

Impact assessment in the marine environment- the most challenging of all

Adam K. Smith, Great Barrier Reef Marine Park Authority, PO Box 1379, Townsville QLD, Australia 4810

Abstract

This paper is an introduction to a theme forum at IAIA08 on *Impact assessment in the marine environment*, which will discuss the current and future challenges.

The marine environment is a vast, diverse, dynamic, complex area with major environmental issues. There is continuing pressure on the marine environment from conflicting activities including aquaculture, agriculture, fisheries, urbanisation, industrial developments, shipping, conservation and tourism. The scale and public opinion on individual development projects is unprecedented and there are increasing legal challenges. Management in the marine environment is generally fragmented, complex and poorly understood. A review of scientific and popular literature found examples of excellent, controversial and inadequate EIA projects in marine and coastal areas. Examples of excellent or best practice EIA all involved planning, prediction, monitoring, consultation and management. Controversial or inadequate examples often had a lack of information.

In order to improve marine environmental management we need to recognise its importance and follow examples of best practice. EIA processes such as: Scoping, Assessment, Implementation and Audit need to be integrated with roles such as: Planning, Prediction, Monitoring and Management. In the long-term we need to embrace a paradigm shift of new leadership, strategic EIA and measured positive marine environmentally sustainable development outcomes.

Introduction

The introduction provides a brief review of the marine environment and EIA processes.

Marine environment

The Australian *National State of the Marine Environment Report* (1995) identified five major issues: (1) Unsustainable use of marine and coastal resources, (2) Declining marine and coastal water/sediment quality, particularly as a result of inappropriate catchment land use practices, (3) Loss of marine and coastal habitat, (4) Lack of marine science policy and lack of long-term research and monitoring of the marine environment, and (5) Lack of strategic, integrated planning in the marine and coastal environments.

The marine environment is governed by a complex array of legislative and institutional arrangements from local, state, national and international. In Australia, we have rights and responsibilities to manage over 16 million square kilometres of ocean. The marine environment is generally common property rather than freehold or owned by an individual, which is the system for terrestrial land.

EIA process

An Environmental Impact Assessment (EIA) is an assessment of the likely positive and/or negative influence a project may have on the environment. EIA can be defined as: "The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made" (Wikipedia, 2008).

The basic principles of best practice EIA is that it should be: Purposive, Rigorous, Practical, Cost-effective, Efficient, Focused, Adaptive, Participative, Interdisciplinary, Credible, Integrated, Transparent and Systematic (IAIA, 1999). The process of best practice EIA should include (IAIA 1999):

Screening – to determine whether or not a proposal should be subject to EIA and, if so, at what level of detail.

Scoping – to identify the issues and impacts that are important and to establish terms of reference for EIA.

Examination of alternatives – to establish the preferred or most environmentally sound option for achieving the objectives of a proposal

Impact analysis – to identify and predict the likely environmental, social and other related effects.

Mitigation and impact management – to establish the measures that are necessary to avoid, minimise or offset predicted adverse impacts and, where appropriate, to incorporate these into an environmental management plan or system.

Evaluation of significance – to determine the importance of residual impacts that cannot be mitigated.

Preparation of environmental impact statement (EIS) or report – to document the impacts of the proposal, the significance of effects, and the concerns of the interested public and the communities affected by the proposal.

Review of the EIS – to determine whether the report meets its terms of reference, provides a satisfactory assessment of the proposal(s) and contains the information required for decision-making.

Decision-making – to approve or reject the proposal and to establish conditions for its implementation.

Follow up – to ensure compliance with the terms and conditions of approval; to monitor the impacts of development and the effectiveness of mitigation measures; and, where required, to undertake environmental audit and process evaluation to strengthen future EIA applications and mitigation measures and to optimise environmental management.

The basic principles advocated by IAIA (1999) are subjective and difficult to measure. The process steps of best practice EIA advocated by IAIA (1999) can be evaluated by reviewing EIS's and other documents. The process advocated by IAIA (1999) is generally followed in EU, USA and Australia, but there are huge differences in EIA systems throughout the world (Wood, 2003). The current best practice is to have a framework of legislation, policy and guidelines, risk based approach, longer-term simple permits, issue-based monitoring and a partnership approach (Smith et al, 2006; 2007). The *Environmental Protection and Biodiversity Conservation Act 1999* has been a comprehensive act by Australia's Commonwealth government to lead environmental laws, reform and processes (Scanlon and Dyson 2001).

Major criticisms of the EIA process by proponents are that it is complex, costly, and inevitably involves considerable delay to development (Elkin and Smith, 1988); and major criticisms from the community is that it does not use rigorous science, is not independent, does not assess risk and uncertainty, is poorly coordinated, ignores community views and allows inappropriate developments (AMSA 1997; Danaher 2008; Wood, 2003).

The above description of principles, process, best practice and major criticism leads to the question "What is an excellent, adequate or inadequate EIA project?"

A review of some EIA projects in marine and coastal environments

Most EIA projects in the marine environment register very little community interest, and there are a lot of them – a recent www search indicated 28 potentially significant marine referrals under the *Environmental Protection and Biodiversity Conservation Act* to date in 2008 and a total of 60 referral for marine referrals in Australian waters for 2007. The Great Barrier Reef Marine Park Authority manages a small area of Australia and we assessed approximately 700 marine proposal in 2007. As states and local councils also undertake EIA and make decisions that impact on the marine environment it is highly likely that there are 100 major decisions and possibly 10,000 or more minor EIA decisions made each year that impact the marine environment in Australia. It is likely that there may be similar or more marine EIA decisions in Europe, Asia and America.

There have been very few independent reviews of EIA projects processes or values. A specific review of "What is a good EIS?" analysed 37 criteria and found that 50% of reports were inadequate (Elkin and Smith 1988). Another review of 45 EIA's investigated technical or political influences in decision making (Leknes 2001). The review undertaken for this paper was simple and used web search with key word "excellent, controversial, inadequate, marine, EIA". It is acknowledged that this is a subjective review but it serves a purpose of identifying some different quality EIA project examples for further discussion.

Table 1. Examples of excellent, controversial and inadequate EIA projects in marine environments

	Project	Location	Reason	Reference
Excellent	Marina	Townsville	Process Monitoring	Koloi et al (2005)
Adequate	Dredging	Mackay	Consultation	Trimarchi (2007)
	Tourism	Queensland	Management	Warnken & Buckley (1998).
Controversial	Pulp mill	Tasmania	Process Monitoring	DEWR (2007)
	Resort	Guana Cay	Planning	Smith (2005)
Inadequate	Mining	South Africa	Information	Heydorn (1996)
	Marina	Ningaloo	Planning	WS (2002)
	Runway	Japan	Information	Greenpeace (2008)
	Casino	USA	Process	Fletcher (2000).
	Whaling	USA	Process	ELAW (2004)
	Sonar	USA	Process	AWF (2005)

It was very difficult to find examples of excellent EIA in the marine environment, and the examples that have been included in Table 1 are Australian examples. It was easier to find examples of large controversial EIA in

the marine environment (Smith et al, 2004). Many of these controversial or inadequate projects have been documented by conservation groups (AWF 2005; Greenpeace 2007; WS 2002).

A critic of the system of EIA said: “EIA remains, at best a Band-Aid to mitigate the worst consequences of rapid industrial development because it is wealth, not legislation, that leads to indigenous demands for clean energy, stable populations, and stewardship of the land and water” (Rayner 1993).

A specific comment from Hemmings and Roura (2003) illustrates both the lack of standard terminology in EIA as well as the quality of documents and decisions:

“The number of Comprehensive Environmental Evaluations (CEE) is small, but no CEE has resulted in a decision not to proceed with the activity... some Initial Environmental Evaluations (IEE) are extremely rigorous, others are extremely slight, some simply atrocious”.

So, if we recognise that EIA has some problems, then how do we improve EIA and particularly for the marine environment?

How do we improve impact assessment in the marine environment?

In our theme forum at IAIA08 we ask 4 key questions about EIA:

1. Do **planning**, policies and guidelines lead to better results for project based EIA?
2. What confidence do we have in EIS **predictions**?
3. What level of precision is appropriate to **monitoring** in the marine environment?
4. How can we best integrate people, monitoring and **management**?

In order to facilitate discussion in the theme forum the following table has been organised by EIA Process (GBRMPA, 2004) and the 4 roles that we will be discussing: planning, prediction, monitoring and management. Some simplified detail has been included in each of the sections to assist discussion in the theme forum about why, where and how specific actions are undertaken and how they are related. I have also given a personal opinion on my view of the performance of EIA processes and roles using a traffic-light indicator or Red (Bad), Amber (Inadequate) and Green (Good). My opinion is that we have a patchy performance on the Scoping process and do some roles well such as monitoring, and other badly such as planning. If you look across Table 2 and the summary it indicates a good performance for assessment and adequate for implementation. However we have a bad performance for auditing (Table 2). If you look down Table 2 it summarises adequate performance for planning and monitoring and inadequate for management and poor performance for prediction.

Table 2. Matrix of processes and roles in EIA (with a traffic light scoring system of Red ■ problem, Orange ■ warning, Green ■ good) and overall summary

Process\roles	PLANNING	PREDICTION	MONITORING	MANAGEMENT	Summary
SCOPING	Proposal Legislation Plan Policy\Guideline Options Consultation	Hypothesis	Desktop Baseline Pre-monitoring	Meeting Issues	Inadequate
ASSESSMENT	Preferred Option EIS risk		Monitoring	Consultation (public) Decision Legal	Good
IMPLEMENTATION	Project management Communication		Monitoring	Supervision Adaptive management	Adequate
AUDIT		Accuracy of hypothesis?	Post- monitoring	Audit Workshop Communication Recommendations	Bad
Summary	Adequate	Bad	Adequate	Inadequate	

Many of these processes and roles are also applicable to terrestrial EIA and I hope that some of the discussion in the theme forum will lead to differences of opinions. A successful theme forum would also be able to draw some generalisations that could be communicated and focussed on to improve EIA. Examples of some of these generalisations may include:

- Planning is more important in the marine environment than terrestrial because of common rather than private ownership.
- Prediction and hypothesis testing is essential due to the uncertainty of impacts in the marine environment.
- Communication of the project results after construction is more important than the pre-construction EIS documentation.
- Strategic EIA is preferred to project EIA in the marine environment due to cumulative impacts.

Future

In the decade since SOMER (1995) was published, the three major issues of unsustainable use of resources, declining water quality and loss of habitat have generally become worse (EPA, 2007). The SOMER (1995) recommendations for long-term research and strategic planning have been partially implemented. The bottom line is that cumulative human development and impacts and the increasing threat of climate change have resulted in major declines in species, habitats and values and catastrophic predictions such as the death of the Great Barrier Reef within 50 years (Johnsone and Marshall 2007).

EIA is a widely used process but it needs to be a lot better as it is widely criticised and is not leading to positive environmental outcomes. The reality is that most EIA projects in the marine environment are not evaluated or benchmarked or awarded for excellence or highlighted as inadequate. However, the vast majority are approved and the EIA profession does not have a standard measure of how many are approved/refused at a national scale. All these challenges combined with the lack of understanding of the marine environment have proven current management strategies to be 'fragmented, complex and poorly understood' (Neely 1998; Roff, 2005).

So are there existing or new tools that can improve EIA and environmental outcomes in the marine and coastal environment? Is Strategic Environmental Assessment (SEA) more likely to promote sustainable development than project-level EIA as suggested by Weaver (2002)?

So if environmental professionals recognise we have a problem and can improve, then how do we change and move forward? In a democratic society one of the primary drivers for change is politics. In Australia, the House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts is currently conducting an inquiry into climate change and environmental impacts on Australian coastal communities. Submissions will be received until 30 May 2008 on the following:

- Existing policies and programs related to CZM, taking in the catchment-coast-ocean continuum
- the environmental impacts of coastal population growth and mechanisms to promote sustainable use of coastal resources
- the impact of climate change on coastal areas and strategies to deal with climate change adaptation, particularly in response to project sea level rise
- mechanisms to promote sustainable coastal communities
- governance and institutional arrangements for the coastal zone

This new inquiry demonstrates a political will to recognise the current environmental problems and seek new solutions and we as EIA professionals should be actively involved to provide community leadership and ideas.

Conclusion

The conventional approach to EIA is the same for terrestrial and marine environments and this process has resulted in many developments and degraded environments (SOMER 1995; Danaher 2008). Many of the controversial developments in Australia and throughout the world are in the marine environment- oil, gas, marinas; and these have the potential to negatively impact on endangered and threatened species and other human users of the marine environment. There are many unknowns. There are very few if any developments which have a positive or neutral impact on the marine environment.

There has been some good work on legislation, planning and EIA process in the marine environment- particularly in Australia with the EPBC Act and Marine Protected Areas (Smith et al, 2007). However, the marine environment is still degrading and we face major challenges. Environmental professionals need leadership and a paradigm shift for improved EIA, decisions and outcomes in the marine environment.

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