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# Monitoring, evaluation, reporting and improvement (MERI) as an integrated assessment tool:

## Improving socio-economic and biophysical outcomes from investment decisions in natural resource management (NRM)

WORKING PAPER 5



Robert Gale and Nick Milham  
Industry & Investment NSW

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## **Abstract**

The New South Wales' Catchment Management Authorities (CMAs) apply the Australian Government's Monitoring, Evaluation, Reporting and Improvement (MERI) framework to Natural Resource Management as well as the States own Monitoring, Evaluation and Reporting (MER) Strategy. A public policy 'philosophy' of stakeholder engagement in NRM investments is emerging as part of a strategy to address market failure in NRM practices. A key component of this 'philosophy' is that to improve biophysical resource conditions, investment decisions should have a socio-economic dimension. The MERI Framework, for example, focuses on both the means and the ends of investment noting that the 'ends' involve investing in biophysical outcomes, whereas the means to achieve biophysical outcomes are based on investment in social, institutional and economic outcomes. Drawing on a pilot study at a NSW CMA, we make the case that there is a role for socio-economic MER/MERI as an integrated assessment tool that can be applied at the regional and local level to reduce the need for government intervention in improving NRM practices.

**Keywords:** Integrated assessment; market failure; private investment behaviour; community stakeholder engagement; economic sustainability; social well-being; biophysical targets.

## **1. Introduction**

The State Government of New South Wales, Australia, is implementing a natural resource management (NRM) strategy at the catchment level through various departments and Catchment Management Authorities (CMAs) in which eleven biophysical targets are linked to indicators of resource conditions. There are two additional "community" targets, one on economic sustainability and social well being and the other on capacity building. Our aim in this paper is to consider the biophysical indicators from community stakeholder engagement and market failure perspectives. We investigate how information on these issues could become part of a more robust analysis of alternative investments in the biophysical targets and their impact on economic sustainability and social well being in each catchment. A pre-requisite for CMAs is that methods for obtaining information must be relatively low-cost, quick and repeatable. Specific details concerning an actual consultation process for community stakeholder engagement and the degree to which it captured a comprehensive assessment of the community are provided in the larger project report from which this account is largely drawn (Gale, Thomason, and Milham 2009a). These details were explained in a conference report that will be published in a future paper (Gale and Milham 2009).

## **2. Natural Resource Management in Catchment Management Authorities**

Recent institutional reforms in natural resource management in New South Wales involve regional delivery of NRM. These reforms include the creation of a Natural Resources Commission (NRC) in 2003 and thirteen Catchment Management Authorities in late 2004. The NRC developed the *Standard for Quality Natural Resource Management* (the *Standard*) as well as targets for natural resource management (Natural Resources Commission 2005). The *Standard* and targets have been adopted by the New South Wales Government in the *NSW State Plan* (NSW

Government 2009). Among the priorities in the *NSW State Plan* is “Better outcomes for native vegetation, biodiversity, land, rivers, and coastal waterways.” The government wants to work with local communities to target public and private investment in natural resources that have the greatest potential for improvement. Within the CMAs, Catchment Action Plans (CAP) set out the aim and aspirations for each target.

The eleven biophysical targets identified in the *NSW State Plan* include four targets for biodiversity, four targets for water, two targets for land and two targets for community (Table 1) (NSW Government 2009). Targets for cleaner air and progress on reducing greenhouse gas emissions fall into another category of priorities (NSW Government 2009).

### **2.1 Integrated assessment**

The literature on integrated assessment and decision-making in NRM includes legislation and frameworks for biophysical resource conditions such as biodiversity, water, land, and atmosphere including climate change (Bardsley 2006; de Groot et al. 2008). Integrated NRM has been defined as “A holistic, long-term approach to natural resource management that, while retaining the benefits and efficiencies of sectoral management and associated expertise, also brings together the considerations and expertise of all sectors” (Bardsley 2006). Bardsley (2006) states that “An integrated

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Table 1: Thirteen state-wide targets for natural resource management in New South Wales

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#### *Biodiversity*

1. By 2015 there is an increase in native vegetation extent and an improvement in native vegetation condition.
2. By 2015 there is an increase in the number of sustainable populations of a range of native fauna species.
3. By 2015 there is an increase in the recovery of threatened species, populations and ecological communities.
4. By 2015 there is a reduction in the impact of invasive species.

#### *Water*

5. By 2015 there is an improvement in the condition of riverine ecosystems.
6. By 2015 there is an improvement in the ability of groundwater systems to support groundwater dependent ecosystems and designated beneficial uses.
7. By 2015 there is no decline in the condition of marine waters and ecosystems.
8. By 2015 there is an improvement in the condition of important wetlands, and the extent of those wetlands is maintained.
9. By 2015 there is an improvement in the condition of estuaries and coastal lake ecosystems.

#### *Land*

10. By 2015 there is an improvement in soil condition.
11. By 2015 there is an increase in the area of land that is managed within its capability.

#### *Community*

12. Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being.
  13. There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management.
-

planning response will need to recognise that species and ecosystems require time, space and resilience to adjust effectively to change” (Bardsley 2006).

In Australian and State Government NRM agencies, efforts to overcome fragmented or disjointed investment and decision making in NRM have led to widespread interest in integrated assessment (Environment Australia 1999; National Land and Water Resources Audit (NLWRA) 2004; NSW Department of Environment and Conservation 2004). Although there are a wide variety of literature reviews on various aspects of integrated NRM, there is no universal agreement on which frameworks or procedures work the best (Oliver 2003; Kilpatrick 2003; Walker et al. 2006; Larson 2009; de Groot et al. 2008). For example, de Groot *et al* (2008:22) state that,

The importance of indicators (ecological, socio-cultural and economic) cannot be underestimated for integrated assessment. Whilst the value of indicators for adaptive management is recognised, there are few guidelines or case studies on how to identify and apply them.

Nevertheless, some points about indicators and frameworks are typically held in common, implicitly or explicitly. A common thread in much of the integrated assessment literature, particularly as it pertains to indicators, is the Pressure-State-Response framework or related frameworks. For example, De Groot *et al* (2008:22) apply,

...a DPSIR analysis for understanding the causal relationships between various policy issues. DPSIR is an acronym for Driving Forces (D), Pressures (P), State (S), Impacts (I) and Responses (R). It is used to understand the entire chain of an (environmental) issue or problem beginning with its real causes, identifying its effects and subsequently arriving at potential responses needed.

The P-S-R type frameworks are essential to indicator development and monitoring, evaluating and reporting and sit inside a broader philosophy of integrated NRM. In South Australia this philosophy is further guided by three themes: landscape scale (whole-of-system) approaches; genuine community engagement; and adaptive management. (Government of South Australia Department of Water 2006) These themes are part of a general recognition by the South Australian Government that,

A significant challenge to successfully achieving integrated NRM is securing adequate investment and commitment to engaging and building community ‘capacity’ – the community’s ability to understand the issues, engage in developing effective and efficient solutions and have the necessary social and economic resources and the motivation to take action.

## **2.2 MER and MERI**

The NSW NRM Monitoring, Evaluation and Reporting (MER) strategy was a State Government program from 2006 to 2009 which required agencies “to refocus the resources of NSW natural resource and environment agencies and coordinate their efforts with Catchment Management Authorities, Local Governments, landholders and other natural resource managers to establish a system of monitoring, evaluation and reporting on natural resource condition” (NSW Department of Environment and Climate Change 2006). The Strategy focused on various agencies with NRM

responsibilities and involved the monitoring of resource condition and performance in achieving the defined biophysical targets. Resource condition monitoring refers to understanding whether the overall health of the resource is changing and then assessing the effectiveness of remedial action in reversing any deteriorating trends. Performance monitoring requires information about the cause of an observed trend.

The thirteen NRM targets in NSW are split among various agencies, with each agency responsible for its own indicator development and implementation plan. The Department of Primary Industries (DPI) led the invasive species (T4), marine waters and ecosystems (T7) and socio-economic (T12) themes.<sup>1</sup> The MER Strategy involved programs and reports that included the three-yearly State of the Environment report and a new on-line series of State of the Catchment reports, as well as supporting technical and scientific papers.

At the Australian Government level, the Monitoring, Evaluation Reporting and Improvement (MERI) framework for NRM and the NSW MER Strategy differ in many respects. For the purposes of this paper, we note that the MERI Framework focuses more explicitly on both the means and the ends of NRM investment and that the 'ends' involve investing in biophysical outcomes, whereas the means to achieve biophysical outcomes are based on investment in social, institutional and economic outcomes. We take up this aspect of the definition in our discussion of the NSW State Target indicators for biophysical targets, by linking the resource condition indicators of biophysical targets to socio-economic considerations (Target 12) through community and CMA consultation processes and exploratory considerations of market failure concepts.

Community stakeholder engagement and market failure concepts are essential in considering the links between biophysical targets and the economic sustainability and social well-being (ESSW) of local and regional communities. In the study reported here, the socio-economic MER process involved community stakeholder engagement on the following biophysical and community targets:

- Target 4     Invasive species: 'By 2015 there is a reduction in the impact of invasive species'.
- Target 7     Marine waters and ecosystems: 'By 2015 there is no decline in the condition of marine waters and ecosystems'.
- Target 12    Community: 'Natural resource decisions contribute to improving or maintaining economic sustainability and social well-being'.

Challenges with indicator development and MER frameworks have been documented by (Reeve, Stayner, and Marshall 2007).

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<sup>1</sup> The Department of Primary Industries (DPI) was renamed Industry and Investment NSW (I&I NSW) in July 2009; the Department of Environment and Climate Change (DECC) was renamed the Department of Environment, Climate Change and Water (DECCW) at the same time. For the purposes of this paper, the original departmental names are retained.

### ***2.3 Community engagement: Linking biophysical targets to impacts on ESSW***

The paper describes experience in implementing an approach to integrating the above targets based on the following definitions of economic sustainability and social well-being (ESSW) (Vernon et al. 2009):

Economic Sustainability: ““A sustainable economy should preserve its capacity to generate income, which is made possible by maintaining natural capital’, and more specifically ‘that decisions about NRM affect (and are affected by) economic sustainability’ either ‘positively or negatively’”.

Social Well-Being: “Social well-being includes ‘both objective components (quantitative data) such as income and health and subjective data (qualitative data) such as how we feel about life because both of these influence well-being’ and more specifically there is a strong emphasis on ‘community engagement in NRM decisions’ including a participatory approach of consultation with the local community to identify and analyse aspects of ESSW themselves and ultimately ‘in validating the set of indicators that are selected’”.

We recognise that these definitions are not unproblematic. On the one hand, the quest is to investigate whether resource conditions and trends maintain (or enhance) natural capital and whether decisions about NRM are positive in this regard. Decisions about NRM refer to the CMA’s prioritisation of investments as well as to the mode of investment given that each CMA has a limited budget. On the other hand, the quest is also to validate the biophysical indicators selected through community engagement in NRM decisions and how stakeholders perceive investments in these indicators to affect their social and economic well-being. Although a specific measurement of success is not prescribed for ESSW because so many other factors have a bearing, it is still possible to benchmark the ESSW conditions and to gauge the pressures through a mix of stakeholder consultation processes and data from the Australian Bureau of Statistics (ABS) and other sources.

Details of the community engagement process are reported in Gale, Thomason and Milham (2009) and Gale and Milham (2009). Suffice it to note here that there is an emerging public policy “philosophy” of community stakeholder engagement in NRM investments as part of a strategy to address market failure in NRM practices. A key component of this “philosophy” is that to improve biophysical resource conditions, investment decisions should have a socio-economic dimension.

### ***2.4 Market failure: Linking biophysical targets to impacts on ESSW***

The rationale for public investment in NRM by government is that private firms and households may not undertake socially desirable levels of investment in marine waters and ecosystems through activities such as protecting coastlines, fisheries, water quality, and marine ecosystems because there is insufficient private economic incentive to do so. Also, the cost required to make a difference is beyond the capacity of most private firms and households.

Public investment by government in natural resource management needs to be tied to outcomes that are beneficial to society and would not have otherwise been delivered

through private activity. Governments expect various outcomes from their investment in natural resource management including better science, better decision making, a stronger economy, sustainable landscapes, biodiversity and more resilient communities now and into the future. While some investment decisions might be expected to bring monetary returns, improvements in economic sustainability and social well-being have also emerged as an important rationale. However, not all potential NRM investments are equally worthwhile or warrant public investment and governments have a critical role in making decisions about the allocation of resources, both in assessing whether there is a case for a particular investment and in prioritising between investments.

Understanding biophysical targets in the context of market failure will ultimately help guide agencies on how to use socio-economic information to better inform NRM priority setting and decision-making. Where a public policy objective is not being achieved because of a market failure, public agencies such as a CMA can play an important role in identifying the cause of the failure and in possibly providing a remedy. To this end, MER officers and senior staff at the CMA need to know if the indicators of a biophysical target involve any one of three market failure outcomes:

- i. there is little or no incentive to act privately;
- ii. the ability to act effectively privately is constrained; or,
- iii. decisions are poorly informed.

It is a principle of contemporary public policy in Australia that the best approach in addressing these market failure outcomes is one involving the least government intervention while at the same time achieving the objective sought. The spectrum of options thus includes information, education and training, financial assistance, self-regulation and direct government regulation.

While the potential impacts of public investment based on economic, social and environmental values are beyond the terms of reference of this project, the values provide an underpinning rationale and context for NSW Government investments. The potential impact of public investment also provides CMAs, which do not have regulatory powers in relation to many NRM issues, with an opportunity to strengthen their rationale for action or investment through a better understanding of how market failure concepts affect public investment (Pannell 2008).

To effectively address environmental degradation and other natural resource conditions typically requires understanding of the underlying causal factors that produce the condition. Frequently, these causal factors have socio-economic origins that fall outside the market economy and involve goods and services whose value cannot be directly determined by the market. A challenge for applying socio-economic analysis to NRM decision-making in CMAs is thus to identify the type of market failure at issue (public goods, 'externalities', information failure, etc) and to understand the scope for response that further strengthens the rationale for public investment in NRM and the setting of investment priorities.

Market failure concepts establish grounds for potential government intervention through public policy (Randall 1983; Bromley 1989; Daly and Farley 2004; Pannell

2008; Beare and Newby 2005) though the market failure approach is not without criticism (Bromley 2007; Zerbe and McKurdy 1999). Bromley (2007), for example, considers market failure as a metaphor which leads to a policy “lock-in”, that is, a form of path dependence that prevents the dynamic adjustments necessary for achieving sustainability. Zerbe and McKurdy (1999) argue that “market failure analysis leads to conclusions about the efficiency of government intervention that are not supported by empirical studies”. In their view, some “markets are inefficient not because of any inherent ‘failures’, but because the government has neglected to provide the appropriate institutional framework” (Zerbe and McKurdy 1999). They recommend the analysis of transaction costs as a better method to improve the policy process.

Our approach to market failure accounts for these criticisms because apart from when dealing with trade practice issues, we define market failure not in terms of economic efficiency but in terms of a failure to be efficient in meeting community goals in NRM investment. In other words, the preferences at the local level may be different than when aggregated at a larger scale. When defined in this way, identification of whether market failure actually exists and consideration of measures to address it if it does are directly focused on the effective achievement of policy outcomes at the catchment scale. Furthermore, the assessment of the impacts of biophysical resource conditions on ESSW includes the dynamic of a community stakeholder engagement process to determine desired NRM outcomes (ie policy objectives). Accordingly, application of the market failure framework not only assists CMAs to better understand the links between the indicators chosen for biophysical targets and the socio-economic information required for ESSW, but is also important pre-cursor information for community stakeholder consultations. Socio-economic information not only assists with understanding the relevance of a biophysical indicator to ESSW but ultimately in prioritising investments that address market failure criteria. The CMA, as a partner of influence in NRM decision making, thus has a key role in working with local government and other bodies to identify and address market failure issues in NRM and in particular those issues amenable to being addressed through incentive funding.

### **3. Analysis: Linking the target for marine waters and ecosystems to ESSW**

This paper reports on the experience of a pilot study in applying a low-cost, quick and repeatable consultative approach to linking Target 7 on marine waters and ecosystems of the Coffs Harbour Coast sub-catchment of the Northern Rivers CMA to ESSW impacts. The approach, which we call “socio-economic MER”, attempts to provide an integrated assessment of a given resource condition and its impacts on ESSW.

Four pre-determined indicators apply to the marines waters and ecosystems target, namely, the presence of rocky reef biota, the frequency of algal blooms, recreational water quality in metropolitan areas, and the extent of marine protected areas (MPA). Two of the resource condition indicators were considered for this target on the Coffs Harbour Coast: the extent of marine protected areas (more an indicator of a change in pressure than a condition indicator) and the frequency of algal blooms. Recreational water quality in metropolitan areas and rocky reef species were not considered in the pilot study. Recreational water quality is monitored through Beachwatch programs and is concerned with public health (sewage contamination and waterborne

pathogens). In the Coffs Harbour Coast area, however, no Beachwatch program was reported so this indicator could not be considered. The rocky reef species indicators were also not considered as data collection has only just started in this region.

The absence of a Beachwatch indicator led to consideration of the management of a pressure indicator (rather than a resource condition indicator). This led to the choice of wave impact, a pressure on resource condition, particularly dunes, for which there was active public interest. Comments on dune care were also sought from focus groups and CMA participants.

The pilot study involved an exploratory consideration of the biophysical indicators of marine waters and ecosystems through a consideration of market failure and community stakeholder engagement.

### 3.1.1 The impact of the extent of Marine Protected Areas on ESSW

The rationale for public investment in the Solitary Islands Marine Park is to restrict access for private benefit purposes that have negative environmental impacts so as to preserve a representative set of marine ecosystems and rebuild depleted fish stocks on the New South Wales coast. Additional rationales are to protect ecosystems. These rationales fall outside the jurisdiction of CMAs. However, it is evident that run off from adjacent land and estuaries have significant impacts on marine ecosystems, such that decisions in farming practices, land use, riverine care and so on can have substantial impacts on marine waters. This is a clear instance where CMA staff could consider market failure concepts, such as public goods, externalities and imperfect information and particularly the imposition of external costs on other users, as a routine part of their analysis and priority-setting process on NRM investment decisions.

The community views on the area of the marine park were generally positive. Participants thought that the broader community accepted the park, although there might be a grudging acceptance on the part of some commercial fishers. Other fishers were not convinced that the benefits of the Marine Park offset the economic cost of reduced fishing. So for these fishers there was the perception of a negative impact on business profitability. In contrast, however, the tourism industry generally cited the benefits of the marine park on economic sustainability. These tourism benefits were modest, but nevertheless important.

There was a moratorium on housing development in the Coffs Harbour Coast area until the local sewage system was upgraded with a deep-sea release. Water quality is considered a critical issue especially in estuarine areas. Much of this relates to erosion control during real estate development, ongoing stormwater management and sewage management. While the community reported that practices had improved the development continues, so there are still adverse impacts on receiving waters. While there is a consensus that improving and maintaining estuarine health is a major challenge for the future, no-one is confident of strong improvements in marine waters given the existing problems and ongoing development pressures. Concern about the recently established

Solitary Island Marine Park does, however, bring development pressures under more scrutiny.<sup>2</sup>

Three examples of CMA investment decisions addressing commercial fishing, Aboriginal fishing and tourism in the marine park were noted as benefits:

1. The investment in by-catch reduction devices for fishers in the area. This reduced the amount of discarded fish and hence led to less waste in commercial fishing and thus less waste disposal.
2. The restoration of Aboriginal fish traps. This was considered culturally significant.
3. The investment in moorings in the marine park. This helped prevent anchor damage from dive tour operators on rocky reefs.

### 3.2.2 The impact of the frequency of Algal blooms on ESSW

Algal blooms are not always a meaningful indicator of water quality: it depends on whether the algal bloom is produced naturally through an upwelling of nutrients in the ocean off the coast or human induced through nutrient runoff from coastal rivers discharging into the marine waters. This distinction, however, may not be important to visitors and tourists who might simply choose to leave an area considered to be unsightly. Hence, whatever its cause, an algal bloom deters tourists and has a negative impact on ESSW. For example, a weed infestation at Mackay, Queensland, the cause of which was not identified, led to an exodus of tourists. Similarly, in an analogous example, many shellfish fisheries have been closed temporarily because of “red tides”, and these closures may also have impacts on tourism and hence the ESSW of local communities.

The cause of algal blooms, however, ought to be important to local authorities and parties with an interest in preventing the contamination of marine waters and ecosystems. CMAs, of course, cannot do anything directly about human induced algal blooms. CMAs could, however, document and explain in their reports, the CAP and NRM “investment decisions” that algal blooms caused by human activities represent examples of market failure (public goods, externalities and imperfect information). Attention could be drawn to the type of failure, for example, a negative externality in which a person or organisation’s activities have side-effects on others that are not taken into consideration by the first person or organisation.

The communities’ perspective on algal blooms was that healthy estuaries and appropriate regulation are generally believed to be essential to ensuring a sustainable future for recreational and commercial fishing.

### 3.2.3 The impact of Dune Care on ESSW

Dune Care projects are another example of the rationale for public investment in an activity that private firms and households will not fund. If, as reported, dune fencing and vegetation stabilisation initiatives are frequently washed out by high water storms, there is a good case to be made for a public benefit test to review this funding priority and the CMA’s role in “protecting” this public good (coastal beach dunes).

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<sup>2</sup> For further details see the Solitary Islands Marine Park webpage at: <<http://www.mpa.nsw.gov.au/simp.html>>

The rationale for public investment is undermined if the vegetation stabilisation and fencing initiatives cannot withstand normal, annual weather events.

The local community had mixed views about the importance of dune stabilisation in terms of ESSW benefits. Financial support for community activities was now targeted at areas above the assumed changes to the high-water mark estimated from climate change impacts.

#### **4. Discussion**

CMAs are required to implement the *NSW State Plan* Priority E4 targets including linking the NRM biophysical targets to impacts on ESSW. Implementation strategies need to take into account that resource conditions, community expectations and public policy initiatives change over time and that agencies involved in NRM activities need to keep in touch with current community “norms”, emerging needs, the potential for new partnerships and the rationale for public investment in NRM projects. Consultative mechanisms that include focus groups provide a “fast track” method of linking biophysical resource conditions to impacts on ESSW.

In this pilot study, the relationship between the indicators of biophysical indicators and impacts on ESSW is weakly developed. We attribute this to the process of engaging in community focus groups before engaging with the CMA in diagnosing market failure concepts in previous NRM investment decisions and the identification of future NRM investment options. As a result the survey instrument recorded what we set out to do, to capture views on ESSW, but the information provided was not necessarily related to the impacts of the biophysical indicators on ESSW. Given this experience, it would be constructive to trial an approach in which the focus group survey instrument is based on the outcome of a CMA’s deliberations on NRM decisions and investment options. The focus group would then be surveyed on the impacts of the biophysical indicators on ESSW as well as their preferences for future NRM investments. This information could then be used to inform the CMA about the focus group perceptions and preferences.

In terms of institutional reforms, coastal CMAs are not just land-based organisations; they are also marine-based. While the Northern Rivers CMA has focused on building knowledge and collaborative partnerships with land-based organisations they are conscious of knowledge gaps on marine waters and ecosystems. CMA NRM officers are interested in how to measure changes in the levels of conflict over resource use and how to tell if situations are getting better or worse.

Participants noted that land use planning is at the heart of managing population pressures along the Coffs Harbour Coast and that many people would like to see the CMA have a greater influence over planning decisions (though within the community many people are not aware of the CMA or its role). Deliberate and planned consultation with relevant stakeholders on NRM issues has strong potential to contribute to improved decision making and hence in achieving the T12 outcome of improved ESSW. CMA staff at all levels would benefit by linking biophysical and socio-economic targets through a formal consultation process. While this consultation process can improve confidence in gathering socio-economic information and increase the appreciation that socio-economic information leads to a more

comprehensive understanding of NRM issues, there is a need to understand basic market failure and public benefit concepts to understand how to use socio-economic information to improve decisions on NRM priorities and investment and how to apply the concepts in current work.

In the pilot study, the market failure analysis took place after the consultation process was completed. It was a department analysis rather than a CMA and community stakeholder analysis. Our experience now suggests that CMA's investment in NRM needs to consider a more encompassing approach to socio-economic MER. The analysis of market failure concepts should be a formal screening process of NRM investments by NRM officers and other CMA staff. Once this internal process has taken place, it would then be appropriate to gauge the impacts on ESSW of the projects that pass the market failure test. The internal screening would be used to develop the survey instrument used for focus group consultations. Once the communities' views are known about the impacts of previous investment decisions and potential investment opportunities, it would then fall back to the CMA to prioritise a small number of NRM investment options for more detailed consideration.

We believe that there are major benefits for CMAs whenever staff consider and apply the socio-economic MER approach proposed here. The market failure framework provides staff with arguments to promote widespread behavioural change based on the public benefits of using incentive funding and education, for example, to achieve change. The experience of linking the various indicators of biophysical resource condition targets to ESSW, interpreting the links through a market failure framework and ultimately extending this interpretation to include socio-economic implications, demonstrates the value of incorporating ESSW findings into CMA CAP and other strategic planning documents. At the same time, the market failure approach is not a substitute for stakeholder engagement. Recent trends in NRM consultation suggest that a 'public policy' philosophy of stakeholder engagement is emerging through community consultation in identifying NRM investment priorities.

The results reported here provide an encouraging start for the application of a MER/MERI framework as a tool of integrated assessment for identifying NRM investment priorities. It will be essential, however for information from the community consultations and market failure approaches to be included in strategic documents at the CMA level including CAPs. More generally we see this approach as providing broader scale benefits as the costs of NRM rise both nationally and internationally.

## **5. Conclusion**

More work is required on linking biophysical indicators to impacts on ESSW through community consultation and market failure approaches. For the socio-economic MER approach to work effectively, CMA staff including MER officers will need to develop their capacity to apply the market failure perspective as a screening tool, to gather socio-economic information independently, to link indicators of biophysical targets to impacts on ESSW, and to incorporate findings about market failure and community consultations in the CMA's strategic documents, including the CAP. The department has a training program under development to help achieve these outcomes.

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