

Keep calm and plan on? – Have Estuary Management Plans achieved ecologically sustainable management of our estuaries?

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Around 100 Estuary Management Plans (or equivalent) have been prepared in NSW, mostly by local government, with assistance through the NSW Government's Coastal and Estuary Management Program (OEH unpublished). While it has always been a requirement to undertake a review of implementation progress of individual plans (NSW Government 1992, OEH 2013), a large scale audit of plan implementation and overall success across the state is long overdue.

This paper provides a first step towards a retrospective review of NSW Estuary Management Plans. It builds on an earlier state-wide audit commissioned by the State Government in 2003 (MHL, 2003), supplemented by further independent assessment of a sample of recent plans (prepared within the last 10 years) along the NSW coast using feedback from Council and State Government officers, along with previously unpublished information.

Our review identifies key trends in plan implementation. For example, actions involving physical works were found to be more frequently implemented than planning and development controls, as they are more likely to satisfy criteria for capital works funding. However, many of the physical works implemented up to 10 years ago, such as stormwater treatment devices, have not been sufficiently maintained (as maintenance funding is more difficult to access), and as such, their earlier environmental benefits have now been compromised, and now may be considered a source of pollution in some instances. Additionally, there are some actions contained within the plans that are considered simply un-implementable due to unrealistic costs or a lack of community support and political will.

The outcomes of our review highlight a range of low cost actions with few trade-offs and significant benefits that should be undertaken by Councils and other authorities regardless of successful grant funding through the State's Estuary Management Program. We call these 'no regrets' actions, and should generate positive benefits for the long-term ecologically sustainable use of estuaries throughout NSW.

Introduction

The NSW Estuary Management Program was introduced in 1992 and along with the NSW Estuary Management Policy, had a primary objective to *'encourage and achieve an integrated, balanced, responsible and ecologically sustainable use of NSW estuaries through the preparation and implementation of management plans.'*

The Program now has its statutory basis in the NSW *Coastal Protection Act (1979)* with provisions for the protection of the coastal environment of the state for the benefit of both present and future generations. The Program provides support to councils to improve the health of NSW estuaries through technical and financial assistance to:

- prepare (or update) coastal zone management plans and associated technical studies (including estuary health and coastal hazard assessments); and
- implement actions to manage the risks associated with coastal hazards and to protect or improve coastal environments and estuary health.

Grant offers are subject to availability of funds for each financial year and state-wide priorities. Councils typically apply for funding through the NSW Office of Environment and Heritage (OEH) on a 50/50 State / Council basis. OEH also provide technical assistance to preparing plans and directing implementation.

Since the initiation of the Program in 1992, almost 100 estuaries have been the subject of such plans. The NSW Government has provided in the order of \$40 million to local councils for more than 800 minor projects (OEH, pers. comm.). Funding has been intended to be directed towards the most cost effective environmental outcomes.

Estuary Management Plans (and more recently, Coastal Zone Management Plans) have been prepared in a consultative manner and have typically involved input from a range of stakeholders representing state government agencies, commercial and recreational stakeholders, community groups and various departments within the councils.

Large scale improvements to highly degraded waterways have been achieved at locations such as Chipping Norton, Tuggerah Lakes, Lake Macquarie, Lake Illawarra, Kooragang Island and the Tweed River (OEH, pers. comm.).

Actions included in Estuary Management Plans (EMPs) typically include stormwater management improvements, changes to planning policies and instruments, streambank remediation, community education, habitat mapping and protection, wetland rehabilitation, foreshore erosion control, monitoring, reporting and improvements to community access.

Now that most of the estuaries across the state have a plan in place, and many have or are being considered for review, it's an opportune time to examine how the plans are written, how the plans have been implemented, and what estuary managers, plan writers and the plethora of stakeholders can be doing to ensure the future sustainability of these highly valued natural systems.

This paper investigates the implementation of a sample of EMPs (or equivalent) since 1992. The objective of this investigation is to gain insight into how estuary management plan implementation is working on the ground and to identify the strategies that are effective so that the benefits of these experiences can be shared and rolled into future Coastal Zone Management Planning efforts.

In addition to the data collected for this paper, relevant information was made available by OEH. This included a review of implementation undertaken by Manly Hydraulics Laboratory (MHL) on behalf of the former Department of Land and Water Conservation (MHL, 2003), an internal briefing document regarding estuary management prepared by OEH and a listing of documents prepared under the Estuary Management Program since 1992.

The objective of the previous DLWC review of 17 EMPs (MHL, 2003) was to provide an implementation status report on the EMPs that had been approved by local Councils at that time. The results of this review, primarily conducted by written survey, are included below. Information was also provided by a number of individuals with long term involvement in the NSW Coastal and Estuary Management Program, including Bruce Coates, Gus Pelosi and Doug Lord.

While the question of how pro-active estuary management planning has influenced estuary health is important to ask, there is simply not enough data to provide an answer with a high degree of certainty, particularly when considering natural variability of estuarine systems. Notwithstanding, the Precautionary Principle emphasises that we should not discontinue existing environmental works on the grounds of a lack of evidence in support of improving estuary health. To the contrary, efforts need to be concerted in order to protect and preserve environmental values for existing and future generations.

Methods

Methods used for undertaking the assessment of EMP effectiveness were largely qualitative, as outlined below.

Estuary Planning Effort

Estuary Planning Effort was determined through a listing provided by OEH that was compiled in 2010 (OEH, 2010). This listing was updated where additional information was publicly available.

Stakeholder Discussions

Interviews were undertaken with Council officers responsible for EMP implementation. Interviewees were selected based on previous studies with the interview team. However, where information was available on other EMPs this has also been incorporated. In total interviews were held regarding 20 EMPs.

The interviews were undertaken predominantly by telephone. A framework of questions was prepared to guide the interview process. These questions were:

- What worked well and why?
- What didn't work and why?
- How do you track implementation?
- How has the plan been integrated into Council planning / work processes?
- What changes would you like to see made to improve estuary management in NSW?

Where considered relevant, qualitative responses reported in MHL (2003) were compared to these.

Implementation Data

Where available, data collated on plan implementation by Councils was compiled and analysed. Spread sheets used to track implementation were provided for the following estuaries:

- Lower Hawkesbury
- Brooklyn

- Berowra Creek
- Killick Creek
- Saltwater Creek
- Korogoro Creek

- Macleay River
- Turross River
- Batemans Bay

Information on implementation rates were also provided for:

- Hearnes Lake
- Pipe Clay Lake
- Woronora River
- Moonee Creek
- Woolgoolga Lake
- Nambucca River
- Avoca Lagoon
- Terrigal Lagoon
- Wamberal Lagoon
- Cockrone Lagoon
- Wollongong Council generally
- Gosford Council Generally
- Port Hacking POM
- Smiths Lake

Results

Estuary Planning Effort

EMPs (or equivalent) have been prepared for at least 93 estuaries in NSW. Of these, eight have also been formally reviewed. The majority of the 93 EMPs have been in place for more than 5 years and are due for review. This information is summarised in Figure 1. The NSW coast has been divided into three segments to show the geographic spread of plan preparation. The three segments are North (covering estuaries north of Newcastle), South (covering estuaries south of Wollongong) and Metropolitan (covering estuaries between Newcastle and Wollongong). Information within these three geographic segments is shown in Figure 2.

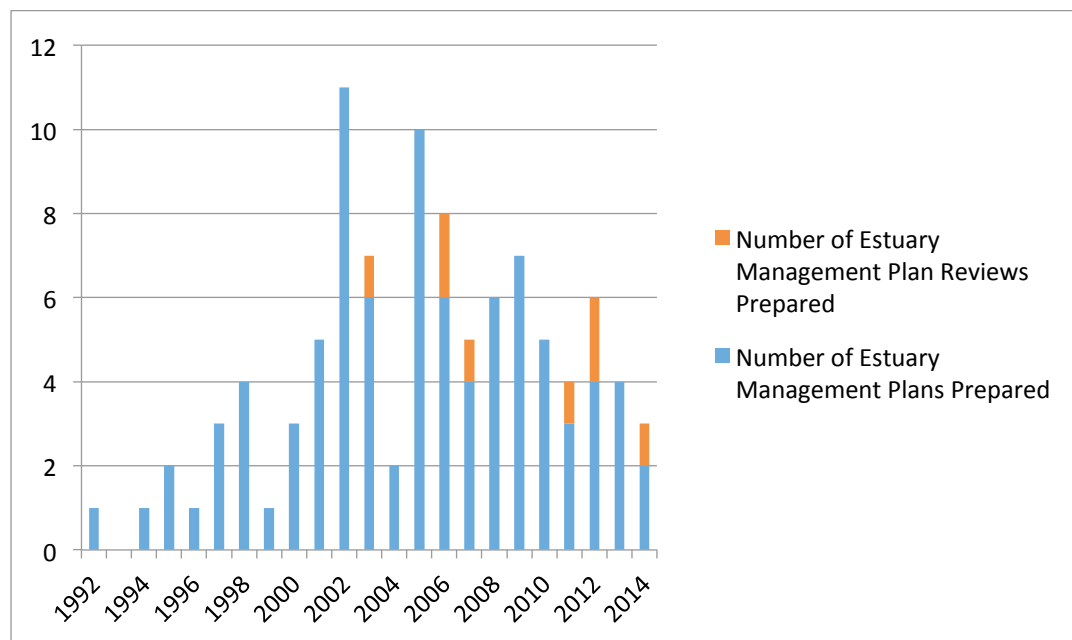


Figure 1: Estuary planning effort since 1992

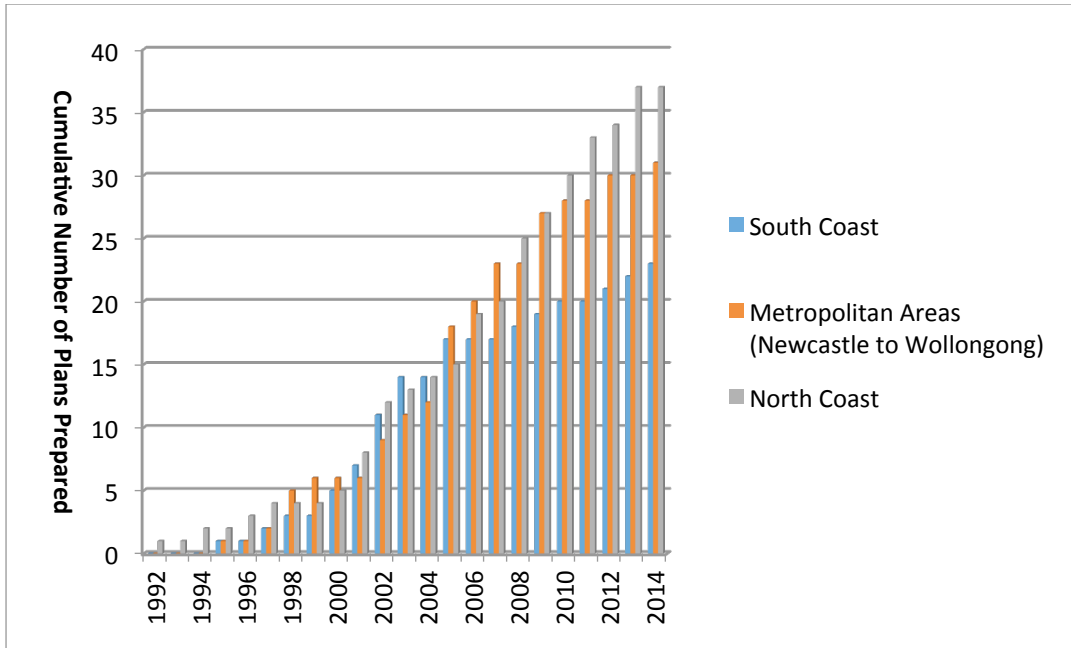


Figure 2: Geographical spread of estuary planning effort

Stakeholder Discussions

Responses from discussions with Council officers to the questions outlined previously are documented in Table 1.

Table 1 Responses from Council Officers

Question	Summary of Responses
<u>What worked well?</u>	<ul style="list-style-type: none">• The actions that go straight to doing works without requiring further studies work well.• Actions that say "revegetate this, or implement an education campaign, or undertake these works."• Where there was a clear opportunity identified and good involvement throughout the planning process. For example a key success was a stormwater education project between the wider community and elders. It also involved WQ monitoring by Elders. Because there had been a good level of involvement during the plan preparation stage everyone was on board. Perceptions changed significantly amongst the wider community and we were even told it was a topic of conversation at the pub• Rehabilitation was easy to implement• Stormwater quality devices- everyone supported this no matter what their interest was• Actions that involved something to be physically built• The plan has been most valuable at targeting grant funding for specific projects or actions.• Fish habitat. Estuary management and other grants could account success to being identified actions in the estuary management plan• Actions that were specific and could literally be lifted out of the document and used in grant applications.• Its easier to access grant funding for physical works• Where other departments within Council were familiar with and supportive of plan contents

Question	Summary of Responses
<p><u>What didn't work?</u></p>	<ul style="list-style-type: none"> • Where you need individual land owners to come on board, particularly where there are individual parcels of land. For example erosion on residential land, Council reported every grant application to fund works has been rejected. • It is difficult to justify spending council money on privately owned land. • Where you require multiple parties to work together. For example an attempt for Elders to be included in management of Crown Lands, where the Crown Lands Trust is not supportive of this. • It's difficult as a Council officer coming into a new job and taking ownership of an existing plan. • The standard LEP made it difficult to adapt zoning to particular issues. • The community really wanted dredging but Council was unable to secure approvals from Lands. • Recommendations that were included to appease the community, for example, dredging for tidal flushing and water quality benefits when the environmental assessment alone would cost \$80,000 and is unlikely to support dredging • More complex actions -due to resource issues. • Concerns raised regarding section 55c which states that proposed actions must not include actions regarding land owned by a public authority unless the public authority agrees and this would have reduced the number of successes reported. • Getting planning and development controls in place was too difficult • Council staff in other departments are not always supportive • Reducing boat numbers, size and speeds. Who decides what the carrying capacity is for this recreational activity on estuaries?
<p><u>How do you track implementation?</u></p>	<p>There is a variety of ways that EMPs are written and their implementation tracked. Tracking of implementation varies from one example of 'lase fair minimal' (i.e. not at all), to detailed tracking of every relevant communication and action via complex Access data bases.</p> <p>Most Councils were able to quickly located up to date spreadsheets that tracked implementation.</p> <p>Where spreadsheets were available, these are further considered under the heading Quantitative Data below.</p>
<p><u>How has the plan been integrated into planning / work process?</u></p>	<ul style="list-style-type: none"> • A development checklist has been prepared for Council DA applications and is included in the LGA wide DCP. • A WSUD policy has been implemented. • Land zoning has changes • EMPs integrated into Council 20 year community strategic plan as a measure • Included in other strategic documents such as local Masterplans. • It hasn't been integrated into planning. There is a disconnect between planning and engineering. It is generally just used to back up grant funding applications • Often this is the only information we have about the estuaries. When a DA is submitted, within an estuary catchment, the EMP (and Processes Study) is referred to and considered. This is often a driving force in DA approval or otherwise

Question	Summary of Responses
<u>How useful is the EMP?</u>	<ul style="list-style-type: none"> • It is a useful tool for internal communication, communicating with the community and securing grants. • The process of preparing plans is very beneficial as it gets everyone thinking and talking • Community understanding and appreciation has anecdotally increased • It is very useful for securing grants beyond the Estuary Management Program with benefits in, around and beyond the estuary
<u>How could the program be improved?</u>	<ul style="list-style-type: none"> • A reduced number of higher quality options that could be achieved in the short term. • Actions in an EMPs should be worded like a project brief. • Grant offers should coincide with Council budget preparation timeframes • Links within Council are an important factor for implementation. Relationships are crucial and involving the right people early in the process is important. • Preparation of an estuary standard • Gazettal would help • 5 year recurrent funding through estuary program for actions. This would allow for example stormwater works to be implemented, • Funding should be weighted so that smaller councils with a low rate payer base but highly valued estuaries from a state perspective receive proportional funding. 50/50 makes this difficult. • Review of options impacts in NSW on environmental outcomes. For example does rehabilitating riparian vegetation improve water quality? To what extent?

Implementation data

Qualitative data is invariably difficult to analyse given the different quality of information and different perspectives of data sources. As such, only simple analysis of the quantitative information has been undertaken and presented herein. Also comparisons of implementation as reported in MHL (2003) and this present assessment need to acknowledge the time perspective (i.e. 10 years has elapsed since the previous review). The median age of plans audited in 2014 is 9 years, while the median age of plans audited by MHL (2003) was 6 years.

The 2003 Estuary Management Plan Review reported on the implementation status of actions grouped by category (MHL, 2003). The results of this are presented in Figure 3. A similar categorisation has been used for this present assessment, as shown in Figure 4.

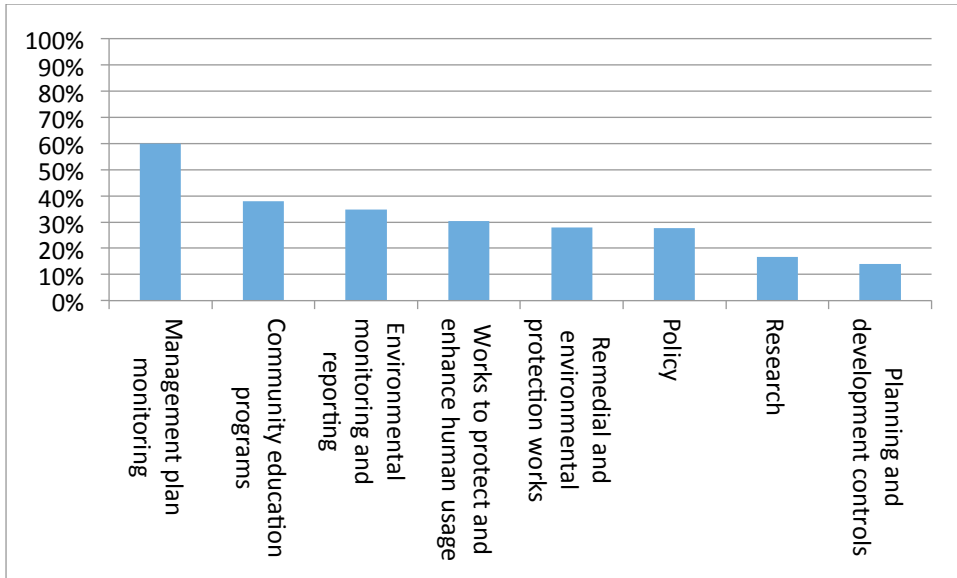


Figure 3 implementation status of actions grouped by category (MHL, 2003)

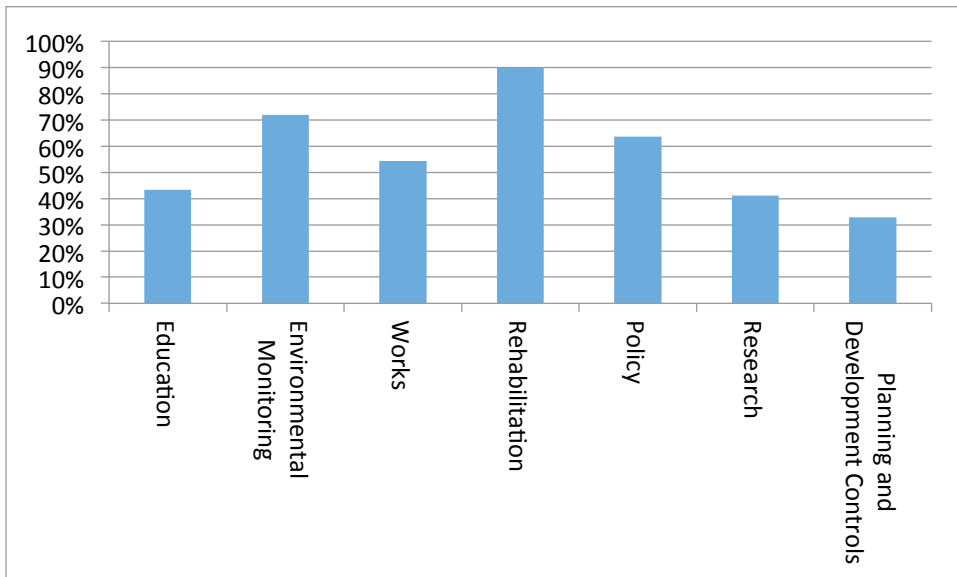


Figure 4 implementation status of actions for Estuary Management Plans prepared since 2004.

MHL (2003) reported on sources of funding for the implementation of actions across 13 EMPs (refer Table 2).

Table 2 Sources of funding for EMP implementation reported by MHL (2003)

Source	Relative Contribution
Council	36%
Estuary Management Program	33%
Local environment groups	3%
Universities	1%
Environment Australia 70,000	1%
Coast Care	<1%
DLWC and WADAMP	2%
Floodplain Management	1%
Catchment Management Committee	<1%
Natural Heritage Trust	1%
NPWS	1%
Rivercare	<1%
Stormwater Trust	7%
Sydney Water	6%
RTA	4%
Total Catchment Management Enhancement Funding	>1%
Waterfront owners	4%
Waterways Authority	3%

Sources of funding have not been directly tracked by most of the Councils consulted for the present assessment. However, detailed information on all grant applications and their outcomes were made available by Hornsby Council. This included 78 grant applications, as shown in Table 3.

Table 3 contributions by funding sources for successful grant applications.

Source	Relative Contribution
Estuary Management Program	29%
Australian Research Council	17%
Coast Care	18%
Catchment Management Authority	11%
Recreational Fishing Trust	1%
Universities	3%
Council	22%

Figure 5 shows the outcome of grant applications by action type for Hornsby Council. Success rates across different categories of action types is really similar, however, the number of applications submitted is notably different, and may reflect the higher availability and diversity of works based grant programs. Planning and development controls were the only category of actions for which grant applications had only been made to the Estuary Management Grant Program.

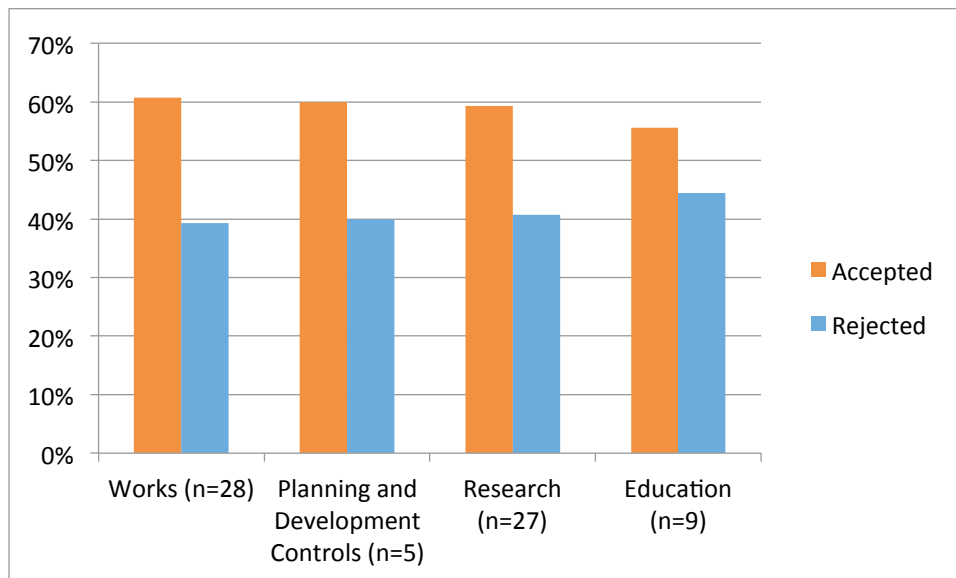


Figure 5 Outcome of submitted Grant Applications for each action category

Discussion

The NSW Estuary Management Program (now known as the Coastal Zone Management Program) has been a successful mechanism to support ecologically sustainable development in regard to estuaries within the limits of available grant funding and political will.

A common observation from Council officer's implementing Estuary Management Plans is that actions involving physical works are the easiest to implement. One important contributor to this may be larger opportunity for grant funding for capital works projects. Capital works are also visual, meaning that implementation of these types of works provides clear evidence to the community of progress towards environmental restoration and protection.

In contrast to capital works, changes to planning and development controls are considered the most challenging to implement. This is surprising, as generally, these actions can be implemented by Council staff without the need for further grant funding. Poor implementation of recommended planning and development controls is considered to be a function of both lack of involvement of Council planning staff during the plan development process and external drivers such as ongoing changes to the statutory planning framework. It is also recognised that changes to planning and development controls requires consideration and balancing of a wide range of factors, meaning that seemingly simple changes for environmental purposes are not necessarily translated into straightforward amendments to environmental planning instruments.

Some Councils also found conversion of existing planning scheme to the standard template LEPs a stumbling block for maintaining ESD. In a number of instances, unique categories of zoning had been used to protect estuary catchments and these did not translate neatly into the standard zonings provided within the template. Examples of this include the Coastal Open Space System in Gosford LGA and the Coffs Coast Regional Park.

The Gosford Coastal Open Space System (COSS) is a network of reserves supporting native vegetation that are managed by the Gosford City Council for a number of environmental and community values. In addition to the publicly owned Council freehold land and Crown Land within the COSS boundary, a number of private properties have been identified to be voluntarily acquired for inclusion in the System. Bringing these properties into public ownership in the future will ensure that the land will be managed for its ecological, cultural and social values. One of the objectives of COSS is to ensure natural areas within water catchments remain undeveloped thus not causing deterioration in water quality entering the Gosford Lagoons (as recommended in the Estuary Management Plan). The objectives of the COSS do not fit with the standard zonings available for use from the Standard Instrument.

Gosford Council is currently negotiating with the State Government to introduce a new zone (E5 Public Conservation), to better reflect the intention and function of the existing COSS Lands. If the COSS was to be zoned as per the current Standard Instrument, then the current level of conservation imposed over these lands would be compromised.

A consistent qualitative observation with estuary managers from councils was the high rate of construction of stormwater infrastructure during the 1990s and early 2000. This observation is supported by the quantitative data reported by MHL (2003). Actions that involved on ground action, were significantly more often recommended and implemented. The data collected in 2003 by MHL, showed both the (former) NSW Stormwater Trust and Sydney Water as significant contributors to action implementation. During this period the NSW Environment Protection Authority introduced the Urban Stormwater Improvement Program. Under this program a directive was given to Councils to prepare Stormwater

Management Plans. Once the plans were produced it became apparent that there were no funds available to implement these and so a \$60 million grant program was introduced, although grants only covered capital costs (Wainwright, pers. Comm. 2014).

During this period, suppliers of proprietary GPTs began targeting Councils and a total of 190 capital works grants for the installation of GPTs were awarded (largely without the requirement for assessing the capability for undertaking and financially supporting regular maintenance). As Council maintenance resources are generally very limited, many stormwater devices have fallen into disrepair or are significantly compromised due to reduced functionality from inadequate maintenance. Indeed, some Councils are presently removing such structures where they are having a negative impact on water quality and visual amenity.

The build up of wet leaves and other debris in such structures can result in oxygen depletion in downstream waterways during small rain events. Disposal of water and sediment from these structures is also a challenge, may require environmental assessment and is often prohibitively expensive. Interestingly, later stages of the Stormwater Improvement Program shifted more toward capacity building, education and water sensitive urban design rather than capital works for gross pollutant control.

A significant contributor to grant funding in more recent times has been the (former) Catchment Management Authorities (CMAs). While these were again very focussed on on-ground works, the works focussed on rehabilitation (thus leading to the high rate of implementation of rehabilitation type actions in EMPs). CMA's were recently replaced by Local Land Services (LLS), which now brings together agricultural production advice, biosecurity, natural resource management and emergency management into a single organisation. How this aspect will be influenced by the changing role of the local land services and opportunities to work with the Coastal Industry Partnership and Biosecurity Programs remains to be.

The importance of internal communications cannot be over emphasised in the success or otherwise of Estuary Management Plans (and CZMPs in general). A consistent message from all those interviewed was the need to ensure that the contents and relevance of the plans were recognised and implemented across multiple departments within councils (for example, environment, planning, engineering, works). There are many examples within numerous LGAs where seawalls and other significant public infrastructure have been constructed without reference to a current EMP or CZMP. Engagement with key staff across all Council departments therefore needs to be undertaken to raise awareness and ensure consistency. It is considered, however, that without a fundamental statutory basis for EMPs and CZMPs, this cooperation relies on internal championing, excellent communications and considerable good will.

While the current process allows for Council to submit the CZMP to the Minister administering the *Coastal Protection Act 1979* for certification, current advice from OEH is that there remains a temporary deferral on the certification of CZMPs. A small number have been certified in the past including the Tweed River and Tuggerah Lakes CZMPs. As documented in the responses from Councils (Table 1), there are a variety of ways EMPs have been integrated with other Council documents and rolled into forward investment plans. However, EMPs are not consistently included as a S79C head of consideration for future development applications.

In a review of the 'open coast', coastal zone management program funding allocations, Lord (2001) found that Program uptake was higher in metropolitan areas where Councils can afford to fund their share. There was also a preference amongst Councils to direct funding toward visible outcomes (beach enhancement) rather than forward planning.

In a review of the NSW coastal program for last year's coastal conference, Lord (pers comm. 2014) identified that the 2013-14 OEH Business Plan identifies the key performance indicators for the next two years (2013-2014 and 2014-2015). For coast, estuary and floodplain management, the document recognises the performance in 2012-2013 as an under-spend of \$9.4M against the coast, estuary and floodplain management program allocations (Lord pers comm. 2014). It is not possible to determine what proportion of this underspend is relevant to the estuary programs.

Where to from here?

The coastal reform process currently underway by State Government provides a good opportunity to refine the Estuary Management (Coastal Zone Management) process in NSW. In reconsidering the program it is important that the experience garnered so far through the implementation of the program over 22 years is reviewed, assessed and informs adaptive management into the future. In particular an assessment of the available monitoring data and case studies on actions success in meeting environmental targets should be undertaken.

The success of actions on improving or preserving estuary health has not been assessed in this paper, and would require a much more extensive and quantitative review. Nonetheless, there is opportunity for future CZMPs to be prepared within a framework that allows for more rigour in terms of monitoring and review using well-established processes (e.g. State's MER process).

This cursory assessment and review of estuary management plan implementation has identified some key opportunities to improve the current process. These include:

- An initial review and fine-tuning of plans after 12 months with minor amendments
- Standardise tracking of implementation and monitoring to assist in future reviews
- Clarify gazettal process
- More extensive review and update after 5-6 years
- Potential for weighting of in kind contributions for regional councils with high value estuaries
- Include maintenance and monitoring of actions for a 5 year period so that they are adequately implemented – after 5 years there cost benefits should be well enough understood to demonstrate their importance to council
- Invest in pilot projects in high value estuaries for smaller regional councils and monitor their impact on key indicators – this benefits other councils by helping inform future management option costs benefit assessments
- Improve interaction between the State's flood program, coastal hazard program and estuary program in terms of identifying and managing hazards around estuaries. This would include consideration of sea level rise and potential changes to estuary morphology, especially within entrance areas
- Accelerate time to prepare documents – in many instances they are taking a year or two to prepare, and can lose relevance quickly.

This assessment has also identified a number of 'no regrets' actions that appear to be quite achievable by Councils and can have significant benefits to estuary health. These include:

- Development of a WSUD chapter in DCPs to help control future development around estuaries and within catchments
- Preparation of a riparian / foreshore planting guide, especially for revegetation works on private properties
- Undertaking an audit of existing Council assets around estuary foreshores (such as stormwater infrastructure) to identify which assets are nearing the end of their

functional life, and consideration of estuary objectives in forward planning for asset replacement or relocation.

A number of 'un-implementable' actions were also identified by the assessment. While theoretically feasible, these actions typically did not have the benefit/cost or necessary community/political support to be realised. These actions include:

- Dredging of estuaries to improve water quality and flushing
- Returning foreshore land to public ownership
- Options that generally involve multiple landholders
- Options that require input and commitment by stakeholders that have not been involved in the process of preparing the plan
- Changes to environmental planning instruments when planners were not fully engaged and committed to plan development

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