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ABSTRACT

Follow-up is an essential component of Environmental Impact Assessment (EIA) if the success of EIA in improving the sustainability of a project once implemented is to be determined. This paper aims to establish universally-applicable criteria for EIA follow-up to evaluate project performance once assessed and underway. A suite of 24 criteria is derived from EIA follow-up best practice principles published by the International Association for Impact Assessment. The criteria are categorized according to the five dimensions of EIA follow-up: monitoring, evaluation, management, communication and governance. Posed as questions, the criteria support qualitative assessments of EIA follow-up performance for a project. Through application of the criteria to a case study currently under construction (the Shell Cove Marina project in eastern Australia), we found they provided an effective basis for a document review process delivering a short but informative account of the follow-up performance of the case study. The more robust evaluation of some of the criteria, particularly in the governance category, would require supplementary techniques such as interviews.

Keywords: EIA follow-up; best practice; monitoring; evaluation; management; communication; environmental performance; governance.

1. Introduction

Environmental impact assessment (EIA) follow-up refers to the ‘monitoring and evaluation of the impacts of a project or plan (that has been subject to EIA) for management of, and communication about, the environmental performance of that project or plan’ (Morrison-Saunders et al., 2007, p1). International Best Practice Principles (hereafter the Principles) for EIA follow-up have been published by the International Association for Impact Assessment (IAIA) with the aim of guiding capacity development amongst practitioners for improving EIA outcomes (Morrison-Saunders *et al.*, 2007). These 17 principles were developed by recognised experts through a collaborative process, and approved by IAIA’s Publications Committee, prior to being published online under an open access policy. IAIA believes that good outcomes will be realised from EIA processes that uphold these principles. As will be explained later in this paper, we also note that there is potential to elaborate on certain elements of the principles in light of insights from professional experience and the EIA literature.

The Principles define appropriate objectives for various aspects of EIA follow-up concepts, procedure and practice, with the intent of defining best practice. To actually evaluate EIA follow-up, however, requires criteria that can serve as the benchmark for success in delivering these objectives. As Wood (2003, p12) puts it: ‘evaluation criteria are, in effect, shorthand versions of principles for EIA and, carefully articulated, have considerable advantages in terms of brevity and clarity’. The derivation of such criteria from the Principles, including the subsequent test of the utility of these in the evaluation of a case study, is the focus of this paper.

The definition of EIA follow-up articulated above encompasses the four dimensions of monitoring, evaluation, management and communication, and was derived from the outcomes of a workshop at the annual conference of IAIA in 2000 (Arts et al., 2001). The four dimensions of EIA follow-up are explained in the Principles as follows:

1. **Monitoring** – the collection of activity and environmental data both before (baseline monitoring) and after activity implementation (compliance and impact monitoring).
2. **Evaluation** – the appraisal of the conformance with standards, predictions or expectations as well as the environmental performance of the activity.
3. **Management** – making decisions and taking appropriate action in response to issues arising from monitoring and evaluation activities.
4. **Communication** – informing the stakeholders about the results of EIA follow-up in order to provide feedback on project/plan implementation as well as feedback on EIA processes.

This conceptualisation of EIA follow-up has subsequently been adopted in numerous research publications (e.g. Jha-Thakur et al., 2009; Nadeem and Hameed, 2010; Wessels, 2013; Jalava et al., 2015) and we are not aware of any alternative definition in common use. As is explained later, our criteria for EIA follow-up best practice are structured around these four dimensions of this definition, although for the purposes of deriving evaluation criteria that could investigate practice, we found it beneficial to divide the management dimension into: arrangements for managing the follow-up process (governance); and arrangements for managing the impacts themselves (management). Thus, we also have incorporated an additional dimension to our framework:

5. Governance – the processes and structures for ensuring that there is commitment to implement the Principles in categories 1–4, and that processes to do so are in place and functioning.

Arts and Morrison-Saunders (2004) conceived of EIA follow-up as operating at three levels: meta level evaluation of the efficacy of the EIA concept; macro level evaluation of an EIA system for a given jurisdiction; and micro level evaluation of individual projects or other forms of development that have been subjected to EIA. In this paper, the focus is micro level follow-up and we develop an evaluation method that can be used to test project follow-up practice in any EIA system. Stated simply, the objective of EIA follow-up for projects identified in the Principles is to address the key question: ‘Were the project and the impacted environment managed in an acceptable way?’ (Morrison-Saunders et al., 2007, p1).

Despite being an essential component of best practice EIA (IAIA and IEA, 1999) there has been frequent criticism that micro level EIA follow-up is largely neglected or poorly developed in formal practice (Sadler 1996; Wood et al., 2000; Runhaar et al., 2013); it was even described by Hollands and Palframan (2014) as the ‘missing link’ (p.43) in EIA. We note that, conversely, there is a long tradition of academic EIA follow-up studies at the project level that audit the accuracy and impact outcomes for predictions made in the pre-approval stages of EIA (e.g., Bisset, 1984; Culhane, 1985; Culhane et al., 1987; Bailey et al., 1992; Wood et al., 2000; Noble and Storey, 2005; Jalava et al., 2015) and/or compliance with and subsequent performance of mitigation measures proposed by proponents or imposed on them through conditions of approval (e.g. Munro, 1985; Gilpin, 1995; Morrison-Saunders and Bailey, 1999; Marshall, 2001; Wessels et al., 2015) for research purposes. These studies provide many valuable insights on the efficacy of approaches to EIA follow-up, but they are conducted for research purposes and do not form part of the formal EIA process conducted by proponents and regulators. Furthermore, each applies a different methodology, with no evidence of a consensus on how such a study should be undertaken.

Our motivation for this paper is to promote best practice EIA follow-up by developing a set of criteria to be used for evaluating the outcomes of projects that have undergone EIA with respect to monitoring, evaluation, management, communication and governance. More specifically the aim of this paper is to translate the Principles into a practical set of follow-up criteria, and subsequently to test their utility through application to a case study. Our intention is that criteria that adhere to the Principles should be universally applicable notwithstanding differences in EIA culture and applications around the world – a point to which we return later. By promoting the notion of ‘best practice’, we draw attention to the possibility that application of our criteria may encourage evaluations of practice that extend beyond minimum compliance with the legal specifications for EIA in a given jurisdiction. We further contend that the set of criteria should be succinct and easy to apply in practice on the basis that this will increase the likelihood of gaining traction and uptake with practitioners.

2. Methods

Within the field of EIA, there is a long tradition of studies that seek to evaluate the performance of various aspects of single case studies through the application of criteria. The Lee and Colley review package (Lee et al., 1999) is a well-known example of a set of criteria for evaluating the quality of environmental impact statements (EIS) (a key report of the EIA)

that has frequently been utilised by researchers ‘because it is adaptable, easy to use, and it also provides a systematic, structured and objective approach to quality review’ (Sandham et al., 2013, p156). A recent example of evaluation criteria applied to a single case study to determine the overall effectiveness of an assessment process can be found in Pope et al. (2018).

In terms of method, the approach of Fournier (1995) is evident in these previous EIA evaluation studies and our work here. It involves firstly establishing ‘criteria of merit’ (Fournier, 1995, p16) and subsequently applying these to practice (e.g. a case study project that has undergone EIA) to judge performance. We adopt this approach to develop best practice criteria for EIA follow-up structured in accordance with the five dimensions of EIA follow-up that we presented in the introduction (monitoring, evaluation, management, communication and governance). We see the development of these criteria as being the main emphasis and contribution of the research.

We commence by allocating each of the 17 Principles to the dimension with which it best aligns. It is important to note that we sought to avoid repetition by selecting the ‘best fit’ for key points explaining each principle rather having them appear multiple times in our criteria. We acknowledge that this represents a degree of compromise in our approach.

We then turn to the follow-up literature to explore each dimension in more depth, in order to distil more detailed and nuanced characteristics of best practice follow-up. These characteristics form the basis of our criteria. Following the example of many other researchers establishing criteria for evaluating impact assessment performance at various scales (e.g. Wood, 1994, 2003; Annandale, 2001; Chanchitpricha and Bond, 2013; Dalal-Clayton and Sadler, 2017; Pope et al., 2018) we present our criteria in question format. Simple answers of yes, no or partially are used, after Wood (1994; 2003), to give a summary answer to the question of whether a criterion is satisfied or not. But the criterion questions also invite longer qualitative responses based upon the judgment of the researcher in response to case study documents that are intended to ‘provide a structure for discussion’ (Annandale, 2001, p189) and are thus intended to be ‘problem-solving or process-enabling, rather than fault-finding’ (Dalal-Clayton and Sadler, 2017, p.258).

In the context of the evaluation processes described by Scriven (1967) and Ahmann (1967), our criteria could serve for the purposes of either or both formative or summative evaluation. Formative evaluation would be undertaken by an internal agent (e.g. the proponent) to inform project management and enable learning and adaptation to take place during its implementation while summative evaluation would more typically be carried out by an external party (e.g. EIA regulator or a third party) in order to obtain an overall performance account of the project under examination. Our own approach to the case study project is that of summative evaluation. To test the utility of our method for evaluating EIA follow-up performance, we apply our criteria to a case study: the Shell Cove Marina project in New South Wales, Australia (Section 4). The Shell Cove Marina project was chosen as it is considered one of the largest coastal/tourism development projects in Australia involving multiple steps in EIA activity, in addition to being a rather complex project. It is also located conveniently close to the residence of the lead author at the time of the research, thereby being of some personal interest and topicality, and meaning that some aspects of the development could be observed directly, and documentary information was relatively easy to collect.

Our evaluation of the case study is based upon publicly available documents. These include:

- pre-approval decision EIA documents prepared by the proponent and regulators, such

as feasibility studies, the environmental impact statement, modification proposals and the approval decision itself;

- post-approval monitoring reports and management plans; and
- third-party evaluations of the project including research papers from independent researchers, government agencies and local news items.

It should be noted that the case study we have chosen is still under construction and not yet fully operational; thus, our analysis provides only a snapshot in time. Ideally, follow-up monitoring and evaluation should be dynamic (e.g. Arts and Meijer, 2004, p78) and cover all the major stages in the project life (Glasson, 1994, p310) right through to project decommissioning and rehabilitation where appropriate. Our EIA follow-up criteria are intended to be relevant for application for all project stages.

3. Establishing criteria for best practice EIA follow-up

The Principles document presents 17 individual principles in the four groups of:

- *Why?* – guiding principles that present core values (principles 1–3);
- *What?* – guiding principles that address the nature of EIA follow-up (principles 4–6);
- *Who?* – operating principles regarding the roles and responsibility of participants in EIA follow-up (principles 7–11); and
- *How?* – operating principles that address how EIA follow-up should be conducted (principles 12–17).

Each principle is expressed with a headline statement and a paragraph of explanatory text (typically of 2-3 sentences) for each. Table 1 provides a summary account of the alignment of the 17 principles with the five EIA follow-up dimensions, with reference to the headline statement and quoted extracts of the explanatory text provided in the Principles. This alignment provides the basis for the distillation of criteria. Remarks not included in quotation marks are our own explanations for classifying the principles.

Table 1 Alignment of EIA follow-up principles and dimensions

Group	Headline EIA Follow-up Principle (Morrison-Saunders et al., 2007)	Relevance of different follow-up dimensions to Criteria Development (drawn from explanatory text in Morrison-Saunders et al., 2007)
Why?	1. Follow-up is essential to determine EIA (or SEA) outcomes.	Governance – application of our criteria means that follow-up is taking place. Management – the emphasis of follow-up should be ‘action taken’ to ‘minimize the negative consequences of development and maximise the positive’.
	2. Transparency and openness in EIA follow-up is important.	Communication – ‘all stakeholders have a right to feedback on the EIA process’ and ‘active engagement of stakeholders in follow-up processes is preferable with genuine opportunities for involvement’.
	3. EIA should include a commitment to follow-up.	Governance – ‘a clear commitment to undertake EIA follow-up is needed’ (i.e. similar to Principle 1) and ‘all parties should be accountable for their actions’.
What?	4. Follow-up should be appropriate for the EIA culture and societal context.	Governance – ‘EIA follow-up... should be custom-made for the legislative and administrative, socio-economic and cultural circumstances; and dovetail with existing planning, decision-making and project management activities’. To allow comparability across jurisdictions, international best practice should be the benchmark, notwithstanding that legal compliance locally may be less or more stringent than this.
	5. EIA follow-up should consider cumulative effects and sustainability.	Monitoring – ‘Application of EIA follow-up at the individual project level is intrinsically limited in terms of dealing with cumulative effects of multiple developments and sustainability issues. This may necessitate application beyond the individual project level; for example, strategic level or area-oriented approaches’. We have assigned this principle to Monitoring, notwithstanding that the measuring function of monitoring is fundamental to action being taken in the other dimensions.
	6. EIA follow-up should be timely, adaptive and action oriented.	Monitoring – ‘monitoring data collection and evaluation activities should be sufficiently frequent that the information generated is useful’. To avoid repetition, we did not also assign this to the Evaluation element. Management – the Principle embodies the notion of adaptive management in the headline. ‘Actions must be efficacious to meet the defined goals of EIA follow-up programs’.
Who?	7. The proponent of change must accept accountability for implementing EIA follow-up.	Governance – ‘As the polluter, proponents must pay careful consideration to the consequences of their actions and the necessity of EIA follow-up’.
	8. Regulators should ensure that EIA is followed up.	Governance – ‘Regulators should determine the need for EIA follow-up and ensure that it is implemented well’.
	9. The community should be involved in EIA follow-up.	Communication – ‘At the very least, the community should be informed of EIA follow-up outcomes, but direct community participation in follow-up program design and implementation is desirable’. We note that there is a close relationship with Principle 2 here.
	10. All parties should seek to co-operate openly and without prejudice in EIA follow-up.	Governance – ‘EIA follow-up will be successful when a shared sense of purpose to avoid, reduce or remedy adverse impacts is acknowledged’.
	11. EIA follow-up should promote continuous learning from experience to improve future practice.	Communication – ‘EIA follow-up ...should always strive to maximise learning from experience through active feedback. Thus, good EIA follow-up requires good communication’.

How?	12. EIA follow-up should have a clear division of roles, tasks and responsibilities.	Governance – ‘The roles in EIA follow-up should be identified in pre-decision EIA documentation and subsequent EIA approvals and management systems. This should be set down as a series of clearly defined steps outlining tasks and responsibilities...’.
	13. EIA follow-up should be objective-led and goal oriented.	Management – ‘EIA follow-up should seek to achieve defined objectives or goals, which may include: (i) Controlling of projects and their environmental impacts (ii) Maintaining decision-making flexibility and promoting an adaptive management approach to EIA and project management (iii) Improving scientific and technical knowledge (iv) Improving community awareness and acceptance of projects (v) Integrating with other information (e.g., state of the environment reports or EMS)’. We assigned this principle to Management as the best fit, notwithstanding relevance also to the other follow-up dimensions.
	14. EIA follow-up should be "fit-for-purpose."	Monitoring – ‘EIA follow-up must be commensurate with the anticipated environmental effect’. Governance – ‘EIA follow-up programs [must] be tailored to the proposed activity, its stages and dynamic context’, be ‘practicable and feasible—to focus on the "art of the possible."’.
	15. EIA follow-up should include the setting of clear performance criteria.	Evaluation – ‘Performance criteria used in EIA follow-up actions or programs should be rigorous and reflect best practice. This should be enacted through well-defined methodologies or approaches to monitoring, evaluation, management and communication. Such actions should produce useful information and outcomes which can be easily measured, and unambiguously appraised against clear criteria’. The (repeated) emphasis on performance criteria in the headline principle and explanatory text alike was our key reason for assigning it to the Evaluation element, notwithstanding explicit mention of the other dimensions of follow-up.
	16. EIA follow-up should be sustained over the entire life of the activity.	Governance – ‘EIA follow-up actions or programs should cover not only the design and construction of a development, but also the operation and where relevant the decommissioning phase’. Management – ‘EIA follow-up must also be responsive to long-term and short-term environmental changes’. We note that there is close relationship with Principles 6 and 13 regarding adaptive management here.
	17. Adequate resources should be provided for EIA follow-up.	Governance – ‘EIA follow-up must be cost-effective, efficient and pragmatic’. The linkage with being fit for purpose in Principle 14 is noted. Management – ‘EIA follow-up should be done to best practice standards and should ensure that real actions are taken adequately when needed’. There is apparent linkage with Principles 6, 13 and 16 regarding adaptive management here.

Further discussion of the five dimensions of EIA follow-up is provided below. This discussion invokes the Principles as summarised in Table 1 together with insights from the literature and our own professional experience. As previously explained, we have adopted a ‘best-fit’ approach in our allocation process to avoid repetition; however, a number of principles are relevant to more than one dimension of follow-up as noted, and hence our

discussions of each dimension in Sections 3.1 – 3.5 draw on more principles than may be allocated to that dimension in Table 1.

3.1 Monitoring

Monitoring is principally a technical undertaking. It is defined as the collection of environmental and/or project related data before and after implementation of impact control methods, including those from mitigation measures defined through the EIA process (Morrison-Saunders and Arts 2004; Marshall et al., 2005). Monitoring may be undertaken through spot checks, random site visits, and periodic measurements or fully integrated continuous data collection (Masera and Colombo, 1992). Principle 6 highlights that monitoring regimes should be designed such that useful data is generated in a timely fashion. Principle 15, although assigned primarily to Evaluation in Table 1, also emphasises the importance of well-defined and robust monitoring methodologies.

As EIA should ideally be focused on the most significant impacts, monitoring efforts should also reflect and be proportional to impact significance. The importance of prioritising EIA follow-up activity is noted in the explanatory text of Principle 14. Although the term ‘significant’ itself is not used in the Principles, we have opted to include this term in our criteria; our point being that monitoring effort should be directed to potential impacts on the environment considered to be significant (as determined in the local context for conducting EIA).

However, while it is reasonable to expect proponents to focus monitoring efforts on potentially significant impacts, it is also important to ensure that the mechanisms are in place to identify potential unintended consequences that could arise if impact predictions prove to have underestimated actual impacts. For example, the Hong Kong system has a complaints system developed for each project that enabled members of the public or other stakeholders to report on observed impacts. The developer must then determine whether observed impacts are due to the project, and if so, to develop remedial action; this is irrespective of predictions made in the EIS (Au and Hui, 2004). Such a complaints process can be considered a form of supplementary monitoring undertaken by other stakeholders. Similarly, the follow-up studies of Bailey et al. (1992) and Morrison-Saunders and Bailey (1999) reported on unpredicted impacts that came to light and were identified by proponents or third parties during project implementation which were subsequently addressed in ‘new’ mitigation measures (i.e. not previously identified in pre-approval EIA documentation), thus highlighting the value of what we refer to in our criteria as supplementary monitoring processes.

Principle 5 suggests that best practice monitoring should ‘consider cumulative effects and sustainability’ (Morrison-Saunders et al., 2007, p2). With respect to sustainability, this implies that biophysical and socio-economic impacts alike should be monitored. Whether or not follow-up monitoring considers the full spectrum of sustainability impacts, however, will likely be a product of how ‘environment’ is defined in law or procedural guidance for EIA in a given jurisdiction (Morrison-Saunders, 2018). Thus, an evaluator will need to bear this important aspect of context in mind, as reflected in Principle 4.

The cumulative effects expectation of Principle 5 means that the application of EIA follow-up should account for the cumulative effects, biophysical and socio-economic, of multiple activities arising from the project, and from other activities in the region. While the proponent will typically be responsible for coordinating and conducting monitoring on the impacts of a project, Principle 4 highlights that other mechanisms may already be in place

that suffice to provide information necessary to evaluate project performance. Previous research by Glasson (2005) and Petäjajarvi (2005), regarding follow-up of the socio-economic impacts of major development projects, both utilised information sources from existing monitoring activity by government agencies and other bodies independent of the proponent. Thus, there is need to explain the inter-relationships between individual monitoring activities carried out specifically for the project and with other relevant forms of monitoring external to the project (often associated with cumulative effects and the full spectrum of sustainability considerations) and to integrate them as appropriate.

This leads us to the following criteria for evaluating the Monitoring dimension of a follow-up study of an individual project:

1. Is monitoring conducted using appropriate and well-defined methods?
2. Are all impacts considered to be significant being monitored?
3. Is there a supplementary process to ensure that significant impacts that were not predicted are identified and subsequently addressed?
4. Subject to significance, are sustainability impacts being monitored?
5. Subject to significance, are cumulative effects being monitored through an appropriate mechanism?
6. Are the interrelationships between individual impacts and related monitoring activities explained?

3.2 Evaluation

Monitoring and evaluation are closely linked activities that would often be conducted by the same party at the same time. The description of monitoring provided by Masera and Colombo (1992), for example, includes evaluation activity within it. Similarly, the Principles discuss evaluation (primarily in Principle 15) alongside other dimensions of EIA follow-up. Here, as explained previously we discuss it as an activity in its own right.

Evaluation refers to assessing the monitoring information to make sense of it for purposes of learning and management. This may involve analysing the effectiveness of mitigation measures employed (Marshall et al., 2005) or other aspects of pre-approval EIA such as accuracy of predictions (e.g. Culhane et al., 1987; Bailey et al., 1992). Understanding monitoring outcomes may serve as an early warning system for project or environmental issues that may require attention (Arts and Morrison-Saunders, 2004; Au and Hui, 2004). As highlighted in Principle 15, this requires the use of performance criteria or indicators which, whether quantitative or qualitative in nature, provide a measure of the magnitude or status of an environmental characteristic in relation to expectations and acceptable limit levels (Masera and Colombo, 1992; Au and Hui, 2004; Lee and Gardner, 2014). Appropriate and well-defined methods will be necessary to uphold expectations for rigour and credibility (IAIA & IEA, 1999) during EIA follow-up evaluation.

This leads us to the following criteria for evaluating the Evaluation dimension of a follow-up study of an individual project (numbered sequentially from the Monitoring criteria):

7. Is evaluation undertaken in accordance with appropriate and well-defined methods?
8. Are clear, pre-defined and well-justified performance criteria provided for guiding evaluation outcomes?

3.3 Management

Management involves applying knowledge and understanding developed through the monitoring and evaluation steps to optimize performance through ‘controlling of projects and their environmental impacts’ (Morrison-Saunders *et al.*, 2007, p3). Thus, management can be defined as the process of making decisions after evaluation of environmental impacts (if any), and taking appropriate action in a timely fashion (Principle 17) to address negative consequences and to maximise positive outcomes (Principle 1). Many management actions are likely to be inter-related as mitigation measures may simultaneously address multiple impacts (Morrison-Saunders and Bailey, 1999). Aligned with Principle 12 (addressed more fully in Section 3.5 on Governance), responsibilities for management actions should be clearly allocated.

Principles 6, 13 and 16 all highlight the importance of an adaptive approach to management. This means that if monitoring and evaluation processes demonstrate that defined performance targets or criteria are not being achieved, then action is taken to improve impact mitigation activities (Au and Hui, 2004; Morrison-Saunders *et al.*, 2004). Effective management also calls for flexible provisions for environmental management, such as the use of environmental management plans (EMPs) rather than prescribed mitigation measures (Arts *et al.*, 2001; Morrison-Saunders *et al.*, 2004; Lee and Gardner, 2014; Morrison-Saunders, 2018). The goal is to accomplish successful proposal implementation and acceptable environmental performance (Morrison-Saunders & Arts, 2004). Consistent with Principles 2, 9 and 11, any such modifications to mitigation activities should be recorded and communicated.

As discussed in Section 3.1, there is a risk that if monitoring and evaluation efforts are focused solely on the significant impacts predicted in the EIA, that other residual impacts may become significant without the proponent (or possibly regulators) being aware. Effective management of environmental impacts thus requires additional processes, such as the complaints process and emergence of new mitigation measures to respond to unexpected impacts in relation to supplementary monitoring processes discussed previously in Section 3.1, to ensure that appropriate attention is given to significant impacts that may not have been predicted. This can be considered another aspect of adaptive management (Arts *et al.*, 2001; Morrison-Saunders *et al.*, 2004; Morrison-Saunders and Bailey, 1999; Lee and Gardner, 2014; Morrison-Saunders, 2018).

Being accountable and having clear lines of responsibility for management action is important as indicated in Principle 3 (addressed in Section 3.5 on Governance). This may extend to engagement with stakeholders (addressed in Section 3.4 on Communication) and improving knowledge for application beyond immediate management of the project (Bailey *et al.*, 1992; Arts *et al.*, 2001; Morrison-Saunders, 2018), a point reflected in Principle 13.

This leads us to the following criteria for evaluating the Management dimension of a follow-up study of an individual project:

9. Is there evidence that management actions seek to minimize the negative consequences and maximise the positive?
10. Are the interrelationships between individual mitigation and management activities explained?
11. Are management actions implemented in a timely fashion?
12. Are responsibilities allocated for undertaking and signing off on management actions?

13. Are adaptive management measures (i.e. changes or alterations to former mitigation measures) explained?

3.4 Communication

Communication is a key tool in decision-making processes (Tennøy et al., 2006), as well as in promoting understanding of EIA and its outcomes amongst affected communities and interest groups (André et al 2006). The importance of good communication in EIA follow-up is reflected in Principles 2, 9 and 11.

While use of the term ‘Communication’ might imply a somewhat passive model of involvement in follow-up in the spectrum of public participation (e.g. Cashmore, 2004; O’Faircheallaigh, 2010), Principles 2 and 9 do advocate for the active involvement of members of the community directly affected by a project in follow-up processes. Involving the community in environmental monitoring/evaluation of the plan or projects can assist in better understanding residual impacts (if any) and their ongoing management whilst enhancing understanding and acceptance of the development activity (Morrison-Saunders et al., 2001), as reflected in Principle 13. Ideally, then, EIA follow-up should be designed to involve stakeholders, with the minimum position being to allow for open and transparent communication with affected persons so that EIA follow-up outcomes can be understood (Bisset, 1987; Morrison-Saunders et al., 2007).

Use of traditional environmental knowledge by indigenous peoples may play an important role in the content of EIA follow-up (e.g. Ross, 2004; Noble, 2015), as well as being a way of involving affected communities in EIA follow-up.

Referring to communication more generally, Bisset (1987) suggests information pertaining to an EIA should be in a form that non-experts can understand to participate in the decision-making processes, therefore promoting learning and influencing of future EIA projects. Such information can be transmitted through online media outlets to maximize access and availability. Thus, information should be appropriate to the stakeholder being involved in EIA follow-up, be transparent in nature and promote continuous learning opportunities (Morrison-Saunders et al., 2007).

Borrowing from the recent work on criteria for impact assessment effectiveness by Pope et al. (2018) we invoke the principle of legitimacy as an important test of the Communication element of EIA follow-up: Is the EIA follow-up program perceived to be legitimate by stakeholders? Such a judgment must be made in a holistic fashion in the sense of considering the overall components of a follow-up program taken together along with any external evidence of relevance; for example, if there is any controversy, or conversely particular success stories, regarding a project, this might feature in local newspaper or other media stories. The dimensions of EIA follow-up are inter-related in this regard; thus, each of the previous dimensions and criteria for best practice follow-up whether taken together or separately will contribute to stakeholder perceptions of the legitimacy of EIA follow-up programs.

This leads us to the following criteria for evaluating the communication dimension of a follow-up study of an individual project:

14. Are interested and affected parties kept informed of EIA follow-up activities?

15. Are interested and affected parties appropriately engaged in EIA follow-up activities?
16. Is evidence provided of learning relevant to ongoing project management?
17. Is evidence provided of learning relevant to other future EIAs?
18. Is the EIA follow-up program perceived to be legitimate by stakeholders?

3.5 Governance

As previously explained in Section 1, we employ the term governance in this paper to mean the processes and structures for ensuring firstly that there is commitment to implement the four key tasks of follow-up: monitoring, evaluation, management and communication (Principle 3), and secondly that processes to do so are in place and functioning (Principle 1). In turn, these processes must reflect the specific context within which they are located, and be appropriately integrated with other relevant processes (Principle 4). Principle 4 is thus mainly relevant to a macro, or system-level review and therefore is not reflected in our criteria for the Governance dimension. At the level of the individual development, follow-up should appropriately reflect the nature and stage of the development (Principle 14) and continue in appropriate form over the entire life of the development (Principle 16).

Responsibility and accountability are strong themes in the Principles, as indeed they are for EIA practice more generally (Gibson et al., 2005; Sinclair et al., 2018; Yang, 2018). Principle 7 evokes the ‘polluter pays’ principle, conferring responsibility for follow-up primarily onto proponents, while regulators have a role in ensuring that follow-up occurs (Principle 8). Roles and responsibilities should be clearly allocated throughout the follow-up process (Principle 12), including for specific management actions, as already discussed in Section 3.3.

The importance of collaboration between stakeholders in follow-up is highlighted in Principle 10; the process of follow-up itself might aid negotiation between stakeholders and development of a shared understanding of project performance and ongoing responsibilities, especially where multiple parties are involved in EIA follow-up such as the example of independent follow-up agencies used in Canadian practice (e.g. Ross, 2004).

Finally, Principles 14 and 17 emphasise the need for follow-up to be pragmatic, fit-for-purpose and cost-effective. We argued in Section 3.1 that these qualities are largely achieved by focusing follow-up activities on significant impacts, although noting the risk of ‘missing’ unpredicted impacts and the importance of adaptive management and learning (Arts et al., 2001; Arts and Morrison-Saunders, 2004).

This leads us to the following criteria for evaluating the governance dimension of a follow-up study of an individual project:

19. Are there plans in place to ensure that follow-up is maintained throughout the life of the development and tailored accordingly?
20. Does the proponent accept responsibility for the follow-up process and accountability for the environmental impacts of the development?
21. Does the regulator actively ensure that appropriate follow-up is taking place?
22. Are roles and responsibilities for follow-up clearly and appropriately defined?
23. Are there mechanisms to promote collaboration between stakeholders in follow-up?
24. Is the follow-up process pragmatic, fit-for-purpose and cost effective?

4. Applying the best practice EIA follow-up criteria to a case study

To test the utility of our best practice EIA follow-up criteria, we apply them to the case study of the Shell Cove Marina Project in New South Wales. As noted in the Methods (Section 2), this requires applying the judgment of the evaluator based on the available follow-up program information. For us this depended solely upon publicly available documents. However, in other circumstances an evaluator may have access to other documentation (e.g. internal communications or records of proponents or regulators) as well as interviews with the people responsible for conducting follow-up or with stakeholders affected by or having a particular interest in the project performance or outcomes. An overview of the project, along with salient details of the EIA process and follow-up arrangements, is provided in Box 1.

Box 1 Overview of Shell Cove Marina Project

Context

Considered one of the largest coastal/tourism development projects to be initiated by local government in Australia, the Shell Cove Marina was developed as a joint venture between the Australand (now Frasers Property) and The Shellharbour City Council, in the early 1970/80's, (Benkendorff, 1999). The \$1.5 billion project comprises a marina (30% larger than Darling Harbour in Sydney) and assorted infrastructure to cater to the growing community and increase tourism within the Illawarra region (Coastwide Civil Engineering, 2017).

Assessment Process

Following designation as a Major/State Significant Development (LFA, 1995a) and a series of feasibility studies to determine marina location and funding, the initial Environmental Impact Statement (EIS) was prepared in 1995 with updates made in 2006 to account for modifications put forward by the proponent to improve design and further reduce potential impacts arising from the development (LFA, 2007). Ministerial consent was granted in 2006 in which planning for development began in 2011 and construction in 2012/13.

Given the size and complexity of the project, the initial EIS for the project was large, running to some 900 pages covering various assessments required by significant development assessment applications, including public consultation reports, ecological survey assessments, individual impact assessments, cultural heritage assessments, economic impact assessment and related state significant wetland translocation activities.

Expected Significant Impacts

Expected significant impacts from the development included threats to biodiversity of flora/fauna (mainly marine fauna), leaching from contaminated soils (especially from acid-sulphate soils), undesirable water quality, excessive noise and soil movement resulting from blasting and other activities and air pollution (such as dust).

EIA Follow-up Arrangements

Provisions in place for follow-up are currently limited, however the items below are required for all state significant development proposals in NSW. Considerations for this particular project include the following:

- Monitoring is a required activity for significant development proposals (Benkendorff, 1999), while more specifically for marina developments, significant impacts include emissions to air and water, acid sulphate soils, noise and vibration (DUAP, 1996).
- The Ministerial approval requires the proponent to monitor noise within one month of completion for each stage in addition to ensuring control measures are in place for potential impacts. Indicative Standard Conditions are set to assist with understanding administrative and reporting conditions for development. Compliance with major project assessment requirements is determined by the Probity Advisor and the proponent along with the local government (Council of the City of Shellharbour, 2011; Department of Planning and Environment, 2018).
- Monitoring of physical impacts is compared with performance criteria/standards laid out by the Environmental Protection Authority (EPA).

We give a brief qualitative evaluation of performance for each of the dimensions of EIA follow-up in Sections 4.1-4.5.

4.1 Monitoring performance

A summary account of Monitoring performance for the Shell Cove Marina is presented in Table 2.

Table 2: Evaluation of monitoring for the Shell Cove Marina

Monitoring: the collection of activity and environmental data both before (baseline monitoring) and after activity implementation (compliance and impact monitoring)		
Criteria	Rating (yes/no/partially)	Comments
1. Is monitoring conducted using appropriate and well-defined methods?	Yes	Monitoring is guided by regulations in NSW for this. Detailed methods for monitoring impacts are provided in post-approval documentation such as Secretarial Environmental Assessment Reports.
2. Are all impacts considered to be significant being monitored?	Partially	Physical impacts (on air, water, noise, vibration, blasting and acid-sulphate soils) have been monitored on a monthly basis in accordance with legal requirements (Coastwide Civil Engineering, 2018).
3. Is there a supplementary process to ensure that significant impacts that were not predicted are identified and subsequently addressed?	Yes	Many modifications have been made to the design of the marina to account for additional suspected impacts to the ecology and coastline of shell cove and a separate environmental assessment report was prepared by the proponent (Ethos Urban, 2017) to address these matters. At the time of research evaluation and decision-making on this by the Department of Planning was pending (DPE, 2018); but it is anticipated that this process will likely result in further modifications relating to new impacts and issues that have arisen since the initial EIS in 1995.
4. Subject to significance, are sustainability impacts being monitored?	Partially	There was little to no evidence of social and biological monitoring during construction, despite calls for more extensive biological monitoring to take place (Benkendorff, 1999). Water quality targets appear inadequate to account for proposed increases in housing density and associated infrastructure (McIlwain, 2018).
5. Subject to significance, are cumulative effects being monitored through an appropriate mechanism?	Unable to judge	Insufficient evidence of this found to date. Passing mention of cumulative impacts is made in some of the EIA documents, but these are not identified or discussed further.
6. Are the interrelationships between individual impacts and related monitoring activities explained?	No	No consideration of inter-relationships was detected.

4.2 Evaluation

A summary account of Evaluation performance for the Shell Cove Marina is presented in Table 3.

Table 3: Evaluation of monitoring for the Shell Cove Marina

<i>Evaluation: the appraisal of the conformance with standards, predictions or expectations as well as the environmental performance of the activity.</i>		
Criteria	Rating (yes/no/partially)	Comments
7. Is evaluation undertaken in accordance with appropriate and well-defined methods?	Partially	Some methods appear to be out-dated and do not conform with best practice expectations; for example, current targets for water quality for instance are considered inadequate for proposed modifications to the development, thus limiting control of water pollution (McIlwain, 2018).
8. Are clear, pre-defined and well-justified performance criteria provided for guiding evaluation outcomes?	Yes	Evaluation of monitoring has been in accordance with scoping for the EIS and the approval conditions – i.e. in conformance with EPA standards with compliance subject to external validation (Box 1). Newspaper items imply that economic evaluations have been conducted given numerous financial comments (McIlwain, 2017). A statement of commitments details expected outcomes from proposed management efforts (LFA, 2010).

4.3 Management

A summary account of Management performance for the Shell Cove Marina is presented in Table 4. To date no significant events suggesting any major damage or negative impacts to the environment have been reported, suggesting that the management regime established for the Shell Cove marina project has been effective during the initial construction period.

Table 4: Evaluation of management for the Shell Cove Marina

<i>Management: making decisions and taking appropriate action in response to issues arising from monitoring and evaluation activities .</i>		
Criteria	Rating (yes/no/partially)	Comments
9. Is there evidence that management actions seek to minimize the negative consequences and maximise the positive?	Yes	Modification documents indicate potential improvements in minimising negative impacts on the environment following advice from the EPA, Council of the City of Shellharbour and regulatory bodies. An Environmental Management Plan and a Pollution Incident Response Management Plan have been prepared to both mitigate and respond to potential impacts, whilst ensuring management strategies meet with legislative requirements. The initial stages of development construction were given an environmental award by the City of Shellharbour (Harper, 2012).
10. Are the interrelationships between individual mitigation and management activities explained?	No	Not detected.
11. Are management actions implemented in a timely fashion?	Partially	Construction activity and associated management actions have been delayed relative to what was originally envisaged in the EIS (it has been 30 years since the project was planned and then implemented due to financial issues, among other issues) (McIlwain 2017).
12. Are responsibilities allocated for undertaking and signing off on management actions?	Yes	Responsibilities pertaining to each action for the marina have been given to respective management teams.
13. Are adaptive management measures (i.e. changes or alterations to former mitigation measures) explained?	Partially	Modifications for some activities were detected in the recent Concept approval plans for Northern region. A Modification Application to increase dwelling number and revised infrastructure including an Environmental Assessment Report was publicly exhibited between September and October 2017 ¹ . More information was required in the EIS upon writing this summary to satisfy regulatory authorities.

4.4 Communication

A summary account of Communication performance for the Shell Cove Marina is presented in Table 5. Most of this material has been sourced from third party sources as there is no formal requirement for communication of EIA follow-up activity beyond reporting on monitoring. Consequently, there is limited information available to verify any evidence of learning for project management. Overall with regard to meeting regulator expectations, the proponent has sufficiently satisfied most concerns for the development. Ultimately, though, it is too early in the development cycle to judge legitimacy and our evaluation, being based solely on published accounts, has not extended to interviewing stakeholders to solicit individual perspectives.

¹ documents publicly available at:

http://majorprojects.planning.nsw.gov.au/index.pl?action=search&page_id=&search=shell+cove&authority_id=&search_site_type_id=&reference_table=&status_id=&decider=&from_date=&to_date=&x=68&y=20 [accessed 11 December 2018]

Table 5: Evaluation of communication for the Shell Cove Marina

<i>Communication: informing the stakeholders about the results of EIA follow-up in order to provide feedback on project/plan implementation as well as feedback on EIA processes.</i>		
Criteria	Rating (yes/no/partially)	Comments
14. Are interested and affected parties kept informed of EIA follow-up activities?	Partially	Reporting has consisted of updates on construction progress for each stage of development, monitoring data and incident reporting to major stakeholders and interest groups. There does not appear to be any formal information provision related to follow-up activities for EIA beyond the physical environmental monitoring programs (Coastwide Civil Engineering, 2018). No active engagement of response to current activities other than when modifications to the development are put forward to the Dept. of Planning and Environment for comments. Some information related to EIA activity is difficult to access (e.g. the EMP and monitoring data is only available via the contractor's website). Local news reports have delivered some information on activities for the project during construction. Considerable information is available relating to the commercial, residential and recreational aspect of the development relative to the environmental aspect.
15. Are interested and affected parties appropriately engaged in EIA follow-up activities?	Partially	There does not appear to be much engagement with affected parties and interest groups beyond regulators (e.g. Council of City of Shellharbour), other than information provided by various media outlets and community excursion days.
16. Is evidence provided of learning relevant to ongoing project management?	Unable to judge	Unknown – the project is still at a relatively early stage of development, although the proponent has responded to input received from regulator and public submissions.
17. Is evidence provided of learning relevant to other future EIAs?	Partially	There is much to be learnt from this particular project, as demonstrated by researchers who have mentioned Shell Cove in publications. To date learning has been generated through independent researcher studies rather than by the proponent's follow-up program specifically.
18. Is the EIA follow-up program perceived to be legitimate by stakeholders?	Unable to judge	Mixed reviews of the development are apparent from public stakeholders while regulator concerns appear to have been satisfactorily addressed in ongoing assessments and modifications to the project. There has been considerable opposition to the project in the past (Vivian Twyford, 1995; Benkendorff, 1999) and some negative reporting on funding provisions for the development controls more recently (McIlwain, 2017). Currently it is too early in the development cycle to judge response to EIA follow-up performance.

4.5 Governance

A summary account of Governance performance for the Shell Cove Marina is presented in Table 6.

Table 6: Evaluation of follow-up governance for the Shell Cove Marina

<i>Governance: the processes and structures for ensuring that there is commitment to implement the four key tasks of follow-up: monitoring, evaluation, management and communication, and that processes to do so are in place and functioning.</i>		
Criteria	Rating (yes/no/partially)	Comments
19. Are there plans in place to ensure that follow-up is maintained throughout the life of the development and tailored accordingly?	Partially	The Department of Planning and Environment (2018) makes reference to ongoing assessments in light of new information as the development progresses, but related documents such as the recent environmental assessment of project modifications (Ethos Urban, 2017) do not specifically mention follow-up proposals or activity.
20. Does the proponent accept responsibility for the follow-up process and accountability for the environmental impacts of the development?	Yes	Responsibility and accountability falls with both the proponent and local council as noted in Box 1.
21. Does the regulator actively ensure that appropriate follow-up is taking place?	Unknown	Insufficient information was found to determine this. Occasional reviews have been made over the duration of the project development which suggests appropriate follow-up is taking place to address ‘current’ issues (e.g. Ethos Urban, 2017; DPE, 2018, noting however that these documents are new assessments for amendments to the original proposal rather than distinct programs of follow-up).
22. Are roles and responsibility for follow-up clearly and appropriately defined?	Yes	Roles are determined in the Ministerial approval and compliance reports of the Probity Advisor as noted in Box 1.
23. Are there mechanisms to promote collaboration between stakeholders in follow-up?	Partially	Limited information was found overall. Engagement with the community has occurred as part of ongoing assessments of modifications to the original proposal (Ethos Urban, 2017; DPE, 2018). This includes use of social media, letters, news and meetings.
24. Is the follow-up process pragmatic, fit-for-purpose and cost effective?	Unknown	Insufficient information is available currently and further progress with the development would be necessary before this could be judged.

5. Reflections and Conclusions

In this paper, we set out to develop an evaluation framework that can be used to test any project-based EIA follow-up practice. International Best Practice Principles for EIA Follow-up, published by IAIA, provided our starting point. Through a process of reflection on the Principles, their supporting text, and relevant literature, we distilled a focused and streamlined set of 24 criteria across the monitoring, evaluation, management, communication and governance dimensions suitable for evaluating follow-up processes. We then tested the utility of our framework by applying our criteria to a case study (the Shell Cove Marina, in New South Wales, Australia).

We found our criteria relatively easy to apply to the selected case study, as evaluation against the majority of the criteria could be undertaken through a desk-top document review. Performance against some criteria, however, could not be robustly judged by this method, as indicated in Tables 2–6, and a comprehensive evaluation would require additional methods of data collection such as interviews with key stakeholders. This was particularly the case for the Communication and Governance criteria where ideally the viewpoints of stakeholders

would be solicited directly. While the need for additional methods to evaluate these criteria may be specific to this case study and our own circumstance as summative evaluators, we believe it is likely that this would arise also in other applications of our criteria in practice, since these particular aspects of EIA follow-up are less likely to be clearly and unambiguously documented. Despite this, there were no occasions when we found the criteria themselves to be lacking.

The evaluation process undertaken relied on subjective judgment of the evaluator when evaluating the extent to which the criteria have been met in practice, and in this way our approach is similar to those of other kinds of EIA evaluation processes discussed in Section 1 (Lee et al., 1999; Sandham et al., 2013; Pope et al., 2018). Subjectivity in such cases is generally addressed through duplication of evaluations using separate reviewers, and subsequent agreement of scores by consensus; Peterson (2010) highlighted the reduced variation in agreed evaluation scores where multiple evaluators are used. Thus, we advise the use of at least two evaluators when applying our criteria; in our test case only the lead author carried out the evaluation because the aim was to test the utility of our approach to the evaluation of follow-up practice rather than to critique the specific case.

A feature of our framework is that it could potentially be applied by any stakeholder to any case study. In our case we were all independent of the case study and our only ‘vested interest’ in applying the criteria to Shell Cove was simply to test the utility of our criteria. The criteria could equally be used by proponents (or their representatives), by regulators or by community members interested in understanding project performance. We draw attention to the value of having independent environmental checkers as advocated in the work of Wessels (e.g. Wessels, 2013; Wessels et al. 2011 & 2015).

Our follow-up criteria were specifically designed for EIA project evaluation. We can, however, see potential to adapt our criteria to the evaluation of strategic environmental assessment (SEA) follow-up practice, that Principle 5 does allude to strategic level follow-up. At this point, we have not fully considered how this might best be undertaken, bearing in mind the ‘splash’ effect of SEA as identified by Partidário & Arts (2005, p247), whereby the influence of implementation a policy, plan or program might have flow-on effects in ‘all directions’ simultaneously; i.e. influencing other strategic level initiatives as well as projects. In contrast, follow-up of projects is relatively contained in terms of the direction and scope of outcomes being examined. Nevertheless, there is potential for future research to appropriately adapt and apply a similar approach as we have attempted in this paper that is tailored to SEA follow-up.

As explained in Section 3, our criteria reflect best practice follow-up rather than just minimum compliance with prevailing local legislation. On this basis, our criteria are deliberately generic so that they could be applied anywhere in the world. We do acknowledge that there is some conflict here with the notion of follow-up being tailored to the local context (Principle 4 of Morrison-Saunders et al., 2007), but we believe that evaluators applying our framework will almost certainly interpret the criteria in the context of the jurisdiction within which they are operating or most familiar and therefore to some extent Principle 4 will be reflected in the outcomes of any evaluation. Ultimately, we hope that our distillation of criteria for best practice EIA follow-up are useful to practitioners interested in advancing the practice of EIA and its contribution to sustainable development.

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