

Coastal Issues in Regional Natural Resource Management Plans: The Case of the New South Wales Catchment Blueprints

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Abstract

This paper provides a preliminary overview on how coastal issues are being addressed in regional Natural Resource Management plans in New South Wales, by investigating the Catchment Blueprints for the State's coastal catchments. The consideration of coastal issues in these Blueprints represents progress towards an improved Natural Resource Management in the coastal zone. However, a more explicit relationship between catchment-based activities and coastal zones is yet to be established if coastal zone management needs are to be fully addressed at the overall Catchment Management level.

Keywords

Natural Resource Management Plans, Coastal Zone Management, Catchment Management, New South Wales, Australia.

Introduction

Catchment Management has been a preferred approach to deliver Natural Resource Management (NRM) at the regional level in Australia and elsewhere (1, 2). In coastal areas, Catchment Management should acknowledge the links between river catchments and coastal zones, as coastal and marine environments are affected by upstream activities. In general, however, coastal issues¹ are not usually the major focus of Catchment Management initiatives and, therefore, coastal management needs are often given little attention in the Catchment Management process.

In New South Wales (NSW), the Catchment Management Act 1989 provided the legal basis for Total Catchment Management (TCM), the first state-wide statutory policy in Australia to manage natural resources on a catchment basis. As part of the recent TCM framework, Catchment Management Boards (CMB) were responsible for developing Integrated Catchment Management Plans, known as Catchment Blueprints, which constituted ten years advisory management strategies to guide investments in NRM in NSW (3).

This paper provides a preliminary overview on how coastal issues are being addressed at the catchment level in NSW, by investigating the Catchment Blueprints for the State's coastal catchments. NSW TCM constitutes a particular case to study, as the CMB areas encompassed the river catchment and the coastal zone, including the State waters, *i.e.*, the 3 nautical miles offshore. Furthermore, the Catchment Blueprints will be integrated together with some other existing NRM plans into the Catchment Management Plans to be developed by the new Catchment Managements Authorities, which replaced the CMBs from January 2004 (4). Within this context, gaining insights into how coastal issues are being addressed as part of the NSW Catchment Management is rather opportune.

Study Area

The study area encompassed eleven coastal catchments in NSW. They were the Northern Rivers, Upper North Coast, Mid North Coast, Lower North Coast, Hunter, Central Coast, Hawkesbury-Nepean², Sydney

¹ The term coastal issue is used to refer to issues related to the unique nature of the coastal zone. Coastal zone, as defined by the NSW Coastal Policy 1997, includes the area one kilometre landward along the coastline; three nautical miles seaward; and all coastal lakes, lagoons, estuaries and islands.

² The Hawkesbury-Nepean catchment has two blueprints, *i.e.*, the Warragamba Catchment Blueprint for the upper catchment, and the Hawkesbury Lower Nepean Catchment Blueprint for the lower catchment.

Harbour, Southern Sydney, Southern and South East Catchment, covering the entire State's coast (Figure 1). The area consists of a mosaic characterised by catchments of different sizes and with a variety of landscape units, socio-economic activities, land tenures, stakeholder interests, and a range of coastal problems and issues.

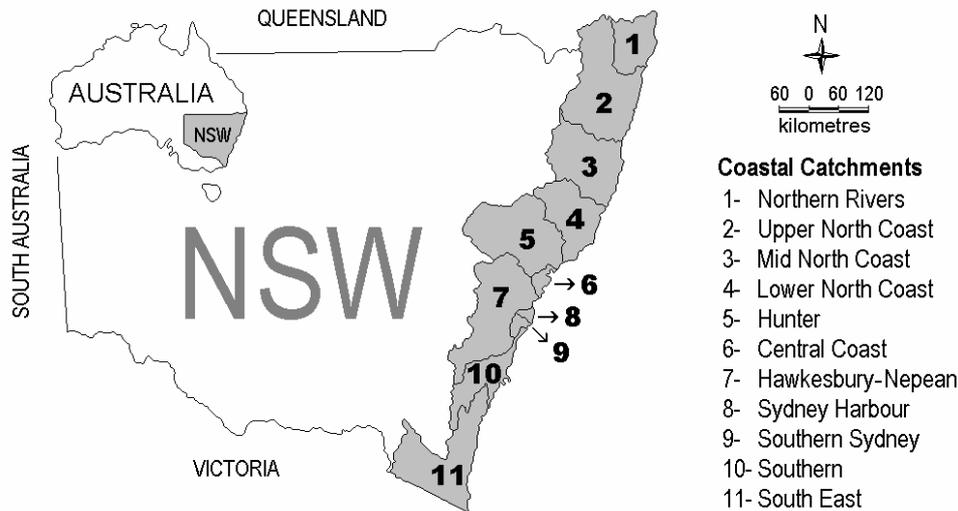


Figure 1. Coastal catchments in New South Wales, Australia. Source: modified from DLWC (3).

Methods

This study was guided by two propositions based on the literature on integrated NRM: (a) In coastal areas, Catchment Management should take into account the coastal zone, which is an important part of the lower catchment and is highly influenced by catchment-based activities; and (b) In coastal areas, Catchment Management should acknowledge the physical and ecological continuum formed by the catchment and the coastal zone, if coastal issues that are influenced by catchment-based activities are to be adequately addressed. Against these two propositions, each of the Catchment Blueprints (5-16) was reviewed.

The present analysis was primarily based on the blueprints' major components, *i.e.*, First Order Objectives, Catchment and Management Targets. First Order Objectives are statements that reflect the community's values and desires for the condition of the catchment's natural resources. They set the priorities and strategic intent of the blueprints and guide the development of Catchment and Management Targets. Catchment Targets refer to an acceptable condition of natural resources at a specified point in time that provides a broad indicator of catchment health. Management Targets correspond to the level of action needed to achieve a catchment target within a specified time (15).

Results and Discussion

The Blueprints of coastal catchments in NSW covered a range of NRM issues, including:

- Biodiversity;
- Water quality and flow;
- Native stream, riparian and littoral vegetation;
- Weed control;
- Land capability and use; soil degradation, erosion, salinity, acid sulphate soils;
- Aboriginal and indigenous people;
- Community awareness, participation and empowerment, stakeholder awareness, organizational capacity; and
- Management incentives, regulation and extension programs; and improved management systems.

Coastal issues have been primarily addressed as part of the NRM issues listed above, such as biodiversity, water quality and land use. In some cases, explicit reference was made to coastal issues, such as those presented in Table 1. Such reference was identified in First Order Objectives of half of the Blueprints, in Catchment Targets for 67 %, and Management Targets for 75 % of the documents reviewed. In two Blueprints, coastal issues comprised a specific section, *i.e.*, the *Coasts, Lakes and Estuaries Program* of the Southern Catchment Blueprint (15) and the *Water and Coasts* section of the South East Catchment Blueprint (16). All the coastal catchments investigated addressed some sort of coastal matter in their Blueprints. Table 2 lists the common coastal issues covered in these documents.

Table 1. Examples of specific reference to coastal issues in the Blueprints of NSW coastal catchments.

First Order Objectives, Catchment and Management Targets

First Order Objectives

“Healthy coastlines and estuaries with non-polluted waters, diverse aquatic ecosystems, foreshore vegetation and ample opportunities for sustainable public enjoyment” (15).

“The coastal zone environment is protected whilst providing for the social and economic needs of the community” (10).

Catchment Targets

“By 2011, the condition of coasts, lakes, wetlands and estuaries in the Southern Catchment will be maintained or improved from current classification as assigned by the National Land and Water Resources Audit and the NSW Comprehensive Coastal Assessment” (15).

“No decline, and where appropriate an improvement, in Estuarine Ecosystem Functioning as reflected in key indicators by 2012” (10).

Management Targets

“By 2008 strategies for sustainable resource use will be developed. This includes settlement strategies for all coastal areas to be developed in accordance with draft Coastal Settlement Strategy (by 2006) and settlement strategies for all non-coastal areas” (16).

“Broad-scale inventory of all aquatic and marine ecosystems within the Board area, and appropriate management priorities developed by 2004” (6)

“No discharge of sewage from boating to estuaries by 2007” (10).

Coastal issues, regardless of being addressed as a specific part of the Blueprints or comprising part of more general NRM issues, were basically limited to estuaries, coastal lakes and lagoons, and coastal vegetation, such as mangroves and saltmarshes. Very few issues concerning the coastal waters (the 3 nautical miles offshore), *e.g.*, inventory of marine habitats and marine protected areas, were found in the Blueprints.

Although some reference was found to the influence of land use on aquatic environments, *e.g.*, the effects of soil degradation on water quality and increased sediment and nutrient loads on estuaries, many Blueprints did not explicitly acknowledge the relationships between upland areas and the coastal zone across the catchment. This is well illustrated in the Hawkesbury-Nepean Catchment, which had two separate Blueprints prepared for the upper and lower catchments, respectively. Such a division was based on the damming of the Warragamba and Nepean Rivers for Sydney’s water supply (11). Appropriate connections between upper and lower catchment Blueprints were, however, not apparent.

Despite being diverse in nature, coastal issues addressed in the Blueprints were, in general, perceived to be limited in scope. Catchment Management, as an integrated NRM approach to coordinate sectoral management efforts and policies within the catchment boundaries (17), should focus primarily on issues that involve different jurisdictions, conflicting multiple uses and interests, more complex relationships between and amongst natural and socio-economic factors, which would not otherwise be adequately addressed by the conventional fragmented and shared responsibilities of the government line agencies.

In this regard, not all coastal issues referred to in the Blueprints would require an integrated approach at the catchment level, *e.g.*, the discharge of sewage from boats to estuaries, infestation of bitou bush and mapping of estuarine and marine habitats. On the other hand, coastal issues that may be significantly affected by catchment-based activities should be regarded as one of the main foci of Catchment Management in coastal areas, such as water quality in coastal lakes, lagoons and estuaries, biodiversity and environmental flows. Such issues need to be given special consideration.

Table 2. Coastal issues referred to in the Catchment Blueprints of NSW coastal catchments.

Coastal Issues
First Order Objectives
<ul style="list-style-type: none">• Water quality in estuarine and marine environments• Physical structure and vegetation of coastal lakes, estuary and wetland riparian zones• Protection of the coastal zone environment• Health of coastlines, estuaries, wetlands and coastal waters
Catchment Targets
<ul style="list-style-type: none">• Biodiversity• Aquatic health• Estuarine ecosystem functioning• No loss of habitats• No loss of coastal vegetation (seagrasses, mangroves, salt marshes etc.)• Improved health indicators (<i>e.g.</i>, water quality) in coastal areas and estuaries
Management Targets
<ul style="list-style-type: none">• Management of coastal ecosystems• Inventory of aquatic and marine ecosystems• Coastal zone management plans• Conservation of coastal floodplain wetlands• Discharge of sewage from boat to estuaries• Water quality in coastal lagoons, estuaries and beaches• Land use capability in hazard areas, <i>e.g.</i>, areas of tidal inundation• Conservation and management of habitats and species• Mapping and assessment of estuarine and marine habitats• Participation of aboriginal communities in coastal management plan preparation• On-ground works• Infestation of bitou bush• Protection of marine areas• Rehabilitation plans• Establishment of coastal management committees

Biodiversity, a common NRM issue addressed in the Blueprints, would require particularly careful examination when dealt with in the coastal zone. The factors that influence biodiversity in aquatic environments are often different and more diverse than those affecting terrestrial biodiversity. Biodiversity in estuaries, for example, is represented by freshwater, estuarine and marine species, which depend on specific habitat conditions that in turn are influenced by both catchment and ocean-mediated processes (18).

River environmental flows, another NRM issue frequently addressed in the documents analysed, should consider the particular flow requirements to maintain coastal processes. Pierson *et al.* (19) identified 16 major ecological processes by which reduced fresh water inflow may impact the estuary, including altered salinity patterns, effects on sensitive fauna and flora, reduced flushing and channel maintenance flows, reduced input of river-borne nutrients and organic material, and reduced dilution of pollutants. These are particularly important, considering that approximately 60 % of the estuaries in NSW are intermittently closed and open lakes and lagoons (ICOLLS). ICOLLS are ecosystems that are sensitive to land use in the catchment (20), where environmental flows and flushing-mediated processes may play a crucial role in their functioning. Given the correlation between catchment and estuary conditions, it has been suggested that the

status of estuaries would be a useful indicator of the effectiveness of Catchment Management in improving catchment conditions (21).

Clark (18) suggests that, for strategic planning, it would be useful to divide the coastal zone into planning subunits, or tiers to recognise their different characteristics (*e.g.*, resources, issues, jurisdictions), so that specific management schemes for each of these tiers could be prepared. Borrowing Clark's idea of a "Tier System" as a planning strategy, the CMB area could be divided into subunits, such as, *upland areas* or *hinterlands* that would comprise most of the catchment area that influence the coastal zone; a *transitional area* between the catchment and the sea, corresponding to estuaries, coastal lakes and lagoons, mangroves and saltmarshes, and the shorelands; and *coastal waters*, defined as three nautical miles offshore. This would allow focusing on specific management needs of the coastal zone. However, it is imperative that special regard be given to the linkages and interactions across the catchment-to-coast continuum, keeping in mind that the catchment and the coastal zone constitute a single interacting system (18).

Another important aspect that appears not to have been highlighted in the Blueprints is the so called "transboundary" issues, *i.e.*, issues that involve linkages between catchments. For example, a number of commercial fish species, such as sea mullet, use the freshwater environment of different catchments to complete their life cycle (22). With regard to socio-economic issues of transboundary nature, development activities, *e.g.*, urbanisation and industries in a given catchment can pose pressures on the resources of another catchment, such as the demand of catchments of the greater Sydney for water and agriculture products from the Hawkesbury-Nepean catchment (11). Such transboundary issues require a consistent management approach that cuts across different catchments, involving coordination to address factors that lie beyond the natural and administrative boundaries of individual catchments.

Potential causes of the problems identified in this paper can be related to a number of factors, including inadequate representation of coastal interests and lack of expertise on coastal matters in the CMBs, inadequate information to allow establishing cause and effect relationships between catchment-based activities and downstream impacts on the coastal zone, and community and stakeholder perceptions on NRM issues. These require further investigation as outlined below.

Conclusions

While the consideration of coastal and marine issues in the Blueprints of coastal catchments in NSW represents progress towards an improved NRM in the coastal zone, a more explicit relationship between catchment-based activities and coastal systems, which recognises the interlinked nature of river catchments and coastal zones, is yet to be established if coastal zone management needs are to be fully addressed at the overall Catchment Management level.

This paper has focused on the products of the planning process of Catchment Management in coastal areas. However, a complete understanding of how coastal issues have been/are being considered in the Catchment Management approach is only possible by reviewing the preparation process of the Blueprints, and by investigating the major components of the Catchment Management framework (17), such as management structure and processes, and organisational culture and attitudes. Such review/investigation would help, not only in identifying the challenges, the causes of the shortcomings identified in this paper, but also the opportunities to move towards an improved coastal catchment management in NSW.

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