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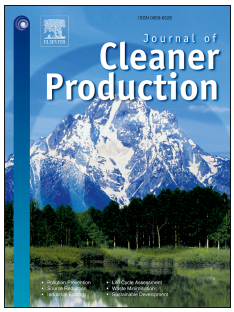

Appraising offsets as a tool for integrated environmental planning and management

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Appraising Offsets as a Tool for Integrated Environmental Planning and Management

Abstract

The steady growth in major development projects suggests that firms will increasingly need to respond to more stringent environmental determinations and project approvals. Accordingly, this article positions offsets as a mechanism for integrated environmental planning and management in response to development impacts. The study uses a stakeholder analysis methodology to identify and explicate the environmental planning and management practices that can be delivered by offsets, while demonstrating how firms and governments may use offsets as a tool to plan and manage environmental conservation and protection. However, despite our positive expectations, the research found that the current framework of offsets rules, regulations and supporting infrastructure requires changes if effective planning and management of the environment is to be facilitated through the offsets mechanism.

Highlights

- Offsets are often used to reduce environmental impacts
- Offsets can used for environmental planning and management
- Stakeholder analysis was undertaken to determine management practices that can be enabled through offsets
- Findings suggest that current framework for offsets needs to change to enable integrated planning and management

Keywords: development, environment, offsets, planning, management

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1. Introduction

Early studies identified that Integrated Environmental Planning and Management (IEPM) practices must take account of technical and socio-political factors, multiple layers of government, and interdependent environmental policies and programs (Petak, 1980; Armour, 1990; Guo et al., 2001). At that time, the failure to see multiple environment stakeholder views; apply scientific and business disciplines to problem solving; and utilize sufficient resources, were identified as shortcomings (Petak, 1980). In sum, the linking of ecological, technical, and business resources for IEPM was considered critical if the environmental conservation goals associated with proposed developments were to be met (Margerum, 1997, 1999a). Thus, we have defined IEPM as 'the co-ordinated planning and management of land, water and other resources within a region, with the objectives of conserving or rehabilitating the resources and environment, ensuring biodiversity, minimizing degradation, and achieving specified and agreed land and water management and social objectives' (adapted from Hooper et al., 1999).

In contemporary business, the pipeline of large scale developments in Australia suggests that firms will be faced with a growing number of environmental determinations and approval conditions (The Australian Trade Commission, 2014). Hence, developers will need to comply with project approvals granted by the Australian federal government under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (Commonwealth of Australia, 2015). Note, the EPBC Act 1999 governs the regulation of impacts on a specific set of environmental values, also termed 'matters of national environmental significance' (Commonwealth of Australia, 2009; Maron et al., 2015a). Importantly, project approval conditions set out the scope of a coordinated program of conservation and/or restoration work required to address the project's residual impacts (Commonwealth of Australia, 2015; Maron et al., 2015a). Accordingly, this raises two important questions.

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First, is there a high utility mechanism firms can use to effectively plan and manage their conservation program? The early IEPM literature suggests that it is extremely difficult with developers needing to integrate complex scientific, cultural and business knowledge with socio-political relationships and inter-organizational connections, all under an umbrella of environmental regulation (Petak, 1980; Margerum, 1997; Guo et al., 2001; Hanna et al., 2007). Second, what key practices should the mechanism possess to deliver effective IEPM? Some IEPM related studies argue that the planning and management functions should be implemented using practices such as applying combinations of scientific and indigenous knowledge (Lane and McDonald, 2005), landscape level analyses (Ramírez-Sanz et al., 2000; Selman, 2004), and transparency in program designs (Born and Sonzogni, 1995; Selin and Chavez, 1995; Rydin and Pennington, 2000; Selman, 2004). Hence, identifying a construct that enables IEPM is an important theoretical and practical matter.

Accordingly, we argue that the development and implementation of environmental offsets provides firms with a viable vehicle to undertake successful IEPM (BBOP, 2012). In this study, environmental offsets are defined as 'the measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken' (for example, a firm can take biodiversity protection actions to compensate or offset the impacts of a development project) (BBOP, 2012; Bull et al., 2013). In commending the use of offsets, we acknowledge that this construct can suffer from various planning and management deficiencies including time lags and risks of failure (McKenney and Kiesecker, 2010; Burgin, 2011; Maron et al., 2012). In this respect, we consider it important that identified offsetting practices should work to reduce these weaknesses (Bull et al., 2013). Hence, understanding how we might best use offsets for IEPM provides important contributions in the environmental planning, management and policy disciplines (Born and Sonzogni, 1995; Margerum, 1997; Koski, 2007; Delmas and Young, 2009).

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The balance of the article is as follows. First, the study will review some of the IEPM and offsets literature, and present a model of offsets enabled IEPM. Second, the article will provide background to the use of offsets in Australia and the research method. The article's third section will summarize the results using a planning and management flow diagram and discuss the key findings. The paper concludes with recommendations of how policymakers and regulators might assist offsets-driven IEPM.

2. Literature Review

2.1 Theory of Integrated Environmental Planning and Management

Early studies identified IEPM as highly complex and requiring greater emphasis in environmental practice communities (Petak, 1980; Armour, 1990; Guo et al., 2001). Theorists and practitioners have identified several characteristics of IEPM practices that are important (Margerum, 1997), including being holistic, interconnected, goal-oriented, coordinative, and strategic (Born and Sonzogni, 1995; Margerum, 1997). Accordingly, IEPM must encapsulate the connections between environmental, development and societal policies and resources; common stakeholder goals; collaboration between public and private organizations; and, making best use of strategic resources (Margerum 1997, 1999b; Margerum and Hooper, 2001). In aggregate, these IEPM characteristics offer enhanced decision-making for successful environmental outcomes.

Several studies outline crucial business processes and procedures that should be implemented. Potentially the most significant process was the facilitation of transparent community based environmental planning and consultations (Selin and Chavez, 1995; Margerum and Born, 2000; Selman, 2004; Lane and McDonald, 2005). In addition to sharing objectives, this approach enabled inclusive application of scientific, indigenous and cultural knowledge in IEPM (Scott Slocombe, 1993; Rydin and Pennington, 2000; Lane and McDonald, 2005). Experts opined that IEPM must be founded on rigorous governance processes that evaluate environmental program costs, benefits and risks, having regard to available resources (Armitage, 1995; Ramírez-Sanz et al., 2000). Hence, IEPM should lever sustained improvements in socially-acceptable development

projects and environmental conservation while acknowledging competing business and investment priorities (Conacher, 1994; Hwang, 1996; Margerum, 1999b, Ramírez-Sanz et al., 2000).

In closing, we would highlight that IEPM should strengthen the links between environmental impact assessments and planning and management systems (Eccleston and Smythe, 2002; Hanna et al., 2007). This reinforces the importance of IEPM, specifically the accurate measurement of environmental impacts, and establishing risk profiles for proposed conservation measures (Armitage, 1995; Hooper et al., 1999; Eccleston and Smythe, 2002; Hanna et al., 2007).

2.2 Environmental Offsets

Early studies considered offsets to be an important tool for the planning and delivery of environmental conservation measures (Cutright, 1996; Hardner et al., 2000); with this study positioning direct offsets and other compensatory measures (OCM, or 'indirect offsets' as denoted in in the international literature) (BBOP, 2012) as a vehicle for IEPM (Margerum, 1997). However, while offsets might appear to be the ideal IEPM device (Burgin, 2010), some drawbacks are present in the technical literature (Bull et al., 2013). For ease of discussion, we have split the views into planning and management dimensions.

In environmental planning, some of the key issues include the valuation of impacts to be offset; assuring offsets equivalence; defining impact reversibility; and undertaking offsets risk planning. The precision of complex offsets valuations can present a challenge as they combine factors such as land area, comparable biodiversity condition, habitat quality, and management expertise, using composite estimates (Latimer and Hill, 2007; Norton, 2009; McKenney and Kiesecker, 2010; Sherren et al., 2012; Gardner et al., 2013). In addition, net present value calculations may apply discount rates that vary from 2-14% depending on program and risk factors (Overton et al., 2013; Alvarado-Quesada et al., 2014). The planning of offsets equivalence is also contentious, with differences of opinion arising over proposed in-kind or out-of-kind (for example, same or differing species), and direct offsets (for example, site based conservation) or OCM (for example, research funding, financial settlements) (Bekessy et al., 2010; Overton et al., 2013). In particular,

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equivalence determinations where the impact-offset couple vary in type (or species), geographic location, and contextual ecology are considered to be vexed (for example, trading flora loss for fauna gain) (Bekessy et al., 2010; Burgin, 2010; Bull et al., 2013). Also, offsets should be planned so that measures work to reverse the development impacts (Norton, 2009; Morrison-Saunders and Pope, 2013; Regnery et al., 2013). However, some studies suggest this rarely occurs in practice, resulting in irreversible environmental losses (Morrison-Saunders and Therivel, 2006; Bull et al., 2013). Hence, when combined with the requirement for risk planning (Gordon et al., 2011; Maron et al., 2012; Curran et al., 2014), these types of offsets shortcomings should be minimized.

In environmental management, several distinct difficulties emerge. One of the primary issues of concern in offsets management is the accurate and consistent accounting of environmental losses and gains (Brownlie and Botha, 2009; Virah-Sawmy et al., 2014). In particular, dynamically changing conditions means that net losses and gains must be carefully assessed against fixed or variable environmental baselines (factoring in background changes), limit losses, and comply with policy (Bull et al., 2014; Gordon et al., 2015; Maron et al., 2015a). Indeed, some experts argued that offsets should provide for additional contributions ('additionality') to conservation (over and above current protections) to counterbalance any accounting system flaws and problems (McKenney and Kiesecker, 2010; Rajvanshi et al., 2011; Pickett et al., 2013). Other exampled tensions focus on offsets scheduling and the requirement for long term funding and administration (note, temporal lagging between impacts and offsets outcomes may be several years); management of risks including the use of adaptive management practices (Maron et al., 2012; Curran et al., 2014); and inconsistencies in offsets terms and concepts that reduce the precision of robust policy design and offsets implementation (Bull et al., 2016). In combination, some experts have suggested that offsets should start in advance of project commencement (reduce the impact-outcomes lag), and that offsets risks might be lessened using longer term contracts with multiple milestones (Doole et al., 2014).

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However, while acknowledging the aforementioned issues, we posit that offsets may still provide a suitable IEPM instrument (Margerum, 1997; Dietz and Adger, 2003). Moving forward, studies suggest that offsets might support the coordinated and strategic growth of quality protected habitats (Bayon and Jenkins, 2010; Alvarado-Quesada et al., 2014; Doole et al., 2014), while offering a means to increase environmental planning and protection investments (Kiesecker et al., 2009; Kumaraswamy and Udayakumar, 2011; Quintero and Mathur, 2011). This study looks to explore some of the potential for offsets-enabled IEPM.

2.3 A Model of Offsets-enabled IEPM

The research model is an adaptation of the offsets policy schema released by the Australian government as in Figure 1 (Commonwealth of Australia, 2012).

Figure 1

The model has impact and offset components cast into a theoretical IEPM scheme. In using offsets to enable IEPM, the offsets planning and management functions are merged to enfold plan assessment-approval, implementation, monitoring and evaluation, and results/outcomes reporting (Margerum, 1997). Note, in accordance with federal offsets policy and consistent with offsets planning (Commonwealth of Australia, 2012), implementation includes ongoing provision of funding, risk management, and schedule controls. In this way, the model theoretically caters for the planning and management requirements of the project developer and offsets regulator (Armour, 1990; Born and Sonzogni, 1995; Margerum, 1997; Margerum and Born, 2000), while providing a suitable investigatory lens for the study.

3. Research Context: Environmental Offsets in Australia

While a history of the policy can be found in Miller et al. (2015), the EPBC Act 1999 – Environmental Offsets Policy and offsets guide were launched in 2012, providing developers with a framework of offsets principles, planning and development guidelines, and a computerized offsets assessment tool (Commonwealth of Australia 2012, 2014). In parallel, various state governments (for example, New South Wales, Queensland, Western Australia) established their

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own offsets policy and apparatus under the Intergovernmental Agreement on the Environment (1992) (Commonwealth of Australia, 1992). As an example, the New South Wales government established a Biobanking Scheme where landowners can earn biodiversity credits by protecting their land's environmental value, with credits made available to offset development impacts (State of New South Wales, 2015). Similarly, Queensland offers developers the option to provide a financial settlement for state-approved offsets (Queensland Government, 2015a). While acknowledging the importance of state offsets policies, this study is limited to the use of EPBC Act 1999 offsets for IEPM.

The research data is drawn from a public inquiry conducted over the period 2014-2015, into the effective use of offsets in development project approvals granted by the federal government under the EPBC Act 1999 (Commonwealth of Australia 2012, 2014). This foundation is important for three reasons. First, the inquiry focused on environmental offsets planning and management thereby offering an opportunity to examine offsets as an IEPM device. Second, an open inquiry provided different stakeholders with a communications channel to convey views on offsets planning and management. Third, the inquiry used five development projects with substantial impacts as focal points for stakeholders' submissions on offsets planning and management (see swim lane diagram in Figure 2). In sum, this foundation supports our research model and provides a source of varied opinion on offsets-enabled IEPM.

Figure 2

4. Appraising Offsets as an IEPM tool

4.1 Data sources

The inquiry received 97 submissions that addressed offsets related planning and management that were collected from the inquiry webpages in written format (.pdf files). The stakeholders were functionally divided (Selin and Chavez 1995) as follows: (i) 47 Non-government organizations (environment) (NGO-ENV) (fauna/flora conservation, education, legal services, and traditional owners); (ii) 9 NGOs (business) (NGO-BUS) (general business, mining, agriculture and

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aquaculture); (iii) 7 Government organizations (GO) (political party, city council, regional development agencies, indigenous land and advisory, environmental protection); (iv) 5 Businesses (consulting, developers) (note, three of the project developers, Whitehaven Coal, QGC Pty Ltd, and Jandakot Airport Holdings provided submissions); and (v) 29 individuals (names and submissions are available from the authors, and on the inquiry webpages, see Commonwealth of Australia 2014).

4.2 Methodology

The research methodology used structured coding of submission statements and content analysis (Miles et al., 2015). A data structure of four branch nodes (N1–N4) matching offsets planning; plan assessment; implementation monitoring and evaluation; and, results reporting, respectively, was created for the analysis (enabled tight coding of statements to nodes) (Corley and Gioia, 2004). The submissions were read and codified using numerical margin codes, with codes then entered into a purpose built research database (partitioned into four nodes) that matched the code number, statement content, and stakeholder submission number (Miles et al., 2015). Using a two-step process, once open coding was completed within the nodes, the results were filtered and axially (sorted) coded into summaries of planning and management themes as depicted in Figure 3. Coding interpretations were cross-checked (using inter-coder protocols) and differences resolved through mediation, including drawing on advice and reviews from expert peers (Denzin and Lincoln, 2011).

Figure 3

4.3 Summary of Results

The summary of results is presented using two artefacts. First, coding results are broken down into the aggregate environmental planning and management practices by stakeholder classification as in Table 1 (Denzin and Lincoln, 2011). This allows readers to easily identify concentrations of opinion and stakeholders weightings in the planning and management areas. Second, the results have been used to compose a weighted planning and management flow

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diagram of offsets-enabled IEPM, representing key environmental planning and management practices, as depicted in Figure 4 (note, weighting factors drawn from Table 1) (Miles et al., 2014).

These results offer three major observations. First, the majority of statements have come from environmental NGOs (66%) and individuals (19%), shaping the analysis with a strong environmental conservation theme. Second, planning and management themes are relatively balanced having drawn close to equal volumes of stakeholders' statements. Third, planning themes are concentrated on project developer planning practices, while management themes are focused on regulatory management of offsets. This is reflective of the large number of environmental conservation statements, and fewer statements provided by firms and business advocates (< 11% overall).

Table 1

Figure 4

5. Findings

5.1 Integrated Planning Processes

Environmental NGOs and individuals opined that the application of the project impacts and offsets assessment guide (Commonwealth of Australia, 2014), scientific principles, criterion and indicators (as in the BBOP (2012) standard) and, apposite levels of transparency (Selman, 2004; Lane and McDonald, 2005) were key integrated planning processes (see examples below).

> ANEDO would support a robust methodology based on the best available peer-reviewed science that consistently implements the fundamental principles of offsetting (Australian Network of Environmental Defender's Offices, 4 Apr. 2014, p. 6).

> One way of improving environmental outcomes is for the Commonwealth to develop a methodology that provides a transparent, science-based system for measuring the impact of a new development (Wentworth Group, 17 Apr. 2014, p. 4)

These aggregate views are consistent with IEPM practices that focus on combining environmental planning with impact assessments (Hanna et al., 2007; Macintosh and Waugh, 2014), and incorporating community participation. In addition, stakeholders highlighted that offsets plans should be formally registered in a National Offsets Register (NOR). The NOR

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would support ongoing environmental information sharing and planning, and plans assessment and approval. However, given that no register exists, this presents an operational limitation in using offsets for IEPM. Thus, the federal government would need to implement a multipart database management system that could provide planning and management functions for developers and regulators (Margerum 1999a, 1999b). This is a key regulatory measure that would support offsets-driven IEPM; and demonstrates that, while offsets may look like an enabler of IEPM, further development is required.

5.2 Planning Scope

In our analysis, we separated the inclusion and exclusion of specific plan items into three segments. First, stakeholders considered that plans should contain direct offsets and OCM, underpinned by quality scientific information (Hooper et al., 1999) and inter-organizational relationships (Selin and Chavez, 1995). Importantly, these inclusions reinforce the IEPM principles related to the best use of resources and environmental knowledge; and enjoined organizations for environmental conservation (Margerum 1999a, 1999b; Margerum and Hooper, 2001) (see examples).

> Environmental offsets provide a vital (planning) tool for decision makers when considering the impacts of development. Offsets provide environmental benefits to compensate for residual significant impacts and can provide improved environmental outcomes in restoration and regeneration, protecting biodiversity, and indirectly through (research and education) programs that enhance conservation (New South Wales Minerals Council, 13 Apr. 2014, p. 4).

> Regulatory agencies have embarked on a new strategy for managing offset funds – Offsets Consolidation Funds. These funds consolidate more than one proponent's cash offsets into a fund which can be used for strategic conservation outcomes linked to the impact (Assoc. of Mining & Exploration Companies, 4 April 2014, p. 7).

Also, as mandated central planning and management requirements in federal policy (Commonwealth of Australia, 2012), the offsets schedule, costings and risk analysis must be included (Armitage, 1995; Selin and Chavez, 1995; Margerum, 1999a, 1999b; Ramírez-Sanz et al., 2000). So, under the combinative regulatory-policy framework, the offsets scheduling, funding and risk management should flow from planning to implementation management (see Figure 4). Crucially, these items reinforce the transitional links between environmental planning

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and management, and theoretically and practically anchor offsets in IEPM (Margerum 1999a, 1999b) (see following example).

> Project-specific offsets are generally developed on an ad-hoc basis, often under extreme time pressures. This creates a situation of considerable uncertainty for proponents, particularly given the uncertainty surrounding the efficacy of restoration offsets, the timescales and indeterminate costs. There is therefore an argument to be made for planning and delivery of offsets that provides proponents with greater certainty of their contributions. (Environment Institute Australia & New Zealand, 23 April 2014, p. 6).

Finally, stakeholders identified exclusions that represent unacceptable planning practices such as offsets carrying a high risk of failure, or are inconsistent with federal law (for example, currently protected land, no additionality) (Maron et al., 2015b, 2016a, 2016b). Critically, these items sit outside the established frame of IEPM characteristics and processes, rendering offsets less effective for IEPM (items warranted exclusion).

In sum, planned offsets and OCM must be consistent with the IEPM planning function. Arguably, if planned offsets cannot be transitioned into implementation due to deficiencies in characteristics and processes, then their efficacy is largely restricted. This suggests that developers might establish a rigorous pre-assessment protocol, thereby assuring that appropriate planning processes are followed and the plan conforms to IEPM characteristics (Margerum 1999a, 1999b; Margerum and Hooper, 2001).

5.3 Planning Assessment and Approval

If an offsets plan successfully transitions into assessment and approval processing, stakeholders presented four major processes (not currently explicit in federal policy) (Commonwealth of Australia, 2012) to be applied. First, the plan must be assessed by an independent scientific body (for example, environmental scientists and engineers) that provides unbiased and non-aligned opinion on scientific information quality and offsets risks. This is a cornerstone of IEPM (Scott Slocombe, 1993; Rydin and Pennington, 2000; Lane and McDonald, 2005), and enables objective testing of environmental impact assessments, ameliorating risks, and enhanced transparency (Lawrence, 2000; Cashmore, 2004; Macintosh and Waugh, 2014). As an example, some of the

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scientific inaccuracies related to the Maules Creek Coal Mine project offsets might have been addressed using independent peer review assessments (see Figure 2 notes).

Stakeholders also sought a process of strategic or continuum assessment of plans. This highlighted the importance of moving away from 'project by project' offsets assessment and management. Importantly, this was consistent with the tenets of IEPM (Born and Sonzogni, 1995; Margerum, 1997) and the positive international view of strategic assessment of offsets (landscape and aquatic expanses) (BBOP, 2012) (see following example).

> Strategic approaches to offsets have the potential to reduce duplication and improve timeframes as well as moving away from case-by-case assessments to strategic assessment at the landscape or regional scale (Chamber Minerals & Energy, WA, 4 April 2014, p.5).

The third process presents a guideline difficulty when using offsets for IEPM. In this situation, while stakeholders asserted that conservation areas delivered through offsets should be granted enduring protection, the federal offsets policy currently allows for implemented offsets to be subjected to future offset actions ('offset an offset') (Commonwealth of Australia, 2012). This is further complicated by additional protections offered by state and local governments that would require amendment for enduring protection (for example, some protected public land, such as state forests and nature refuges, allow exploration and drilling leases to be issued for those areas) (Queensland Government, 2015), and applying these changes to private land acquired for offsets enabled IEPM (Conacher, 1994; Hwang, 1996; Margerum, 1999b, Ramírez-Sanz et al., 2000). Accordingly, using offsets for enduring protection under IEPM can be problematic, requiring regulatory changes (Gunningham et al., 2003; Baldwin et al., 2012; Knill and Tosun, 2012).

While the final process garnered fewer statements, stakeholders considered legal enforceability of offsets as important. At present, the federal offsets policy provides developers with options to deliver direct offsets, OCM and market based offsets (for example, New South Wales Biobanking), and develop third-party offsets contracts with conservation organizations, indigenous corporations or rural landholders (State of New South Wales, 2015). However, direct offsets specified in project approval conditions are not subject to a standard government contract

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(offsets projects and reported outcomes are subject to mutual goodwill negotiations). Once more this presents a restriction on using offsets for the contiguous governance and legal enforcement of IEPM (Armitage, 1995; Ramírez-Sanz et al., 2000), requiring further regulatory change.

In essence, if we use offsets to deliver IEPM, the current federal offsets policy and associated regulations must undergo some specific aforementioned changes. Arguably, failure to make these adjustments render offsets as constrained or unviable apparatus for cohesive environmental planning and management.

5.4 Integrated Management Processes

Stakeholders concentrated their statements in the regulatory management of approved offsets, with four processes aimed at improving offsets management and transparency. First, while stakeholders acknowledged the federal compliance audit program (Commonwealth of Australia 2016), noting the small number of audits and limited portfolio resources (the program was funded to conduct only sixty-six audits during 2006-16), they argued regulators apply full compliance auditing to approved plans. Certainly, on the face of current information, the size and scale of offsets and OCM (see Figure 2) suggests that significant audit and legal resources will be required (note 19 legal actions brought before the Australian Federal (Environment) Court during 2004-15 resulted in damages of A$3,969,900) (see following example).

> The compliance audit process does not appear to have any capacity for capturing the effectiveness of any offset strategy in relation to the ecosystem being affected. In general, this process only targets a handful of the several hundred referrals considered each year. Many of these audits find instances of non-compliance. However, it does indicate that non-compliance with EPBC approvals is occurring and that perhaps resources need to be made available for more auditing to occur. (Friends of Grasslands, 3 April 2014, p.2).

In the second process, stakeholders reasoned that evaluation reports be centrally deposited in the NOR. We would assert that if offsets are used for IEPM, the coordinated management and sharing of environmental information is paramount (Margerum, 1999b). In doing this we build collaborative behaviours within and across stakeholder classes (Margerum and Hooper, 2001), and leverage aggregates of information to form core knowledge sets that support IEPM (Lane and

McDonald, 2005). Holistically, more open access to centrally held M&E information should advance transparency and stakeholder inclusion in long-term environmental management.

Following assessment, stakeholders argued for impartial M&E of approved offsets. From a regulatory perspective, this reinforces the importance of environmental science in offsets M&E (Lawrence, 2000; Cashmore, 2004; Macintosh and Waugh, 2014), while assisting governance and mediating perceptions of bias. Importantly, using an independent M&E body would move away from the current self-regulation and voluntary compliance outlined in the offsets policy (Commonwealth of Australia, 2015), while also addressing the perceived 'conflict of interest' issues raised by stakeholders. Fundamentally, this proposed process supports the foundations of IEPM (Margerum 1999a, 1999b), and would facilitate inclusion of offsets in ongoing environmental management.

The final process supports the goal of public transparency in environmental management (Selman, 2004). While covering a small number of stakeholder inputs, public access to environmental project evaluations would be a cornerstone of offsets-driven IEPM (Land and McDonald, 2005). We would stress that allowing open access to these evaluations would build further collective and supportive community based environmental planning and management, thereby providing a platform for consultation and collective governance (Margerum and Born, 2000).

5.5 IEPM Evaluation

Possibly the most important stakeholder message in the IEPM context (Margerum 1999a, 1999b) was that offsets plan M&E should be treated as a long-term scientific management program. Hence, we would take the long-term and purposefully strategic view of environmental protection, placing rigorous science at the centre of management practices (Lawrence, 2000; Cashmore, 2004; Macintosh and Waugh, 2014). In addition, stakeholders contended that adaptive management should be applied with commensurate modifications to the scale and scope of offsets projects as outcomes emerge (Gregory et al., 2006). Critically, adaptive environmental

management was offered as a means of providing constructive feedback to the developer, while taking account of dynamic changes within the environment (for example, due to climate variations, destructive weather patterns, other human interventions). In this context, the attributes would support offsets-driven IEPM (see examples below).

> It is generally considered critical that offsets be protected from risk of failure if they are to be effective in the long term, including through effective, long-term compliance monitoring and by specifying adaptive management frameworks and identifying actions that will be implemented in the event of initial failure (Environment Institute Australia & New Zealand, 23 April 2014, p. 10).

5.6 IEPM Reporting

The final segment of statements was very small (4.8% of coded statements) with stakeholders commending the value of reporting offsets plan outcomes and results (some emphasis given to reporting failed offsets and degraded land outcomes). This was observed as an intrinsic element of the current offsets policy (Commonwealth of Australia 2015), ongoing environmental management; and an essential process in IEPM (Margerum and Hooper, 2001).

6. Concluding Observations

In closing, we concede that the data used in this research largely reflects those stakeholder views associated with environmental conservation. In addition, the government inquiry, while seeking commentary on the use of offsets in large projects, received limited feedback from developers (Commonwealth of Australia, 2017). A potential reason for this might be that, during the period 2012 to early 2015, the federal offsets policy conditions were only applied to a relatively small number of 17 project developers under the ministerial approvals process (Commonwealth of Australia, 2017). Indeed, only five firms offered comments to the inquiry, with the three developers providing a limited number of defensive comments on their offsets proposals (see Table 1). Accordingly, the study has limitations and would have greatly benefited from more input from developers. We suggest future research that could explore business perspectives of offsets through methods such as interviews to establish whether the views of developers and other businesses offer additional information on the use of offsets in development projects. Nevertheless, we believe that the current research builds into the long held tradition of IEPM

literature dating back to the mid 1980s and makes valuable contributions through its two research questions.

In addressing the first research question, while we held high expectations that offsets would provide a suitable vehicle for IEPM, the analysis shows that the current framework of offsets policy, processes, procedures and infrastructure is not suitable and requires further development. In the planning context, stakeholders asserted that developers would need to ensure that their offsets plans are scientifically accurate and conform to federal regulatory guidelines, in terms of schedule, cost and risk management. Thus, while offsets offer potential for delivering the planning portion of IEPM, more stringent planning guidelines and processes are required.

In turning our attention to the question of IEPM practices, the results suggest that policy makers must further refine planning and regulatory management processes for offsets to be an effective lever. In particular, stakeholders argued that the environment should be treated as a strategic and enduring resource, with offsets projects subjected to legally binding contracts, rigorous compliance auditing, and legal enforcement. These types of regulatory measures were seen as critical for environmental management with further enhancements possible through the use of independent scientists and engineers for transparent environmental planning assessment, and longer term monitoring and evaluation. Regrettably, this shows that continuing improvements are required if offsets are to be used for IEPM.

As we bring this article to a close, we must admit to commencing this study with the notion that environmental offsets looked to offer a strong and functional mechanism for complex IEPM. However, based on our results, it has become clear that offsets are as yet an imperfect vehicle for enabling IEPM (Maron et al., 2016b). Indeed, given stakeholders' emphases, one could argue that we initially underestimated the importance of complementary environmental management processes from the regulator's perspective, and the importance of cohesive environmental policy, regulations, and governance designs. Going forward, other studies might allow practitioners and academic researchers to examine future project offsets and determine whether their planning and

management practices would satisfy the characteristics and processes associated with IEPM (Petak, 1980; Armour, 1990; Margerum, 1997; Guo et al., 2001). While only time will tell, offsets may yet prove to be a suitable conduit for environmental planning and management.

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Figure 1. Research Model – Using offsets for IEPM

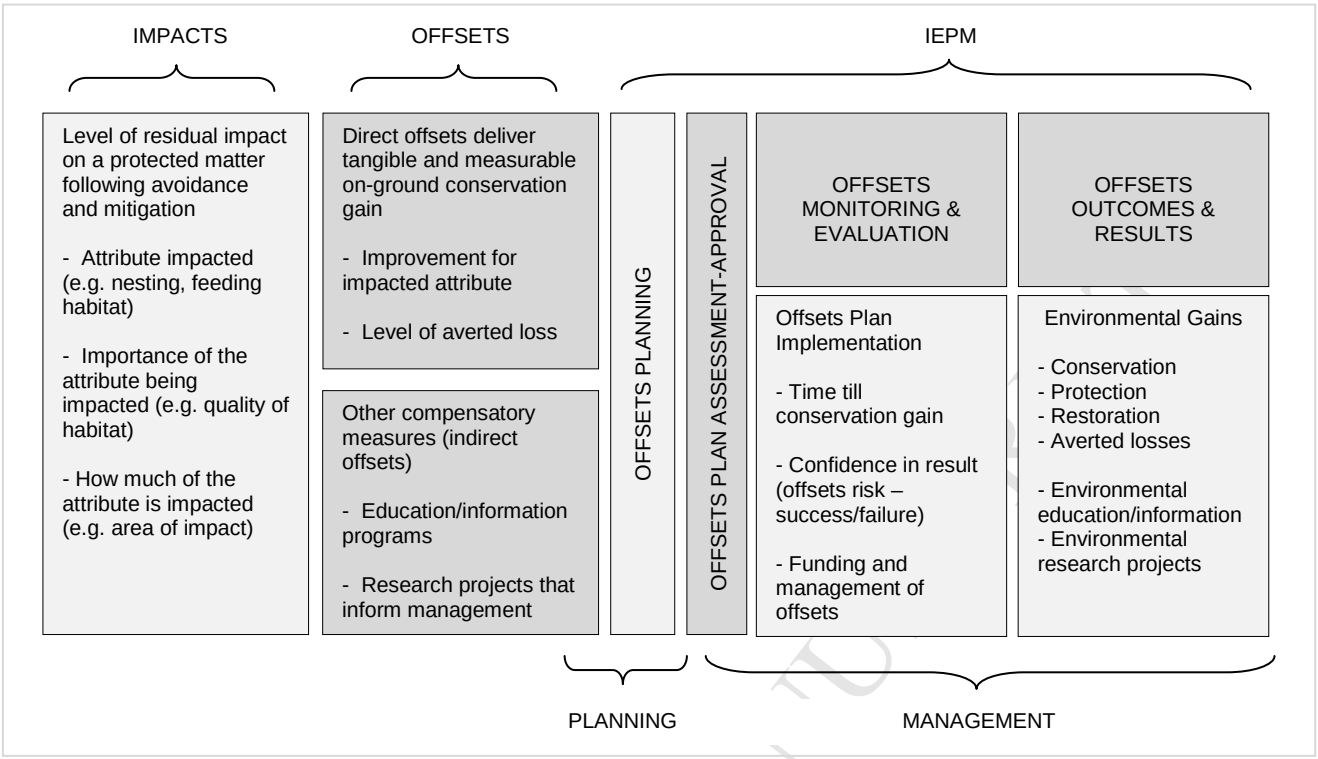

Figure 2. Five large development projects – context for inquiry submissions

Project 1	Project 2	Project 3	Project 4	Project 5
P1: Whitehaven Coal and Boggabri Coal joint venture - New South Wales (open cut mine and railway). ↓ **Land Clearing Impact:** Wood and Derived Native Grassland Critically Endangered Ecological Community (CEEC) (2,179 ha). Foraging Habitat (FH) – bird/bat species ↓ **Approval Conditions:** EPBC threatened species 14,866 ha conservation; A$61 million funding. ↓ **Offsets:** Habitat conservation in 15 properties near mine site: (i) CEEC: Derived Native Grassland 1,875 ha, and Woodland 3,828 ha. (ii) FH: Good condition vegetation 4,974 ha, and Low to moderate condition vegetation 4,469 ha.	**P2:** Waratah Coal Pty Ltd - Queensland (two open cut and four underground mines and railway) ↓ **Land Clearing Impact:** Regional Ecosystems (RE), Essential Habitats (EH), Protected Areas (PA) (9,117 ha). FH - various bird and reptile species (10,601 ha). ↓ **Approval Conditions:** EPBC threatened species 23,224 ha conservation; A$1 million funding. ↓ **Offsets:** (i) Habitat conservation in multiple properties within 50 and 100 km of the mine-railway: Good condition remnant and regrowth vegetation 17,269 ha. (ii) Habitat conservation in multiple properties in Queensland: (a) Good condition remnant and regrowth vegetation 354 ha. (b) FH: Good condition remnant and regrowth vegetation 10,601 ha.	**P3:** QGC Pty Ltd - Curtis LNG Project (development of Gas Fields in south-central Queensland (Surat Basin), an LNG Facility on Curtis Island (Gladstone), and pipelines construction. ↓ **Land Clearing:** Remnant vegetation and regrowth woodlands (9,577 ha) and Blue Gum woodlands (40 ha). FH and nesting habitat – various birds, reptiles, marsupials. ↓ **Approval Conditions:** Habitat conservation 3,541 ha; A$25 million funding. ↓ **Offsets:** (i) Habitat conservation Curtis Island Environmental Management Precinct 4,500ha. Good condition vegetation communities and RE. Nesting sites for sea turtles and birds. (ii) Curtis Island World Heritage Area environmentally significant land 25,000ha. (iii) Conservation Investment: Impact of gas field to be offset with equivalent good condition vegetation communities and habitat 2,100ha. **Other compensatory measures (OCM):** Payments of A$11 million over 20 years to Great Barrier Reef Marine Park Authority.	**P4:** North Queensland Bulk Ports - Abbot Point Coal Terminal Capital Dredging Project (dredge approx. three million cubic metres from the seabed) ↓ **Non-residual Impacts:** (i) Dredge footprint and adjacent seagrass disturbance (up to 185 ha) up to three years. (ii) Increased water turbidity at dredge sites up to several weeks. ↓ **Approval Conditions:** Turtle Plan/Marine Plan (part of Marine offset strategy); A$18 million funding. ↓ **Offsets:** (i) Installation of seagrass friendly screw moorings. Support seagrass recovery. (ii) Development and implementation of a Water Quality Improvement Plan (WQIP) for the Don River catchment as part of the Burdekin Catchment Natural Resources Management Plan.	**P5:** Jandakot Airport Holdings - Airport Developments ↓ **Land Clearing Impact:** Native vegetation and Banksia species (167 ha). FH - threatened bird species. ↓ **Approval Conditions:** EPBC threatened species 1,600 ha conservation; A$9.2 million rehab. funding; A$0.75 million research funding ↓ **Offsets:** Habitat conservation: FH - near Gingin (Moore River National Park proximity), for protection/addition to the conservation estate 1,600 ha.
Notes: Independent Peer Review of Offsets for the Maules Creek Mine Project - EPBC 2010/5566, Report No. 1308001RP3, Greenloaning Biostudies Pty Ltd. (3 April 2014); EPBC2010/5566 Approval (11 Feb. 2013)	**Notes:** (Galilee Coal Project EIS Biodiversity Offset Strategy, Report No. WAR005-ENV-RPT-0001, Unidel (17 June 2011); EPBC2009/4737 Approval (19 Dec. 2013)	**Notes:** QGC LNG Environmental Impact Statement, QGC (28 Aug. 2009) & QGC Regional Gas Field Community Committee Meeting Minutes (Offsets Report), Chinchilla, Qld (27 Feb. 2014); EPBC2008/4398/4399/4402 Approval (22 Oct. 2010)	**Notes:** Abbot Point, Terminal 0, Terminal 2 and Terminal 3 Capital Dredging Public Environment Report Supplementary Report (EPBC 2011/6213/ GBRMPA G34897.1), CDM Smith Australia Pty Ltd (13 May 2013); EPBC2011/6194 Approval (10 Dec. 2013)	**Notes:** Jandakot Airport Holdings EPBC Act Offsets Precincts 6 and 6A, StratGen Pty Ltd (20 Feb. 2014); EPBC2009/4796 (8 Apr. 2014).

Figure 3. Coding schema applied – Example from Planning Function

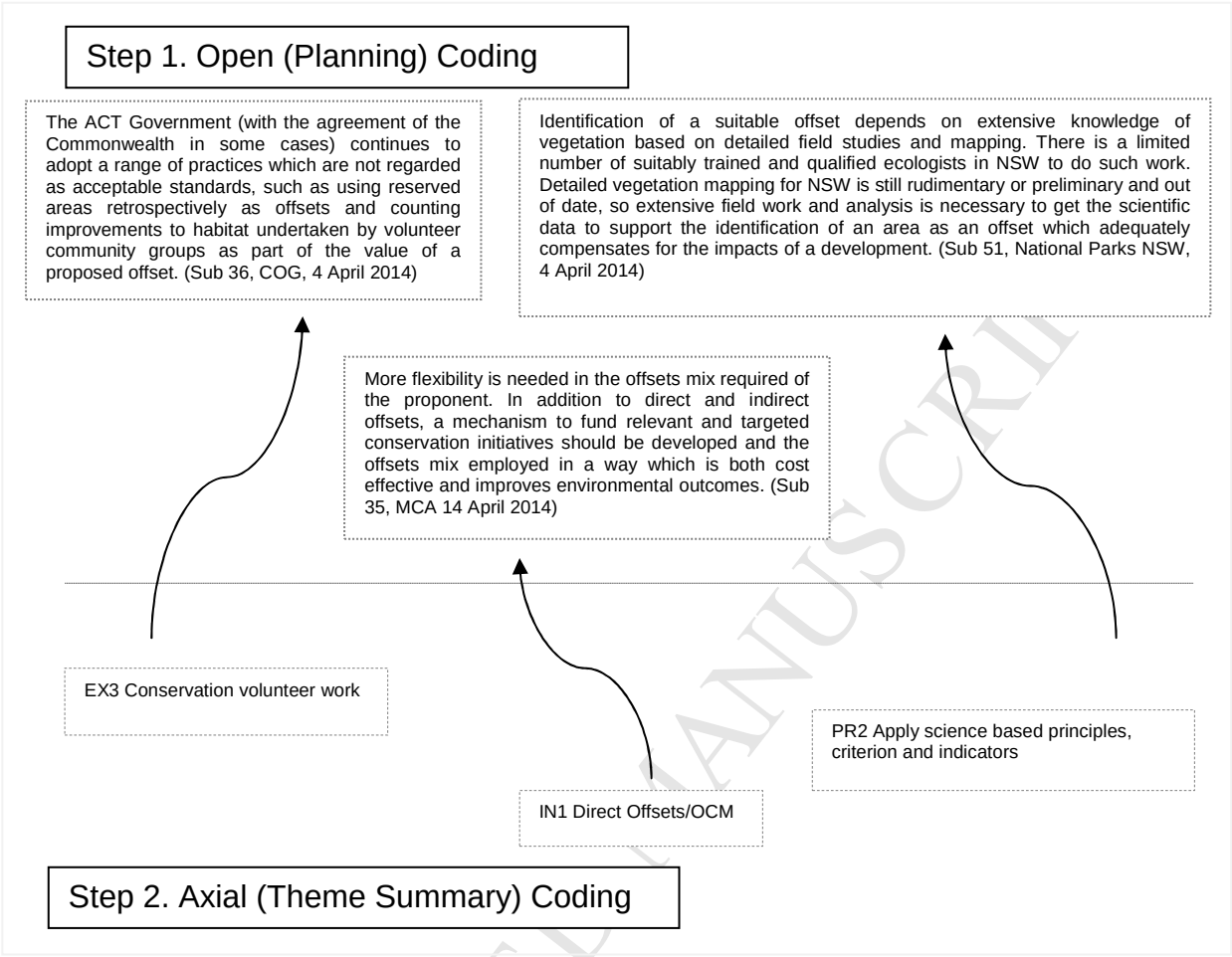

Figure 4. Planning and management flow diagram of IEPM using Offsets

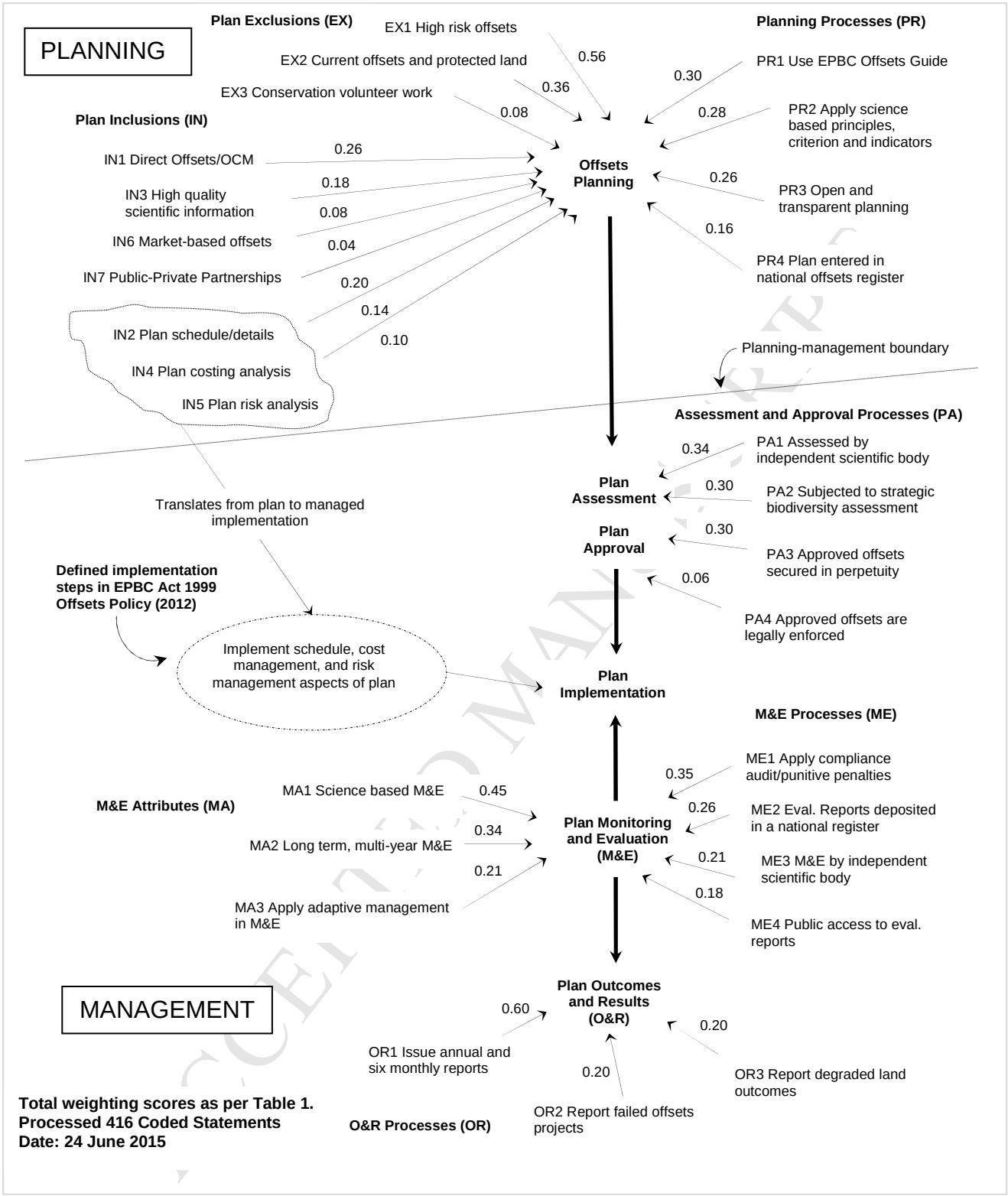
PLANNING
Plan Exclusions (EX)
EX1 High risk offsets
EX2 Current offsets and protected land
EX3 Conservation volunteer work
Plan Inclusions (IN)
IN1 Direct Offsets/OCM
IN3 High quality scientific information
IN6 Market-based offsets
IN7 Public-Private Partnerships
IN2 Plan schedule/details
IN4 Plan costing analysis
IN5 Plan risk analysis
0.56
0.36
0.08
0.26
0.18
0.08
0.04
0.20
0.14
0.10
Offsets Planning
Planning Processes (PR)
PR1 Use EPBC Offsets Guide
PR2 Apply science based principles, criterion and indicators
PR3 Open and transparent planning
PR4 Plan entered in national offsets register
0.30
0.28
0.26
0.16
Planning-management boundary
Assessment and Approval Processes (PA)
PA1 Assessed by independent scientific body
PA2 Subjected to strategic biodiversity assessment
PA3 Approved offsets secured in perpetuity
PA4 Approved offsets are legally enforced
0.34
0.30
0.30
0.06
Plan Assessment
Plan Approval
Translates from plan to managed implementation
Defined implementation steps in EPBC Act 1999 Offsets Policy (2012)
Implement schedule, cost management, and risk management aspects of plan
Plan Implementation
M&E Processes (ME)
ME1 Apply compliance audit/punitive penalties
ME2 Eval. Reports deposited in a national register
ME3 M&E by independent scientific body
ME4 Public access to eval. reports
0.35
0.26
0.21
0.18
M&E Attributes (MA)
MA1 Science based M&E
MA2 Long term, multi-year M&E
MA3 Apply adaptive management in M&E
0.45
0.34
0.21
Plan Monitoring and Evaluation (M&E)
MANAGEMENT
Plan Outcomes and Results (O&R)
0.60
0.20
0.20
OR1 Issue annual and six monthly reports
OR2 Report failed offsets projects
OR3 Report degraded land outcomes
O&R Processes (OR)
Total weighting scores as per Table 1.
Processed 416 Coded Statements
Date: 24 June 2015

Table 1. Stakeholders responses coded into IEPM Themes

	IEPM Themes	Stakeholder Group Response (No.)					
		Business Firms	Govt. Org.	Ind	NGO-Bus	NGO-Env.	Total (Wtg)
Planning	PR1 Apply the EPBC Offsets assessment guide for planning	2	1	5	2	12	22 (0.30)
	PR2 Apply science based principles, criteria, indicators in plan	2	-	3	5	11	21 (0.28)
	PR3 Plan development is open and transparent	1	1	3	1	13	19 (0.26)
	PR4 Register plans in a national offsets register	-	-	2	1	9	12 (0.16)
	IN1 Direct terrestrial-marine offsets and OCM (include)	3	3	3	4	13	26 (0.26)
	IN2 Schedule dates and details (include)	-	-	3	1	16	20 (0.20)
	IN3 High quality scientific information (include)	1	-	7	-	10	18 (0.18)
	IN4 Costing analysis (include)	-	-	2	1	11	14 (0.14)
	IN5 Risk analysis (and alternative offsets) (include)	-	-	2	-	8	10 (0.10)
	IN6 Market based offsets (where applicable) (include)	1	-	2	1	4	8 (0.08)
	IN7 Public-Private Partnerships (where applicable) (include)	-	1	-	1	2	4 (0.04)
	EX1 High risk offsets (likely failure/never complete) (exclude)	1	-	6	1	19	27 (0.56)
	EX2 Current offsets and protected land (exclude)	-	-	3	-	14	17 (0.36)
	EX3 Conservation volunteer work (exclude)	-	-	1	-	3	4 (0.08)
	Stakeholder Total:	**11**	**6**	**42**	**18**	**145**	**222**
Management	PA1 Plans assessed by independent scientific body	-	3	6	-	16	25 (0.34)
	PA2 Plans subjected to strategic biodiversity assessment	1	1	5	2	13	22 (0.30)
	PA3 Approved offsets in plans are secured in perpetuity	-	2	5	2	13	22 (0.30)
	PA4 Approved offsets plans are legally enforceable	-	-	1	1	3	5 (0.06)
	ME1 Apply compliance audit and punitive penalties	-	2	1	1	18	22 (0.35)
	ME2 Eval. reports are entered in a national offsets register	-	-	3	2	11	16 (0.26)
	ME3 Offsets plans monitored and evaluated by independent body	-	1	3	-	9	13 (0.21)
	ME4 Public access to offsets evaluation reports	-	-	-	-	11	11 (0.18)
	MA1 Science based M&E programs	1	-	3	2	11	17 (0.45)
	MA2 Long term multi-year M&E programs	1	1	4	-	7	13 (0.34)
	MA3 Apply adaptive management principles in M&E	-	-	1	-	7	8 (0.21)
	OR1 Publish annual/semi-annual reports	1	1	1	1	8	12 (0.60)
	OR2 Report offsets failure results	-	-	1	-	3	4 (0.20)
	OR3 Report degraded land outcomes	-	2	1	-	1	4 (0.20)
	Stakeholder Total:	**4**	**13**	**35**	**11**	**131**	**194**

Note: OCM = Other compensatory measures; Wtg. = Weighted themes included in the planning and management flow diagram (=1 in theme total).

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