture, urban, water resources and point sources) at the whole-of-basin scale. This area of the program will require substantial development.

The program design document proposes reporting waterway health (catchment, estuarine and marine) at the catchment scale, and reporting of management response (stewardship) at the basin scale (in the first instance).

Purpose of this report

The purpose of this report is to inform the development of the Stewardship measures to be used in the Fitzroy report card by reviewing

1. How other report cards have approached stewardship reporting, and
2. Available data and frameworks for reporting stewardship in the Fitzroy Basin.

Defining stewardship

Broadly, stewardship is defined as the responsible overseeing and protection of something considered worth caring for and preserving. Environmental stewardship is a more specific term that has diverse meanings in different contexts:

- In the USA, waterway programs use stewardship to describe public engagement and educational initiatives (Chesapeake Bay Program, 2000; James River Association, 2011)
- In the UK, the stewardship program provides EU resources for farmers to provide environmental management on their land (Natural England, 2013)
- In some contexts, environmental stewardship is defined as being above 'duty of care' i.e. referring to voluntary good management practice that result in good public benefit (ecosystem services) (Department of Sustainability and Environment)
- In the mining industry, stewardship has a focus on life cycle of materials through production, use and disposal (Department of Industry Tourism and Resources, 2006)
- In corporate management, stewardship theory provides an alternative model of human behaviour, whereby managers seek collective, organisational benefits, rather than individualistic, self-serving benefits (Davis, Schoorman, & Donaldson, 1997).
- Stewardship accounting entails reporting on the safe condition of an asset (O'Connell, 2007).
- Corporate reporting of social and environmental stewardship is increasing (O'Dwyer & Owen, 2005) most commonly embraced by industries with poor or controversial public images e.g. timber or chemical industries (Davis-Walling & Batterman, 1997).
- A more holistic view is that stewardship is 'an approach to natural resource management that is based on the idea of the developer being a temporary custodian of community assets' (Department of Industry Tourism and Resources, 2006)

Methods

Search strategy

The search strategy employed has covered the following information sources:

- Australian catchment programs
- International watershed programs
- Sector-based national and international programs
- Regionally relevant monitoring, assessment and reporting programs or frameworks

Additional sources were identified by web searches, and input from the Partnership Science Team, Science Advisory Panel and Management Committee. The purpose is not to conduct an exhaustive review, but to identify a variety of approaches sufficient to inform the development of the Fitzroy Report Card.

Review questions

The following information has been collected in the review:

- Context (scale, purpose, frequency, audience, sectors)
- How is 'stewardship' interpreted/framed
- Purpose of monitoring/reporting
- What is measured/collected?
- What assessment methods are used?
- What is reported?
- Relevance to Fitzroy report card

Results and discussion

The review of stewardship reporting has identified the 6 potential approaches to stewardship reporting. These approaches are briefly described below, with comments on their applicability to the Fitzroy report card in the short and longer term:

1. Conceptual models

   Conceptual models are used to synthesise and communicate our knowledge of system behaviour. None of the report cards reviewed presented conceptual models – but these would be required to underpin any robust stewardship assessment.

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   - some existing material (agricultural impacts, waterway processes etc)
   - underpin robust stewardship assessment methods
   - effective communication product

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   - takes time and scientific input to develop
   - not suitable for direct inclusion in the report card itself

2. Current practices

   Reporting current practices involves reporting the level of adoption of practices identified to have a water quality impact or benefit. An example is the reporting of levels of adoption of ABCD management practices as part of the GBR report card.

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   - provides a direct measure of the level of activities across the sector (not just the good news)
   - easy to communicate
   - provides direct feedback to resources managers

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   - requires a robust framework to identify and justify relevant practices
   - experience in the GBR suggests that data collection and interpretation can take substantial effort, and developing the framework requires negotiation with industry and scientists

3. Case studies

   Case studies could provide useful information on the benefits of adoption of particular practices. The SEQ HWP review recommended the adoption of a case study approach to monitor and evaluate management interventions.

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   - would provide local data and information

- contribute to greater knowledge about the effectiveness of new practices
- could support public interest ‘good news stories’ in the report card
- could support technical fact sheets for resource managers
- not confronting for partners/resource managers

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- limited to activities that are monitored, or requires resources to monitor and assess initiatives

4. Qualitative assessment

Qualitative assessment involves ‘expert judgement’ informed by available evidence, of some criteria developed to assess ‘stewardship’. The Gippsland Lakes report card uses a 2-step system that scores generic stewardship criteria (e.g. planning, implementation etc) for regional assets. The process first solicits ratings and justifications from relevant organisations. These results and evidence are compiled, workshopped and reviewed by an independent science panel.

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- relatively easy and cost-effective way to provide scores
- asking people to rate and justify their ratings involves a process of reflection, which underpins learning
- could provide a foundation for progressive development of a more robust and quantitative approach

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- stewardship criteria would need to be developed and justified
- partners would need to engage with the process
- credibility of the ratings could be challenged
- without progressive development, the process may not contribute to improved knowledge and better management

5. NRM statistics

NRM statistics would involve reporting available data on NRM initiatives. This data is typically provided to NRM investors, and reported in State of the Environment reports e.g. the Great Lakes report card.

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- readily available data
- could be reported at catchment as well as basin level
- can assess against NRM targets

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- data limited to NRM-funded activities – does not capture voluntary unfunded change, and does not cover corporate and many govt. activities

6. Tiered performance standards

Tiered performance standards refer to the use of a framework that rates different management practices according to their impact/benefit on waterways. The GBR ABCD management practices framework is an example. Similarly, many international certification schemes, such as the International Water Stewardship standard, adopt a similar approach. One option for developing tiered performance standards across sectors is presented in the text box on page 10.

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- could support the development of robust performance metrics for key industries
- development could be staged
- potentially applicable more widely in the GBR and beyond
- links to international and Australian Water Stewardship standard
- provides an opportunity to engage industries in developing standards

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- requires substantial development effort
- would need to align with GBR reporting (potential confusion)
- monitoring system would need to be established

The relative benefits of different approaches to stewardship reporting and their potential adoption as part of the FPRH report card are summarised in Table 1 below:

Table 1. Stewardship reporting options

Reporting option	Report card product	Reflects stewardship	Assesses performance	Robust method	Easy to communicate	Builds knowledge	Cost/effort required	Available data / info.	Feasible this year
1. Conceptual models	N	N	N	supports	~Y	Y	medium	some	some
2. Current practice	Y	Y	N	Y	?	Y	high	Potentially GBR ag. data but timing problematic	Potentially GBR ag. data but timing problematic
3. Case studies	Y	Y	N	maybe	Y	Y	low	likely	Y
4. Qualitative assessment	Y	maybe	Y	maybe	Y	maybe	low	some	Y
5. NRM statistics	Y	partly	N	Y	?	maybe	low	Y	Y
6. Tiered performance standards	Y	Y	Y	maybe	Y	Y	high	Potentially GBR ag. data but timing problematic	Potentially GBR ag. data but timing problematic

Recommendations

The following recommendations have been agreed by the FPRH Science Panel.

Defining Stewardship

The FPRH defines waterway stewardship as the responsible planning and actions taken by individuals, organisations and sectors to minimise impacts on the region's waterways and protect or restore the ecological health of Fitzroy Basin rivers, wetlands, estuaries and coastal/marine environments. Stewardship actions include:

- Practices adopted by individual resource managers that will reduce impacts, protect or restore waterways e.g. adoption of zero till cropping, fencing to land type, mine site management
- Industry or sector-based initiatives that reduce impacts, protect or restore waterways e.g. adoption of grains best management practice, commitment to reef guardian councils program, reduction of discharges to waterways and how waste might be treated
- Government initiatives that reduce impacts, protect or restore waterways e.g. incentives programs such as Reef Rescue, regulation of mine site discharges, land use zoning
- Community engagement and educational activities that reduce impacts, protect or restore waterways e.g. waterway monitoring, riparian restoration

Objectives of stewardship reporting

The objectives of stewardship reporting as part of the FPRH report card are:

1. To report aggregated data on the adoption of practices by resource managers
2. To use, develop and apply robust metrics to communicate the relative benefits of different practices, and
3. To showcase significant stewardship initiatives.

Through stewardship reporting, the report card seeks to inform the public, policy makers and resource managers of the current standards of resource management and implications for waterway health.

The stewardship sub-program is distinct from the threats (prediction) sub-program, which is proposed to 'provide information to assess the level of threats to waterways (pressures)' through remote sensing and modelling e.g. land use change, groundcover, water quality loads and environmental flows. The threats (prediction) sub-program provides the linkage between the cumulative impacts of resource use and management, and waterway health.

Priority sectors

The sectors considered the highest priority for reporting in the Fitzroy (at this time) are grazing, cropping, water resources, point sources, coal mines, Mt Morgan mine, CSG, ports and infrastructure. The next tier priority sectors for reporting are urban, coastal development, horticulture and shipping.

Stewardship reporting – short-term

The FPRH agreed to adopt a case study approach for the first report card.

Criteria for the selection of case studies are:

- Case studies are drawn from the priority sectors
- Case studies showcase stewardship actions implemented in the Fitzroy in the appropriate reporting period
- Case studies should be able to provide a robust case for demonstrating actual or anticipated impact on waterway health e.g. evidence-based logic, monitoring data
- Case studies contribute to defining good or leading stewardship practices for the Fitzroy region (and potentially wider)
- The final selection of case studies will showcase stewardship across a variety of sectors i.e. probably no more than 1 per sector
- The final number of case studies written up will need to be appropriate to the resources available.

A template for reporting case studies adopts a 'fact sheet' format with a technical reporting style. The structure of the template is as follows:

- Title
- Brief description
- Industry context (extent of the industry in the Fitzroy, understanding of risks to waterway health)
- Case study (who, what, where, why, how)
- Benefits (what are the expected benefits, what evidence is there of this, what monitoring is in place, significance for the industry and/or Fitzroy region)

Stewardship reporting – longer term

The FPRH intends to develop good practice standards for stewardship reporting in future report cards. One example of a framework for reporting industry performance against good practice standards for environmental performance is the ABCD management practices framework developed for agricultural industries in the Great Barrier Reef (GBR) catchments. Many international certification schemes adopt a similar framework of tiered performance standards, including the (emerging) International Water Standard (Water Stewardship Australia Ltd, 2012). Developing tiered good practice standards for waterway management in the Fitzroy should:

- Involve the staged development of good practice standards
- Work closely with industry groups and scientists to develop standards
- Support the development of robust good practice standards for key industries
- Have wider application than the Fitzroy Basin
- Link to the development of Australian and international Water Stewardship standards.

The development of tiered reporting standards across industries requires a substantial development effort. Data collection systems and assessment methods would need to be developed. To avoid confusion, the system would need to align with the Great Barrier Reef reporting.

Adapting the GBR ABCD management practices framework

One option for the development of tiered standards across industries may be to adapt the approach used in the Great Barrier Reef catchments for managing the water quality risks of agricultural practices. In the GBR, regional frameworks have been developed that describe management practices for key agricultural industries (grazing, cane, horticulture) according to a four-tier framework. These levels are described as 'A' cutting edge practices, 'B' current 'best practice, 'C' common, code of practice, and 'D' dated practices. The frameworks were developed with growers and scientists and reflect regional variations. The frameworks are used to prioritise grants investment, report uptake and communicate to investors. However, there is some confusion over 'A' class practices as an aspiration for wide adoption (given that these are cutting edge practices still requiring further validation), and also with the ABCD grazing land condition assessment.

Without having to repeat the intensive process undertaken to develop the GBR frameworks, most industries have two standards that are, to some degree, already defined. These are regulatory requirements, and 'good practice'. These could be used to define the boundaries between B, C and D class practices. Frameworks would need to be developed and confirmed with industry and scientific review. Data could be collected by survey each year or number of years (perhaps a rolling audit, focussing on one industry per year) and reported. Innovative practices, equivalent to A class, could be showcased as case studies.

Table 1. Potential adaption of GBR ABCD framework for Fitzroy sectors

GBR practice equivalents		Fitzroy system		
description	score	score	description	approach
cutting edge practices	A	A	innovation	showcase case studies of innovation
regional frameworks	boundary		new practice	
currently promoted 'BMP'	B	B	best practice	report uptake (pass +)
regional frameworks	boundary		relevant good practice standards	
common, code of practice	C	C	compliant	report performance (pass)
regional frameworks	boundary		regulatory requirements	
dated, noncompliant practices	D	D	non-compliant	report non-performance (fail)

Appendix A – Report card reviews

Great Barrier Reef report card 2011

Source of information	(Department of Premier and Cabinet, 2011a, 2011b, 2011c)
Web address	http://www.reefplan.qld.gov.au/measuring-success.aspx
Context (scale, timing, frequency, audience, sectors)	Supported by the Paddock to Reef monitoring and modelling program, reported at GBR and regional scale Annual public reporting, benchmark report for 2008 period released, subsequent annual reports pending Report covers adoption of improved agricultural practices, catchment measures (wetland loss, riparian extent, groundcover) water quality loads (TSS, nutrients, pesticides) and marine condition (water quality, seagrass, corals). Agricultural industries – main focus is sugar cane and grazing, but fruit and vegetables, cropping, dairy also
How is 'stewardship' interpreted/framed	Targets are for the adoption of improved agricultural practices, to achieve water quality targets Adoption of new practices through grants program, and benchmarking of industry-wide practices.
Purpose of monitoring/reporting	Annual reporting against bilateral policy (Reef Water Quality Protection Plan) targets for adoption of practices and achievement of water quality targets
What is monitored and modelled?	Benchmarking of current practice in cane and grazing (?) Adoption of new practices through grants program Trials and monitoring of effectiveness of practices at plot/paddock scale Modelling of water quality and economics of alternative practices at paddock scale
What assessment methods are used?	Comparison of adoption rates against benchmark data 200and Reef Plan targets Agricultural practices are classified on ABCD framework (modified by region x industry) A= cutting edge practices B = established good practices, 'best practice' C = common practices 'code of practice' D = superceded, unacceptable practices Frameworks have been developed for suites of practices e.g. water management, nutrient management, by industry by region. Various data sources e.g. surveys, and expert synthesis steps are employed to derive regional and GBR wide estimates of adoption rates.
What is reported?	Regional land use (%) For grazing - #, % and area of graziers using different ABCD practices For cane and other intensive industries - #, %, area & % areas of growers using ABCD practices, reported by nutrient/soil/pesticide and aggregate
Feedback loops	Paddock to Reef program results feed back into program delivery e.g. metrics for grants program, as well as policy review. Reporting program is also under development.
Relevance to Fitzroy report card	Reporting of ABCD management practice adoption should be readily transferrable to Fitzroy Partnership report card

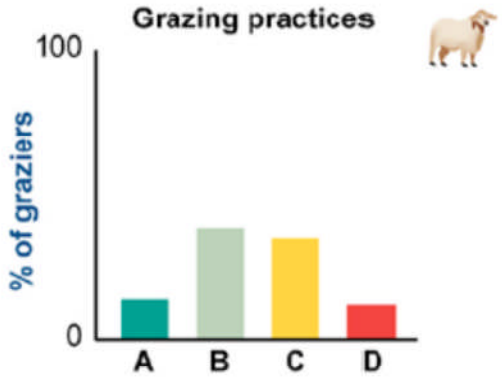


Figure 10.4 – Adoption of improved grazing management practices using the ABCD management framework for the Fitzroy region.

Table 10.1 – ABCD grazing management practices for the Fitzroy region.

Fitzroy	A practices	B practices	C practices	D practices
Number of graziers	496	1385	1266	444
% of graziers	14%	39%	35%	12%
Area (km²)	16,986	47,441	43,358	15,215

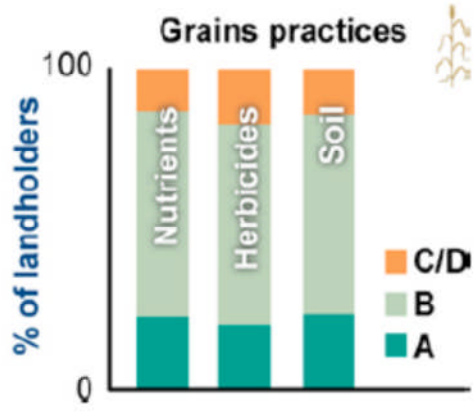


Figure 10.6 – Adoption of improved management practices for grains using the ABCD management framework for the Fitzroy region.

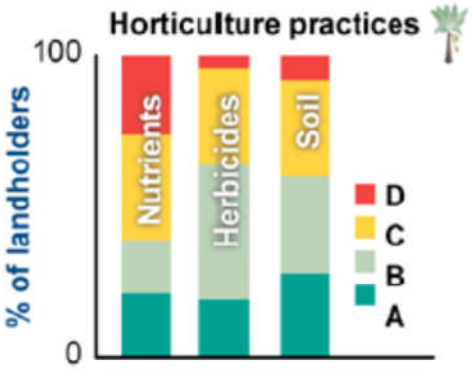


Figure 10.5 – Adoption of improved management practices for horticulture using the ABCD management framework for the Fitzroy region.

Table 10.2 – ABCD horticulture management practices for the Fitzroy region (Source: modified from Wallace S, 2010).

Combined management	A cutting-edge	B best practice	C code practice	D unacceptable practice
Number of horticulture growers	24	33	35	14
% of horticulture growers	23%	31%	33%	13%
Area (km²)	16	17	18	7
% of area	27%	29%	32%	12%
Nutrient management	**A cutting-edge**	**B best practice**	**C code practice**	**D unacceptable practice**
Number of horticulture growers	22	19	38	27
% of horticulture growers	21%	18%	35%	26%
Area (km²)	15	12	18	13
% of area	26%	20%	32%	22%
Herbicide management	**A cutting-edge**	**B best practice**	**C code practice**	**D unacceptable practice**
Number of horticulture growers	20	48	33	4
% of horticulture growers	19%	45%	32%	4%
Area (km²)	17	23	17	1
% of area	30%	39%	30%	1%
Soil management	**A cutting-edge**	**B best practice**	**C code practice**	**D unacceptable practice**
Number of horticulture growers	31	33	33	9
% of horticulture growers	28%	32%	32%	8%
Area (km²)	15	16	20	7
% of area	26%	28%	34%	12%

Figure 2 Excerpts from the Reef Plan baseline technical report 2009: land practice results for the Fitzroy region

SEQ EHMP report card (2010 review recommendations)

Source of information	(BMT WBM, 2010)
Web address	http://www.healthywaterways.org/EcosystemHealthMonitoringProgram/EHMPReview.aspx
Context (scale, timing, frequency, audience, sectors)	Well-established benchmark for regional ecosystem health reporting (established 2000). Annual public reports. Currently the program has 3 components – freshwater, estuarine/marine and event-based.
Review recommendations	A recent independent review (BMT WBM, 2010) recommended an expanded framework with a number of new programs including 'management measures' and 'drivers and pressures' monitoring and reporting. Management measures: The review recommended a case-study approach that would monitor and evaluate management interventions. The objectives would be • To collate, interpret, analyse and provide information to partners about the effectiveness of various management interventions and measures • To explain how the environmental indicators of ecosystem health respond to these measures • To extrapolate the results of local project evaluations and case studies to a broader spatial scale. Drivers and pressures monitoring program: This component would collect information about key drivers (natural and anthropogenic) such as climate and rainfall patters and pressures such as changes in land use, urbanisation and vegetation clearance. The program would support the interpretation of EHMP data and help prioritise future management actions. The review notes that no organisation is systematically collecting information about management actions and drivers and pressures. Where information is available it is not current, usually lagged by several years e.g. QLUMP, SLATs.
Relevance to Fitzroy report card	The review recommendations suggest an alternative way to address management measures (stewardship). The attractiveness of this approach is that it is closely aligned to supporting partners improve their practices. It is less aligned with the objective of informing the public about the performance of different sectors.

Source of information	(Gippsland Integrated Natural Resources Forum, 2011a, 2011b, 2011c)
Web address	http://www.ginrf.org.au/reportcard/list.asp?_PAGE=1&_SORT=EventDate%20DESC
Context (scale, timing, frequency, audience, sectors)	Regional reporting, biannual, commenced 2003, all sectors
How is 'stewardship' interpreted/framed	Report is based on MERGe framework developed by SKM in 2004. The report card underwent a major review in 2009. Stewardship is defined as "the careful and responsible management of the natural asset by a range of government, industry and community stakeholders entrusted with its care".
Purpose of monitoring/reporting	The primary function of the GINRF Natural Resources Report Card is a communication and engagement tool. The subjectivity inherent in the evaluation of the available data is considered relevant and valid in the context of its purpose. The individual CMAs produce more detail catchment condition reports based on empirical data.
What is monitored and modelled?	Uses existing information.
What assessment methods are used?	Agencies with a direct asset management role contribute information pertaining to specific assets. Respondents are asked to rate each of the components of condition, namely land, water and biodiversity, on a scale from excellent to degraded. Similarly, respondents are asked to rate stewardship components on a scale from excellent to lacking. The 6 stewardship components are equally rated: planning, implementation, evaluation, improvement, partnerships and indigenous engagement. In 2011 there were 58 individual survey responses received from across 23 organisations (a significant increase). Respondents are asked to justify these ratings, providing information on the predominant issues influencing that rating and the source or evidence they based their rating on. Interviews were also conducted. Information provided by the contributing agencies is compared to other submissions pertaining to the same asset, evaluated and scored between 0 and 5. The average score determines the overall stewardship rating, a score between one and five stars. This process is represented in the figure overleaf. Agencies are given the opportunity to review the reasoning and proposed ratings (workshop forum). A small independent science panel reviews, discusses and has final say over the ratings and justifications. The sum of the six stewardship component scores is translated to a star rating. ***** Excellent Stewardship components fully integrated; strong, positive impact on asset condition. **** Good Stewardship components occur; positive impact on asset condition. *** Reasonable Most stewardship components occur; some impact on asset condition. ** Poor Some stewardship components occur; limited impact on asset condition. * Lacking Stewardship components scarcely or not evident.

What is reported?	Condition and stewardship metrics against 16 assets (2 page brochure) Companion report provides detail on each asset, individual scores and justifications, and comments on changes in scores over time. Asset Report provides more detail on each asset. (scores, history of scores, explanatory comments) Nb. assets are iconic local resources, including water, forests, agricultural, mining and indigenous landscapes.
Feedback loops	Primary function of the report is seen as a communication and engagement tool. It aims to be 'an independent and informed, subjective evaluation of available information.'
Relevance to Fitzroy report card	Provides a potential methodology for a subjective assessment of 'stewardship'. However, the stewardship measures do not directly reflect practices or performance.

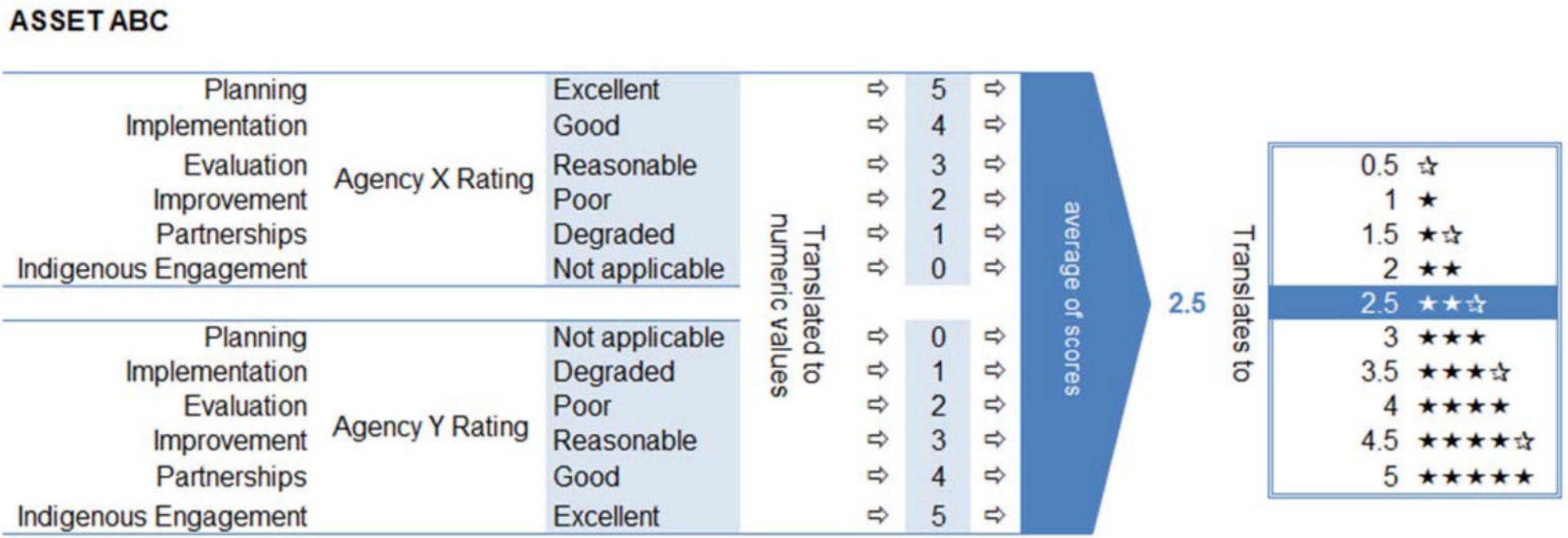
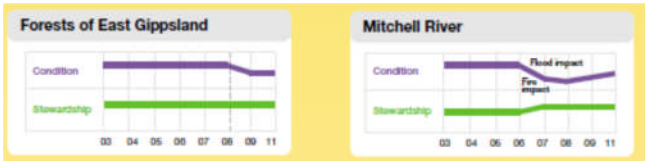
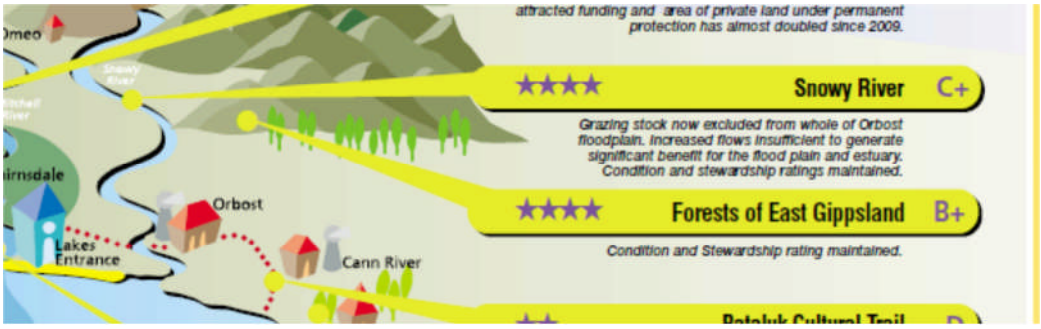


Figure 3. GINF stewardship reporting assessment process





Stewardship Summary

Component	Score	Key Evidence
Planning	Good (4)	The Gippsland Region Sustainable Water Strategy Draft was published in September 2010. This informs water resource allocation planning and on-ground works. The Coastal and Marine Assets Framework whereby Gippsland coasts will be divided into assets and their values and threats identified, is nearing completion (Gippsland Coastal Board, 2011). Environmental Significance planning controls such as zoning and overlays on lake foreshores prevent inappropriate development. East Gippsland Shire administers an Inundation Plan pertaining to townships on the Gippsland Lakes and the East Gippsland Environmental Sustainability Strategy. Urban Design Framework. Coastal Action Plans.
Implementation	Reasonable – Good (3.5)	Actions from the Gippsland Region Sustainable Water Strategy will include limiting water extraction from inflowing rivers. Enforcement of infringements by the public was cited as challenging. East Gippsland Shire administer a Structure Plan for Lakes Entrance which is enforceable on private land.
Evaluation	Reasonable (3)	Gippsland Lakes and Catchment Taskforce Report Card 2011. Integrated Planning Boating and Gippsland Lakes Coastal Action Plans are under review. Wellington Shire funds groundwater monitoring to assess wetland health and salinity. DSE undertaking evaluation of climate change impact to the Lakes and coast; CMA assessing Extreme Flood Levels to assist in future planning.
Improvement	Reasonable (3)	Coastal Action Plans will be updated with reference to monitoring data and experience since their initial implementation.
Partnerships	Good (4)	Use of consultants in program delivery was cited as being a successful way of taking away the bureaucratic flag' and improving uptake of initiatives. A general lack of cohesion between agencies was, however, highlighted.
Indigenous Engagement	Poor (2)	Gunai Kurnai Indigenous Land Use Agreement. Wellington Shire reported a lack of systematic indigenous engagement outside statutory obligation.

Stewardship Comments and Specifics

Finalisation of the Gippsland Region Sustainable Water Strategy represents a jump in stewardship for this asset. Realisation of its recommended environmental flows and extraction limits on inflowing rivers will have flow on effects on the condition of the Gippsland Lakes.

There is a complex array of individual and partnering projects although a lack of cohesion between agencies was cited. Although individual components of stewardship were rated differently to 2009, the over stewardship rating of three and a half stars has been maintained.

Sciences Unit
http://epanote2.epa.vic.gov.au/EPA/publications.nsf/515bc2fde7bf93f44a2565b6001ee896/64e0b189afb26cdeca256e3c0002705f/$FILE/SR4.pdf.
Department of Sustainability and Environment
http://www.gippslandlakestaskforce.vic.gov.au/publications/monitoring/Gippsland_Lakes_seagrass_fish_survey_final_report_July2009.pdf
Gippsland Lakes and Catchment Taskforce
http://www.gippslandlakestaskforce.vic.gov.au/

Figure 4. Excerpts from the GINRF 2011 report card and asset cards.

State of the Estuarine Environment for the Burnett Mary 2008

Source of information	(BMRG, Moss, Scheltinga, & Tilden, 2008)
Web address	http://www.bmrg.org.au/information.php/2/106/350
Context (scale, timing, frequency, audience, sectors)	Once off, 2008 assessment of the 18 estuaries of the Burnett Mary NRM region. Public report. No specific sectors but various covered in pressure indicators.
How is 'stewardship' interpreted/framed	Method as per (Scheltinga & Moss, 2007). 13 stressors identified – each stressor has multiple associated pressure (threat/risk) and condition indicators.
Purpose of monitoring/reporting	Public reporting and to direct NRM investment – to identify and prioritise estuaries and stressors.
What is monitored and modelled?	Existing data used. Total of 49 pressures and 38 condition indicators. Example of pressure indicators for sediment are: 1: catchment land-use 2: % of catchment cleared 3: % length of river system with no riparian vegetation 4: number of point sources per km estuary 5: boating activity within the estuary 6: unsealed road density 7: % of catchment with intensive agriculture on steep slopes 8: % of catchment with less than 70% ground cover 9: dredging activity in river system 10: % difference between pre-European sediment load and current load
What assessment methods are used?	Each indicator assessed on a 5 point score, results aggregated (weighted scores) for overall, overall risk and overall condition, for each stressor and for each estuary overall.
What is reported?	Overall score and overall risk and overall condition, for each stressor in each estuary, and for each estuary. Confidence (high/med/low measure of data quality) and dependability (% of potential indicators available) Methodology also provides for vulnerability and management practice indicators although these were not assessed.
Feedback loops	n/a
Relevance to Fitzroy report card	Pressure indicators demonstrate one possible approach to assessing threats/risk. More akin to elements of the Fitzroy Partnership prediction sub-program than the stewardship program?

Derwent Estuary report card 2011

Source of information	(Tasmanian Government, 2011)
Web address	http://www.derwentestuary.org.au/report-cards/
Context (scale, timing, frequency, audience, sectors)	Derwent Water Quality Improvement Plan developed for heavy metals and nutrients in 2010. Annual public report card and more detailed 'state of the estuary' report every 5 years Major sources are sewage treatment plants, industrial effluent, urban stormwater and diffuse catchment sources.
How is 'stewardship' interpreted/framed	n/a
Purpose of monitoring/reporting	
What is monitored and modelled?	
What assessment methods are used?	Load estimates
What is reported?	In terms of stewardship, changes in major sectoral contributions are reported e.g. STP nutrient loads reduced 25%; paper mill reduced organic loads by 90%. A map shows water quality monitoring sites, STP discharges by volume, major industrial discharges and the location of new WSUD sites. Major 'good news' stories are also highlighted.
Feedback loops	
Relevance to Fitzroy report card	Limited. Focus is on point sources. As it is only the first report card, it's not clear how systematic the 'stewardship' monitoring and reporting will be.

Figure 5. Excerpts from the Derwent estuary report card 2011

Great Lakes report card 2011

Source of information	(Great Lakes Council, 2011)
Web address	http://www.greatlakes.nsw.gov.au/Environment/Plans_and_Strategies
Context (scale, timing, frequency, audience, sectors)	Annual public reporting of water quality parameters (chlorophyll and turbidity)
How is 'stewardship' interpreted/framed	Management actions are reported for each catchment.
Purpose of monitoring/reporting	
What is monitored and modelled?	reporting of NRM statistics
What assessment methods are used?	n/a
What is reported?	'Key stats' include ha of erosion control, wetlands protected, stream bank protected, native vegetation protected or enhanced, aquatic weeds treated and roadside stabilisation.
Feedback loops	
Relevance to Fitzroy report card	limited

Source of information	(NSW Government, 2011)
Web address	http://www.environment.nsw.gov.au/soc/stateofthecatchmentsreport.htm
Context (scale, timing, frequency, audience, sectors)	
How is 'stewardship' interpreted/framed	Management actions at state, regional and local level.
Purpose of monitoring/reporting	Public reporting
What is monitored and modelled?	n/a
What assessment methods are used?	Pressure metric include indicators (normalised) for cleared land, population, sediment input, nutrient input, freshwater flow, disturbed habitat, tidal flushing and fishing (and H/M/L confidence ratings). Management actions report at the state, regional and local levels. State level reporting lists policies, plans and legislation. Regional reporting describes NRM plans and implementation. Local reporting describes local government initiatives. No measure of performance is provided.
What is reported?	The Catchment reports provide information about natural resources and their management in each of 13 regions of NSW. It is complementary to the 'State of the Environment report. Estuary condition, pressures and management activity metrics are reported.
Feedback loops	n/a
Relevance to Fitzroy report card	Similar to the BMRG estuary report card.

Lake Eyre Basin (recommended program 2009)

Source of information	(Lake Eyre Basin Scientific Advisory Panel, 2008; Thoms, Capon, Price, & Watkins, 2009)
Web address	http://www.lebmf.gov.au/publications/index.html#reports
Context (scale, timing, frequency, audience, sectors)	Strategic assessments proposed every 5-10 years, with annual reporting of monitoring results
How is 'stewardship' interpreted/framed	Pressure indicators
Purpose of monitoring/reporting	To provide a context for major changes in land use and land management impacting the aquatic ecosystems.
What is monitored and modelled?	n/a
What assessment methods are used?	Recommended collation of government datasets
What is reported?	Recommended reporting at mid-term & 5 yearly reports
Feedback loops	
Relevance to Fitzroy report card	

Table 1. Pressure indicators recommended for Lake Eyre Basin (Thoms, et al., 2009)

Pressures	Impacting activities associated with the pressure	Indicator areas
Land use changes, especially those impacting on water use Irrigated agriculture Intensification of grazing Mining and petroleum extraction Road construction Earthworks to harvest water	Water extraction, water storage and diversion, construction of barriers across floodplain surfaces and within the channel network, damming, conversion of floodplain lakes to storages, floodplain harvesting, pumping from shallow groundwater, pumping from water holes	Development applications, Environmental Impact Assessments, water permits issued, updates of water management plans
Management of grazing lands	Increased grazing pressure, vegetation management	Vegetation cover, burnt areas
Tourism	Recreational visitors, localized fishing impacts	Number of visitors
Invasive species	Establishment/spread of exotic animal and plant species (on the floodplains)	Occurrence of Weeds of National Importance, exotic fish species
Climate Change	Changes in the amount and pattern of rainfall and the associated changes in river flows, intensity of storm events	National level conclusions on

Rouge River 2005 (Great Lakes, USA)

Source of information	(Rouge River Remedial Action Plan Advisory Council, 2005)
Web address	http://www.epa.gov/greatlakes/aoc/rougriv.html
Context (scale, timing, frequency, audience, sectors)	Two report cards have been produced – 1998 and 2005
How is 'stewardship' interpreted/framed	Focus is community engagement. Institutional partners in the 'river friendly' or 'community partner for clean streams' only require philanthropic investment in community-based programs.
Purpose of monitoring/reporting	Public accountability and stimulus
What is monitored and modelled?	18 indicators, a mix of water quality, ecological and management measures 1 & 2. Sewer overflows (number controlled/uncontrolled, river length free of uncontrolled sewer overflows) 3. Stormwater management (urbanisation, implementation of stormwater pollution prevention initiatives) 13. Public understanding and community stewardship (survey of public views, public education programs and attendance) 14.School-based environmental education (school curriculums, corporate and community support) 15. Recreational use and aesthetics (community clean-up efforts and fishing opportunities) 16. Restoration projects (stakeholder investment, restoration projects, public participation) 17. Local government leadership (meeting permit obligations, strategic partnerships, Bill 1432 legislation) 18. Business and institutional leadership (strategic partnerships, recognition of business initiatives, links with education)
What assessment methods are used?	Assessment looks largely qualitative. Losing ground, breaking even, making progress and insufficient data are the assessment categories.
What is reported?	Previous and current assessments, dot point comments
Feedback loops	
Relevance to Fitzroy report card	

Indicator #13: Public Understanding and Community Stewardship

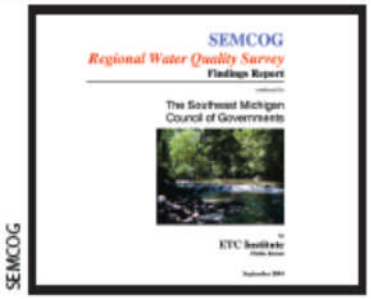
Many residents of the watershed believe the Rouge River is an important part of the community and the environment in which they live.

1999

2005

Primary Issues

- 2004 SEMCOG survey shows public wants a better river.
- Need to expand public education outreach programs.
- Attendance slowly gaining in environmental stewardship programs such as Rouge Rescue.



SEMCOG

Indicator #17: Local Government Leadership

Collaboration by watershed communities has demonstrated strong leadership by local government representatives.

1999

2005

Primary Issues

- Need a united effort to secure necessary funding to fulfill permit obligations.
- Recent formation of Assembly of Rouge Communities (ARC).
- The success in getting Bill 1432 legislation signed into law.

Bill 1432 - Watershed Alliance

Indicator #18: Business and Institutional Stewardship

Stewardship continues to grow within the Rouge River watershed by businesses and institutions.

1999

2005

Primary Issues

- Imperative to continue and expand partnerships.
- Need to better recognize significant role that businesses are contributing to improvements.
- Collaborative efforts between business and educational institutions have proven successful.

FOTR

FOTR Sponsor T-shirt

Figure 6 Excerpts from Rouge Report Card

Chesapeake Bay 2012

Source of information	(Chesapeake Bay Program, 2000)
Web address	http://www.chesapeakebay.net/ http://stat.chesapeakebay.net/?q=node/132
Context (scale, timing, frequency, audience, sectors)	The renewed Bay agreement (Chesapeake Bay Program, 2000) sets targets for ecological resources, habitat, water quality, land use, stewardship and community engagement. The stewardship and community engagement program includes actions on education and outreach, community engagement, government by example and partnerships. Key pressures are nutrients and sediments. The annual State of the Bay report describes progress in indicators of pollution, habitat and fisheries.
How is 'stewardship' interpreted/framed	Within the Chesapeake Bay program, stewardship is a component of the waterway improvement plans that are developed and implemented for each catchment. The purpose of stewardship is defined as 'To reconnect the public with nature and foster a shared ownership' 'To promote individual stewardship and assist individuals, community-based organizations, businesses, local governments and schools to undertake initiatives to achieve these goals and our shared vision' Within stewardship programs, funded actions relate to community engagement, public participation and educational initiatives (grants programs for adoption of improved agricultural practices are included, but not as part of the stewardship programs).
Purpose of monitoring/reporting	Public and partner accountability
What is monitored and modelled?	Partners self-report stewardship activities on a partnership register.
What assessment methods are used?	Assessed against targets
What is reported?	Progress against targets for public access, education and community action, and partner investment, are reported online annually.
Feedback loops	
Relevance to Fitzroy report card	

What progress has been made in fostering stewardship?

Public Access Education Community action

98%

The Bay Program public access goal is comprised of three measures: public access sites, Chesapeake Bay Gateways sites, and water trails. In 2010:

- Six public access sites were acquired, developed or enhanced (for a total of 767), 95 percent of the goal.
- Seven new Chesapeake Bay Gateways sites were added (for a total of 173), exceeding the goal.
- Water trails remained steady at 2,184 miles, exceeding the goal.

Overall, the Bay Program has achieved 98 percent of its public access goal.

Download Chart Download Data File Download Analysis & Methods

How much money is being spent on stewardship?

$13.6 million

was reported in the Chesapeake Registry for 2010 by the Bay Program partners.

Reported funding information is available for activities that foster stewardship in the following areas: watershed education, public access, place-based interpretation, citizen engagement, and other work to foster Chesapeake stewardship.

View more detailed funding information for stewardship.

Download Chart Download Data File

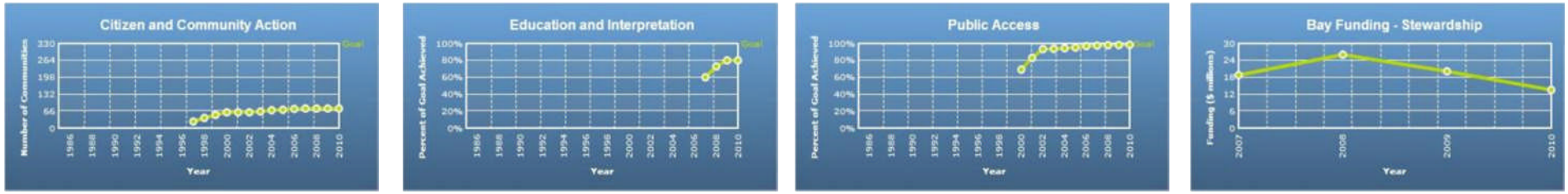


Figure 7 Extracts from Chesapeake State online reporting (http://stat.chesapeakebay.net/?q=node/132&quicktabs_14=0)

State of the James River 2012 (USA)

Source of information	(James River Association, 2011)
Web address	http://www.jrava.org/the-james-river/state-of-the-james/
Context (scale, timing, frequency, audience, sectors)	The James River is one of the catchments of Chesapeake Bay. Chesapeake catchments all have Water Improvement Plans to contribute to reductions in loads. Each reports waterway health, in different ways. A report card is produced every 2 years.
How is 'stewardship' interpreted/framed	Indicators of restoration and protection actions include: Pollution reduction in wastewater treatment Adoption of improved agricultural practices e.g. no-till, cover crops, stream protection Adoption of low impact urban development and management policies and practices e.g. e.g. land disturbance, impervious cover, stormwater mgt. Natural area conservation i.e. restoration of riparian buffers, public or private conservation easements.
Purpose of monitoring/reporting	Public accountability Promotion of conservation and stewardship
What is monitored and modelled?	The report card covers fish and wildlife, habitat, pollution, restoration and protection actions
What assessment methods are used?	Indicators are assessed against targets where they have been set e.g. total maximum daily loads, restoration targets. Progress against targets is scored, and averaged across indicators in each category to determine a grade.
What is reported?	Individual measures and progress against targets in total and over the reporting period e.g. 53% of the target
Feedback loops	
Relevance to Fitzroy report card	

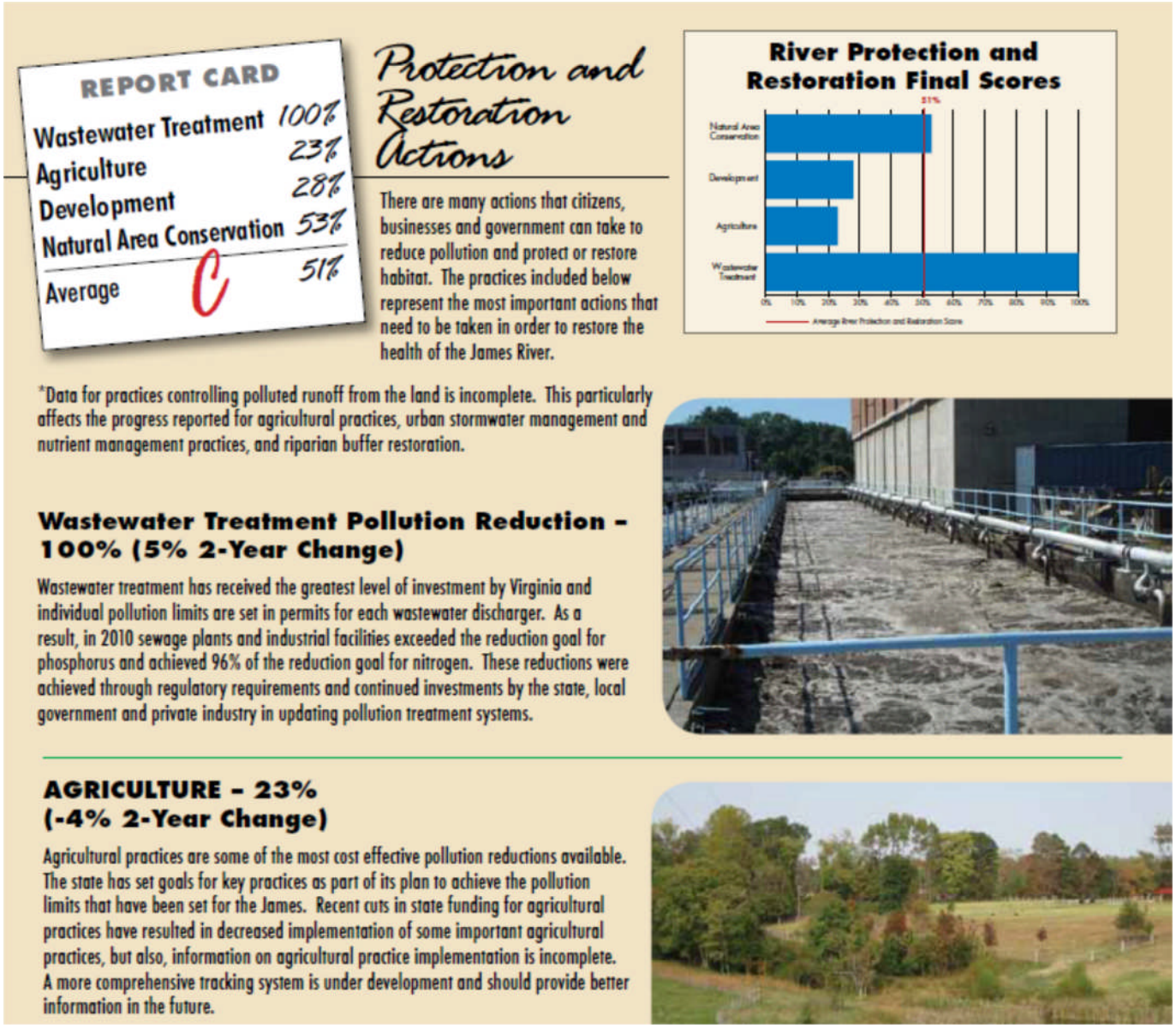


Figure 8. Excerpt from State of the James River 2011

San Francisco Bay 2012 (California, USA)

Source of information	(San Francisco Estuary Partnership, 2011)
Web address	http://www.bay.org/publications/%C2%ADecological-scorecards http://www.calwater.ca.gov/ http://deltacouncil.ca.gov/
Context (scale, timing, frequency, audience, sectors)	The Bay Health report card provides status and trend information on indicators for water, habitat, living resources, ecological processes and stewardship. Reports are produced periodically (2003, 2005, 2009 and 2011).The 2011 State of the Bay is c. 70 pages long.
How is 'stewardship' interpreted/framed	Humans, as part of the ecosystem, can act as stewards by taking individual and community actions that reduce adverse impacts on valued attributes of the Bay. Stewardship activities can include both volunteer efforts as well as the work of regulatory and management agencies or permitees—like cities and counties—pursuant to laws and regulations
Purpose of monitoring/reporting	Public accountability
What is monitored and modelled?	Pilot indicators for stewardship measures (considered 'pilot' indicators) include: Urban water use (total water use, population and residential water use) Recycled water use (recycled water production and substitution) Volunteer efforts (participation in annual coastal clean-up day) Public access (expansion of Bay kayaking trail and ridge hike/cycle trail) Bay Management (case study of regulatory changes for disposal of dredged material)
What assessment methods are used?	Status and trends, relevant goals are described as benchmarks.
What is reported?	Status and trend data are provided with an explanatory commentary
Feedback loops	
Relevance to Fitzroy report card	A different style of reporting – less report card, more state of environment, emphasis on trends rather than achievement of targets.

HEALTH INDICATOR

This indicator measures water used annually by urban users in Bay Area watersheds from 1986 to 2009. It also examines residential water use specifically as this use directly reflects decisions by individuals and families, whose choices to use water more efficiently in and around the home can collectively create large-scale benefits.

BENCHMARK

A recently adopted state law (The Water Conservation Act of 2009) establishes a goal of reducing urban per-capita water use by 20 percent by 2020 with an interim goal of a 10 percent per-capita reduction by 2015. The 2020 goal, interpreted by the California Department of Water Resources as 124 gallons per day per person in the Bay Area, is used to evaluate this indicator of stewardship activity in our region.

KEY RESULTS AND TRENDS

Total urban water use in the Bay Area is 20 percent less today than it was 25 years ago, a remarkable achievement given that the population has increased by 20 percent (Figure 26).

This accomplishment is primarily due to greater efficiency of use, combined more recently with a dampening of water demand due to the economic downturn. The increased efficiency has been achieved through mandates for more efficient water-using appliances, and by Bay Area residents and businesses reducing

Figure 26. Urban water use in the San Francisco Bay Area. Data from the regional water agencies (see Technical Appendix for details).

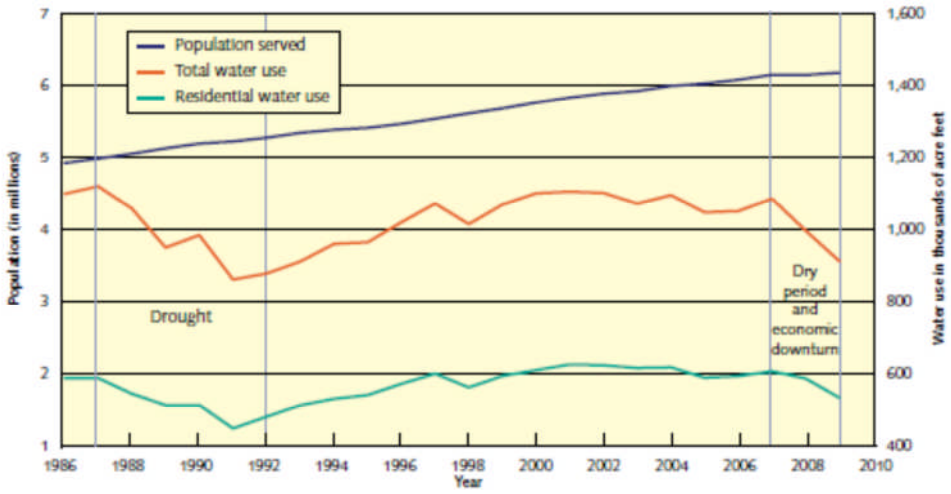
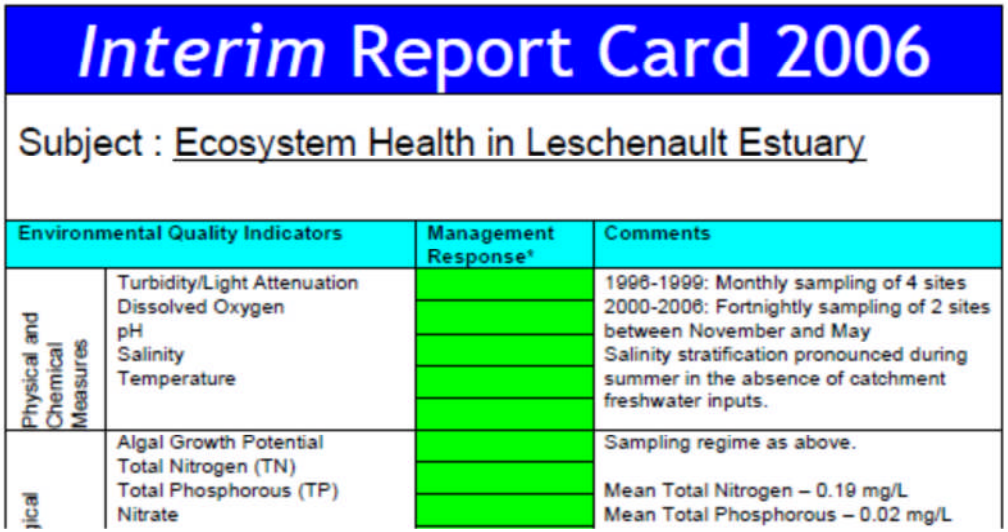


Figure 9. Excerpt from The State of San Francisco Bay 2011

Leschenault Interim report card 2006

Note a similar reporting format is adopted for the Cockburn Sound report cards

Source of information	(McKenna, 2007)
Web address	http://www.water.wa.gov.au/PublicationStore/first/76604.pdf
Context (scale, timing, frequency, audience, sectors)	A once-off report on the condition of the Leschenault estuary
How is 'stewardship' interpreted/framed	No specific stewardship responses., but g
Purpose of monitoring/reporting	
What is monitored and modelled?	
What assessment methods are used?	Rather than assessing water quality and estuary health indicators as ABCD or similar report card grades, findings are color coded for recommended management response. Categories of management response include: • continue monitoring (passes standard) • investigate • initiate response (fails standard) • research (to establish state or standard)
What is reported?	
Feedback loops	
Relevance to Fitzroy report card	Alternative way to present report card grades and draw links to management

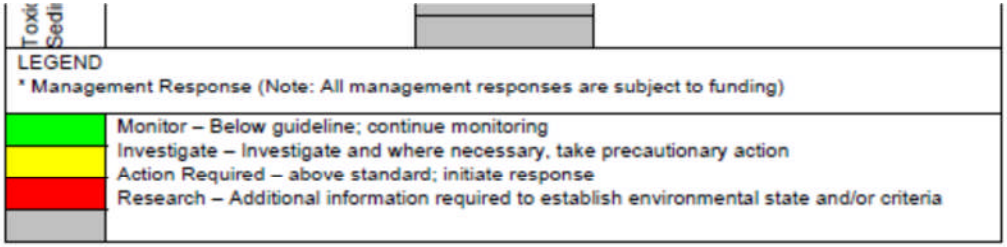


Interim Report Card 2006

Subject : Ecosystem Health in Leschenault Estuary

Environmental Quality Indicators		Management Response*	Comments
Physical and Chemical Measures	Turbidity/Light Attenuation		1996-1999: Monthly sampling of 4 sites 2000-2006: Fortnightly sampling of 2 sites between November and May Salinity stratification pronounced during summer in the absence of catchment freshwater inputs.
	Dissolved Oxygen		
	pH		
	Salinity		
	Temperature		
...jical	Algal Growth Potential		Sampling regime as above.
	Total Nitrogen (TN)		Mean Total Nitrogen – 0.19 mg/L
	Total Phosphorous (TP)		Mean Total Phosphorous – 0.02 mg/L
	Nitrate		

....



Toxi... Sedi...	
LEGEND * Management Response (Note: All management responses are subject to funding)	
	Monitor – Below guideline; continue monitoring
	Investigate – Investigate and where necessary, take precautionary action
	Action Required – above standard; initiate response
	Research – Additional information required to establish environmental state and/or criteria

Figure 10. Extracts from report on the condition of the Leschenault estuary 2006

Victorian River Health Report Card 2010

Source of information	(anon, 2010)
Web address	http://www.water.vic.gov.au/monitoring/river-health/report-card/river-health-report-card-2002-2009
Context (scale, timing, frequency, audience, sectors)	The Victorian River Health Program Report Card 2002 - 2009 tracks the Government's progress against targets set in the Victorian River Health Strategy and includes an overview from each Catchment Management Authorities and Melbourne Water.
How is 'stewardship' interpreted/framed	Case studies are presented e.g. artificial wetlands, community monitoring, riparian restoration
Purpose of monitoring/reporting	Public reporting of progress against river health targets
What is monitored and modelled?	
What assessment methods are used?	Progress is assessed against targets
What is reported?	Progress against 2011 targets set in the Victorian River Health Strategy (quantitative, with descriptions, and an overall progress rating e.g. on track, exceeded, ongoing, underway. Detailed descriptions of progress through 2006-2009 against each specific target area Regional overviews showing key achievements in each of the CMAs,
Feedback loops	
Relevance to Fitzroy report card	Presentation of case studies to highlight action taken on ground

Case study:
East Gippsland riparian restoration

Seven years after the launch of the long-term riparian restoration approach, outlined in the *Victorian River Health Strategy*, entire sub-catchments in East Gippsland have now undergone riparian restoration through fencing, revegetation and other complementary works.

These works are connecting forested catchments all the way through to their estuaries and these streams are now reaping the knock-on benefits such as improved bank stability and water quality.

The following are examples of key systems that are close to completion.

The lower Snowy River is 98 per cent fenced between the lower forested reach and estuary. This stock exclusion is complemented by 21 off stream watering points (to allow cattle access to water without damaging the river bank) and a 260 ha reach-scale riparian vegetation restoration program. (In addition, more than 240 pieces of large wood have been replaced in the river channel and estuary, to provide habitat for fish).

The lower Genoa and Bemm rivers are 90 per cent protected from forest to estuary. Stock exclusion works in the Genoa are complemented by extensive in-channel stability and sediment management works, including the placement of over 230 pieces of large wood and establishment of native vegetation.

Seventy five percent of the lower Nicholson River is now excluded from stock, with 60 per cent fully revegetated. Works are continuing to establish a stock free riparian zone connecting the mountain reaches with the Gippsland Lakes by 2013.

Two other systems are nearing completion: the Wonnangatta River above the Wongungarra River confluence (Mitchell River catchment), and the Thurra River (Far East Gippsland). Both are planned to have total stock exclusion by 2011.

The lower Genoa has had significant previous investment to establish wide riparian zones and re-establish instream vegetation. Works carried out through this program helped consolidate these gains, maintaining stock exclusion, and controlling invasive weeds. Photo source: Sean Phillipson, East Gippsland CMA.

Table 5: Attainment of SEPP environmental quality objectives*

	Upland Sites				Lowland Sites			
	Target: 95% of sites attain SEPP objective by 2011				Target: 60% of sites attain SEPP objective by 2011			
Parameter	**2005**		**2008**		**2005**		**2008**	
	No. of sites	Attainment %	No. of sites	Attainment %	No. of sites	Attainment %	No. of sites	Attainment %
Salinity (EC)	82	80	82	73	81	68	81	65
pH (25%)	56	86	56	88	63	95	63	95
pH (75%)	56	98	56	93	63	95	63	94
Turbidity	96	50	96	63	88	35	88	49
Total Phosphorus	77	52	77	58	77	23	77	30
Total Nitrogen	77	60	77	83	79	42	79	48
Biological**	191	76	177	69	213	23	173	18

Near 100% sites attained target | ≥80% sites attained target | <80% sites attained target

* Figures in Table 2 are based on water quality data collected in 2005–06 and 2007–08.
** All water quality comparisons are between paired sites, except for the biological data which is a comparison of an average from all available sites

2011 Targets	Status at 2009
4,800 km of rivers with improvement of one rating (using the Index of Stream Condition) in the measurement of riparian condition	Target: Achieved Since 2002, 7,066 km of riparian fencing and other works and protection measures improved the condition of 25,351 ha of high-priority river frontage. Note that most of this length will be fencing both sides of a stream. In addition, 469 km of bank stabilisation works were undertaken.
An increase of 7,000 ha of riparian areas under management agreements	Target: Exceeded (more than doubled) Since 2002, 6,473 management agreements were established, covering 17,434 ha of the 25,351 ha of high priority river frontage. Public land managed by public land managers does not require agreements.

Figure 11. Extracts from the Victorian River Health Report Card

Source of information	(Australian State of the Environment Committee, 2001)
Web address	http://www.environment.gov.au/soe/2011/report/approach/3-3-management-effectiveness.html#s3-3
Context (scale, timing, frequency, audience, sectors)	National State of the Environment, reported every 4 years
How is 'stewardship' interpreted/framed	Management responses are linked to trends in state and pressures in two ways. Patterns of improvement or declines trigger reactive management responses and those actions then contribute to changes in pressures and state over time. Management is also a significant contributor to the overall resilience of a system and directly affects the likelihood and consequences of environmental risks. Understanding effectiveness of past and current management responses is an essential part of understanding and improving the state of our environment. Management responses that are assessed in this report are those that relate to environmental issues at a national scale. The assessments attempt to account for the cumulative contributions, or gaps, across a wide range of jurisdictional and institutional boundaries.
Purpose of monitoring/reporting	
What is monitored and modelled?	
What assessment methods are used?	In each theme chapter, management responses are first identified and described, then assessed according to six elements of management: understanding, planning, inputs, processes, outputs and outcomes , based on (Hockings et al., 2006) See http://www.environment.gov.au/soe/2011/report/approach/3-3-management-effectiveness.html#box1-3
What is reported?	Results from assessments in each theme chapter are presented in a summary table that examines how management is addressing the pressures identified in the previous section of the chapter. Management effectiveness against pressures is graded on a scale of four levels of effectiveness (very effective, effective, partially effective, and ineffective) and a scale of three grades of trend over time (improving, stable, and deteriorating). Specific case studies are included throughout the chapters to illustrate important points, but are not presented as surrogates or indicators of how management programs are faring more broadly.
Feedback loops	
Relevance to Fitzroy report card	

Figure 12. Excerpts from State of the Environment 2011

Central West Catchment Management Authority (NSW) Dashboard report 2012

Source of information	(Davidson, 2007)
Web address	http://cw.cma.nsw.gov.au/Dashboards/NRM.html
Context (scale, timing, frequency, audience, sectors)	The dashboard report provides a snapshot of progress in delivering the Catchment Management Authority's Strategic Plan. A range of key performance indicators have been identified to show progress against the 3 year targets in the plan. Five dashboard reports are produced: * Customer and stakeholder * Financial * Internal processes * Natural resource management * Learning and growth
How is 'stewardship' interpreted/framed	Not directly
Purpose of monitoring/reporting	Update stakeholders on progress against the Catchment Authority's Strategic Plan
What is monitored and modelled?	Areas of NRM actions undertaken
What assessment methods are used?	Compared to 3 year targets
What is reported?	Performance measures and progress against 3 year targets
Feedback loops	
Relevance to Fitzroy report card	The NRM statistics presented are relevant to stewardship measures proposed in the Fitzroy. The report area (or length of stream) where NRM actions have been implemented e.g. vegetation restoration, weed control. These only report activities funded or coordinated through the CMA.

Central West CMA Dashboard report - June 2012
Natural Resource Management

NRM at a glance

- Area of wetland native vegetation enhanced/rehabilitated (ha)
- Area of terrestrial native vegetation enhanced/ rehabilitated (ha)
- Streambank length of riparian native vegetation planted to riparian native species (km)
- Area treated specifically for significant species or ecological community protection (ha)
- Area of pest plant control measures implemented (ha)
- Area of vertebrate pest animal control measures implemented (ha)
- Area of soil treatment for other than erosion or acid sulphate soils (ha)
- Area of land managed for sustainable grazing (ha)
- Length of instream habitat established (km)

Colour Legend (Actual vs Target)

- 100% or Greater
- 85% - 99%
- 84% or Less

NRM chart

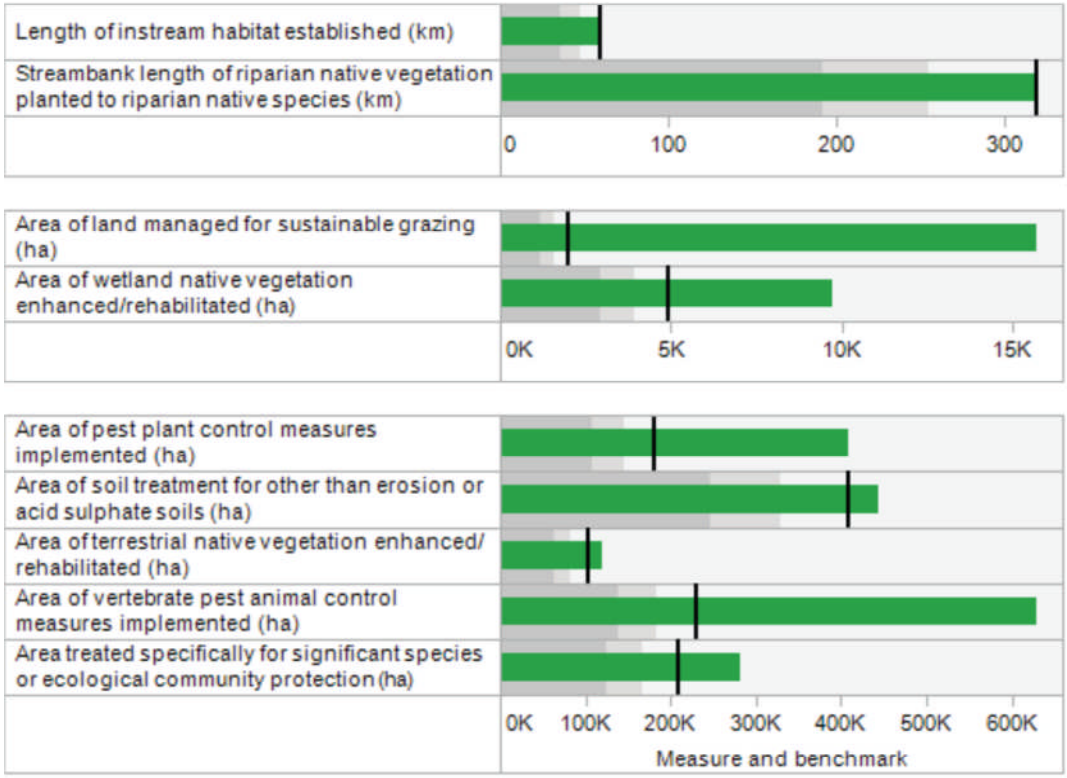


Chart Key
Black line = Benchmark
Colour bar = Actual

Figure 13. Excerpt from Central West CMA Dashboard report 2012

Waikato River (NZ)

Source of information	(Stuart, Berghuis, Long, & Mallen-Cooper, 2007)
Web address	http://www.mfe.govt.nz/publications/treaty/waikato-river-scoping-study/
Context (scale, timing, frequency, audience, sectors)	The Waikato River Trust is established to support restoration of the Waikato River. It is a co-management structure between crown and Maori interests. The work of the Trust and its report card seek to integrate Maori and western science.
How is 'stewardship' interpreted/framed	Incorporating Maori perspectives, river health and wellbeing includes people's economic, social, cultural and spiritual relationships with the river. Priority actions are recommended to restore the health of the river, including actions for holism, engagement, significant sites, access, spiritual values, recreation, aesthetics, human health, water quality, fisheries and kai, taonga species, ecological integrity and water supply.
Purpose of monitoring/reporting	The scoping study recommends a holistic report card approach that incorporates both Maori and western (including social) science. The purpose of the reporting card is to measure success, support adaptive management, provide accountability and engage communities.
What is monitored and modelled?	Proposed restoration indicators include social indicators (.e.g. attitude, knowledge and action) as well as environmental response indicators. Action indicators complement traditional 'state' indicators. Many action indicators reflect targets for on-ground changes. They are also proposed as surrogates for condition measures, which may be difficult to measure, responding to multiple drivers and pressures, and lagged in response. Both state and action indicators are proposed for river health (generally biophysical aspects) and wellbeing (can be social, cultural, spiritual or economic). A cultural health index is also proposed.
What assessment methods are used?	Indicators are assessed against targets and graded in a conventional A to E report card format for individual indicators and aggregated scores. .
What is reported?	Reporting formats have been proposed in the scoping study.
Feedback loops	
Relevance to Fitzroy report card	An innovative approach that incorporates a much wider understanding of river health and wellbeing. Many of the action indicators are equivalent to stewardship measures.

Appendix B. Industry-based programs reviewed

Reef Guardian Councils

Source of information	Website and discussions with GBRMPA staff
Web address	http://www.gbrmpa.gov.au/our-partners/reef-guardians
Outline	GBRMPA runs the reef guardians program to support voluntary, practical actions to improve the sustainability of the GBR marine park. The Reef Guardians program began with schools in 2003 (there are now over 285 schools involved). In 2007 the program was expanded to work with Local Governments (Reef Guardian Councils) and more recently with Reef Guardian Fisher and Reef Guardian Farmers and Graziers (in 2001). Reef Guardian Councils undertake environmental initiatives in the following areas: • Water management - waterways rehabilitation, water monitoring, urban stormwater treatment, wastewater and trade waste treatment • Waste management - waste avoidance, waste reuse and recycling • Land management - vegetation and pest management, resource assessment, erosion control, and land planning and management • Climate change - planning and policy, energy and resource efficiency, and community education • Community - education, capacity building and developing partnerships. There are currently 13 councils between Bundaberg and Cooktown in the Reef Guardian Councils program undertaking a range of projects. To become a Reef Guardian Council, councils must • draft and action plan (using a checklist) • send to GBRMPA for input and assessment • agreed all applicable actions with GBRMPA • formal sign off in council and agreement with GBRMPA • annual review
How is 'stewardship' interpreted/framed	
Monitoring/reporting	
Relevance to Fitzroy report card	

Reef Guardian Fishers

Source of information	
Web address	http://www.gbrmpa.gov.au/our-partners/reef-guardians
Outline	Reef Guardian Fishers operate in the Great Barrier Reef Marine Park and use practices that go beyond what is required by State and Federal laws. Participants in the program: • Set robust voluntary protocols for their operations • Develop innovative practices to minimise impacts on the environment • Share knowledge with other fishers and their communities. A key initiative of the Reef Guardian Fishers program is involving all participants in using an emissions calculator to measure carbon emissions and identify ways to more energy and cost efficient. Participants also report back to the Great Barrier Reef Marine Park Authority on the health of the marine environment. For example, coral damage, sightings of rare or unusual species. Currently the reef line fishery and commercial marine aquarium fish and coral collectors are included in the Reef Guardian Fishers program. The aim is to expand to other fisheries as the Reef Guardian Fishers program progresses. All Reef Guardian Fishers have agreed to a set of robust practices that meet the desired outcomes of the assessment standard. To protect the health of the Great Barrier Reef, Reef Guardian Fishers fish in the right zones and ensure fuel transfer procedures are followed to prevent fuel spills in the marine environment. Participants fish in ways to maximise the health of fish populations. They use non-stainless steel hooks that rust quickly allowing fish with retained hooks to recover quickly. Unwanted fish are released close to reefs so they can escape predators and return to their environment safely. These fishers have also agreed to participate in a range of additional projects such as: • Trialling electronic data collection devices that collect finer scale data on catch, effort and fishing locations • Trialling environmental monitoring forms that will allow fishers to report back to the Great Barrier Reef Marine Park Authority what they see happening on the Reef • Participating in the Coral Trout Tagging Program that will improve the understanding of coral trout growth and movement in normal and extreme weather conditions • Utilising an Emissions Calculator that tracks the fishers' energy use and calculates their carbon footprint. Reef Guardian Fishers are also working with the Great Barrier Reef Marine Park Authority to find ways to protect their operations and limit stress to the Reef in the case of extreme weather events (e.g. cyclones and floods) and climate change.
How is ‘stewardship’ interpreted/framed	
Monitoring/reporting	
Relevance to Fitzroy report card	

GBR aquarium industry

Source of information	(Donnelly, 2009)
Web address	http://www.provisionreef.org/
Outline	Provision Reef is the Australian aquarium supply industry association representing licensed operators in the Queensland Marine Aquarium Fish Fishery; the Queensland Coral Fishery; and the Coral Sea Fishery. The Pro-vision Reef Stewardship Action Plan is a statement of operational standards in the aquarium supply fisheries that are based in Queensland. It has been developed by industry with government support, and compliance is voluntary. A key part of the plan is contingency plans for climate change impacts e.g. coral bleaching. The Stewardship Action Plan will be complemented by an Environmental Management System that will identify environmental risk through all aspects of operation from frontline management and key enterprise personnel to skippers, vessel owners, deckhands and divers. The Environmental Management System will establish individual benchmarks that can be improved upon and measured The Stewardship Action Plan will also be complemented by an Aquarium Supply Diving Code of Practice that is specific to the aquarium supply industry.
How is 'stewardship' interpreted/framed	Those dependent on the collection of marine species are aware of their responsibility to create better practices. The aquarium supply industry on the Great Barrier Reef and in the Coral Sea is accountable for its impact and responsibility towards the ecosystem affected. While the industry is regulated under EPBC Act 1999, the Action Plan 'demonstrate their eagerness to take these environmental safeguards and set The ecological sustainability benchmarks even higher and proactively address a range of emerging issues, such as climate change, in a transparent and auditable manner.'
Monitoring/reporting	Fishing vessels monitor reef health using 'bleachwatch' templates and provide data to GBRMPA. The Action Plan includes responses to coral bleaching. The EMS and dive code have not been established yet.
Relevance to Fitzroy report card	

Water Stewardship Australia (WSA)

Source of information	(Alliance for Water Stewardship, 2012; anon, 2011b; Water Stewardship Australia Ltd, 2012)
Web address	http://www.waterstewardship.org.au/about.html http://www.allianceforwaterstewardship.org/ http://www.ewp.eu/ http://waterstewardship.org.au/wp-content/uploads/Tatura-Milk-Field-Trial-Final-Report.pdf
Outline	WSA is a membership-based non-profit organisation founded in 2011. The purpose of WSA is 'The protection and enhancement of the natural environment through the development, communication and promotion of water stewardship in Australia and the Asia Pacific region.' It has developed a draft Australian Water Stewardship standard (with input from a technical advisory group and stakeholder advisory group) which it is planning to trial in 2012. The structure of the draft standard is based on the ISO 14001 format. WSA is a member of the international Water Stewardship Alliance (WSA). Australian and European organisations are the most active members of WSA. The intention is to create a single, International Water Stewardship Standard, supplemented with appropriate guidance in how the Standard can be applied in different sectors and regions. The standard will offer certification, with third-party verification. The standard will align with the Global Reporting Initiative.
How is 'stewardship' interpreted/framed	Water stewardship is defined as: The responsible use of fresh water in a way that is both socially beneficial and environmentally sustainable, including: (a) water use that is environmentally sustainable in that it maintains and improves biodiversity and ecological processes at the watershed level; (b) water use that is socially beneficial in that it recognises basic human needs and ensures long-term benefits (including economic benefits) for local people and society at large; and (c) water use that is economically sustainable in that is minimises corporate risk while ensuring that water is available for a multitude of economic benefits and uses over the long-term. Water stewardship standards are defined at the site level with the aim to achieve sustainable water use at the catchment level. The evolving draft standard focuses on four key elements to deliver catchment sustainability: o the water flow regime o water quality o water governance o habitat A key feature of the standard is that it attempts to reconcile catchment and enterprise outcomes in one standard. The first draft AWS Standard is designed around a series of steps, which are listed below: 1. Make a leadership commitment

	2. Measure the site's water use 3. Measure the use of water in the defined area of influence 4. Measure the current status of water in the defined area of influence 5. Measure the impacts and risks of the site's water use in the defined area of influence 6. Measure and manage the site's indirect water use 7. Develop plans for rare incidents 8. Develop and internally disseminate a water robust stewardship plan or policy 9. Remain in legal compliance and respect water rights. 10. Improve your water impacts at the site and beyond within the defined area of influence 11. Develop and maintain the necessary capacity to undertake water stewardship 12. Disclose your water stewardship plans, actions and results Additional levels of certification (gold, platinum) are proposed for watershed action and supply chain actions.
Monitoring/reporting	Not yet established. A recent pilot tested the WSA framework with a dairy operation and its suppliers in Victoria (Water Stewardship Australia Ltd, 2012). A number of recommendations are made in the final report.
Relevance to Fitzroy report card	Potential synergies / collaboration in the future – Fitzroy Partnership as a regional pilot of Australian Water Stewardship?

CSG national harmonised regulatory framework

Source of information	(Strahan & Hoffman, 2009)
Web address	http://www.scer.gov.au/workstreams/land-access/coal-seam-gas/
Context (scale, timing, frequency, audience, sectors)	The National Harmonised Regulatory Framework is a guidance and reference tool for Australian federal, state and territory government regulators of the Coal Seam Gas (CSG) industry. Its purpose is to provide a suite of national and global leading practices to consider and implement in the assessment and ongoing regulation of proposed CSG projects. The framework is due to be finalised mid-2013.
How is 'stewardship' interpreted/framed	The framework provides guidance on good practice for government regulators and industry. The framework addresses four areas: well integrity, water management and monitoring, hydraulic fracturing and chemical use. 18 leading practices have been identified – but many of these relate to regulatory processes rather than site management e.g.
Purpose of monitoring/reporting	
What is monitored and modelled?	No monitoring, assessment or reporting is currently proposed.
What assessment methods are used?	
What is reported?	
Feedback loops	
Relevance to Fitzroy report card	

Source of information	(Star, Donaghy, & Rolfe, 2011)
Web address	http://www.minerals.org.au/focus/sustainable_development/enduring_value http://www.minerals.org.au/focus/sustainable_development/water_accounting
Context (scale, timing, frequency, audience, sectors)	The Leading Practice Sustainable Development Program is managed by a Steering Committee chaired by the Australian Government Department of Industry, Tourism and Resources. The 14 themes in the program were developed by working groups of government, industry, research, academic and community representatives. Each theme provides guidance statements on the operation of each principle endorsed by the International Council on Mining and Minerals. These statements are intended as a guide to resource managers in meeting community expectations and achieving a social licence to operate. The statements do not prescribe site-based management practices. The guidance statements are accompanied by good practice case studies. The Water Accounting Framework has been developed with SMI at UQ to provide a consistent approach to water accounting in the minerals industry.
How is 'stewardship' interpreted/framed	Stewardship involves the care and management of a commodity through its life cycle. This can cover the exploration, mining, processing, refining, fabricating, use, recovery, recycling and disposal of a mineral product. Stewardship needs to be an integrated program of actions aimed at ensuring that all materials, processes, goods and services are managed throughout the life cycle in a socially and environmentally responsible manner.
Purpose of monitoring/reporting	Guidance material only, no monitoring, assessment or reporting.
What is monitored and modelled?	
What assessment methods are used?	
What is reported?	
Feedback loops	
Relevance to Fitzroy report card	

Agricultural industry's Best Management Practices

Source of information	See websites below
Web address	https://www.bmpgrazing.com.au/About.aspx http://www.canegrowers.com.au/page/Growers_Toolkit/smartcane/About_BMP__SmartCane/ https://www.grainsbmp.com.au/home.aspx http://www.daff.qld.gov.au/26_3444.htm
Context (scale, timing, frequency, audience, sectors)	Leading agricultural industries have developed 'best management practices'. These are generally voluntary programs developed by industry bodies to support growers achieving better profitability, productivity and sustainability. The history and focus of the different BMP programs varies across industries. The grazing BMP is currently being developed; others are at a more mature stage. Typically the program involves a grower working through a farm planning exercise on their own or with extension officers, assessing their performance against industry standards and identifying areas for improvement. In the Great Barrier Reef, NRM groups have worked with industry to develop modules/frameworks that consider water quality risks more explicitly. In some industries these have been formally incorporated into the industry BMP. This application is further described in this document under Great Barrier Reef reporting.
How is 'stewardship' interpreted/framed	
Purpose of monitoring/reporting	Refer to Great Barrier Reef reporting in this document.
What is monitored and modelled?	Refer to Great Barrier Reef reporting in this document.
What assessment methods are used?	Refer to Great Barrier Reef reporting in this document.
What is reported?	Refer to Great Barrier Reef reporting in this document.
Feedback loops	
Relevance to Fitzroy report card	

References

Alliance for Water Stewardship. (2012). The AWS International Water Stewardship Standard. First Draft for stakeholder input. Version 03.13.2012: Alliance for Water Stewardship.

anon. (2010). Securing our rivers for future generations. Victorian River Health Program Report Card 2002-2009. Melbourne: Victorian Government.

Anon. (2011a). Partnership Monitoring Program Design. Version 8.1. Rockhampton: Fitzoy Partnership for River Health.

anon. (2011b). Water Stewardship Australia. Strategic Plan 2011-2013 draft 3. Melbourne: Water Stewardship Australia Ltd.

Australian State of the Environment Committee. (2001). *Australia state of the environment 2001*. Canberra: CSIRO Publishing.

BMRG, Moss, A., Scheltinga, D., & Tilden, J. (2008). State of the Estuarine Environment Report for the Burnett Mary NRM Region Bundaberg: Burnett Mary Regional Group for Natural Resource Management.

BMT WBM. (2010). EHMP Review Report. Brisbane: South East Queensland Healthy Waterways Partnership.

Chesapeake Bay Program. (2000). Chesapeake 2000: Chesapeake Bay Program.

Davidson, E. J. (2007). Editorial: unlearning some of our social scientist habits. *Journal of MultiDisciplinary Evaluation [online], 4*.

Davis-Walling, P., & Batterman, S. A. (1997). Environmental reporting by the Fortune 50 firms. *Environmental Management, 21*(6), 865-875.

Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management. The Academy of Management Review, 22*(1), 20-47.

Department of Industry Tourism and Resources. (2006). Stewardship *Leading practice sustainable development program for the mining industry*. Canberra. : Australian Government.

Department of Premier and Cabinet. (2011a). Fitzroy region. First Report Card 2009 Baseline. Reef Water Quality Protection Plan. . Brisbane: Department of Premier and Cabinet.

Department of Premier and Cabinet. (2011b). Great Barrier Reef. First Report Card 2009 Baseline. Reef Water Quality Protection Plan. Brisbane: Department of Premier and Cabinet.

Department of Premier and Cabinet. (2011c). Reef Water Quality Protection Plan. First Report 2009 Baseline. Brisbane: Queensland Government.

Department of Sustainability and Environment. Land stewardship. Ecosystem Services through Land Stewardship Practices. Issues and Options. Melbourne: Department of Sustainability and Environment,.

Donnelly, R. (2009). Stewardship Action Plan. Cairns: Pro-vision Reef.

Gippsland Integrated Natural Resources Forum. (2011a). Natural Resource Asset Cards. Traralgon: Gippsland Integrated Natural Resources Forum, .

Gippsland Integrated Natural Resources Forum. (2011b). Natural Resources Report Card 2011. Traralgon: Gippsland Integrated Natural Resources Forum.

Gippsland Integrated Natural Resources Forum. (2011c). Natural Resources Report Card 2011 Companion Document. Traralgon: Gippsland Integrated Natural Resources Forum.

Great Lakes Council. (2011). Waterway and catchment report card for Wallis, Smiths and Myall Lakes. Forster: Great Lakes Council.

Hockings, M., Stolton, S., Leverington, F., Dudley, N., Courrau, J., & Valentine, P. (2006). Evaluating effectiveness: A framework for assessing management effectiveness of protected areas, Gland. *Switzerland: IUCN*.

James River Association. (2011). State of the James River. Richmond, VA: James River Association.

Lake Eyre Basin Scientific Advisory Panel. (2008). State of the Basin 2008: Rivers Assessment. Canberra: Department of Environment, Water, Heritage and the Arts.
McKenna, M. (2007). The Leschenault Estuarine System, South-Western Australia. Condition statement and recommendations for management. Bunbury: WA Department of Water.
Natural England. (2013). Entry Level Stewardship. Enviornmental Stewardship Handbook. London: Natural England.
NSW Government. (2011). State of the catchments 2010. Estuaries and coastal lakes. Hunter-Central Rivers region. Sydney: Department of Environment and Heritage.
O'Connell, V. (2007). Reflections on stewardship reporting. *Accounting Horizons, 21*, 215.
O'Dwyer, B., & Owen, D. L. (2005). Assurance statement practice in environmental, social and sustainability reporting: a critical evaluation. *The British Accounting Review, 37*(2), 205-229.
Rouge River Remedial Action Plan Advisory Council. (2005). Rouge River Report Card. December 2005: Rouge River Remedial Action Plan Advisory Council.
San Francisco Estuary Partnership. (2011). The State of San Francisco Bay 2011. Oakland, CA: San Francisco Estuary Partnership.
Scheltinga, D. M., & Moss, A. (2007). A framework for assessing the health of coastal waters: a trial of the national set of estuarine, coastal and marine indicators in Queensland. *National Land and Water Resources Audit, Canberra, Australia*.
Star, M., Donaghy, P., & Rolfe, J. (2011). Economically viable land regeneration in Central Queensland and improved water quality outcomes for the Great Barrier Reef. *The Rangeland Journal, 33*(3), 267-276. doi: http://dx.doi.org/10.1071/RJ10005
Strahan, R., & Hoffman, A. (2009). Estimating the economic implications for broad acre cropping farms in the Fitzroy Basin catchments of adoption of best management practices. *Department of Employment, Economic Development and Innovation, The State of Queensland*.
Stuart, I. G., Berghuis, A. P., Long, P. E., & Mallen-Cooper, M. (2007). Do fish locks have potential in tropical rivers? *River Research and Applications, 23*(3), 269-286.
Tasmanian Government. (2011). State of the Derwent. Year 2011 report card. Hobart: Tasmanian Government.
Thoms, M., Capon, S., Price, R., & Watkins, D. (2009). Lake Eyre Basin Rivers Assessment Implementation Plan Project. Milestone 2 Report: Proposed LEB Rivers Assessment Methodology. Revised December 2009. Canberra: Kiri-ganai research. .
Water Stewardship Australia Ltd. (2012). Field Trial of the Australian Water Stewardship Standard (Version 2) with the Dairy Industry in the Goulburn Broken Catchment. Final Report. Melbourne: Water Stewardship Australia Ltd.