

Just how 'strategic' are Strategic Environmental Assessments? An assessment of the strategic nature of Australian Strategic Assessments under the EPBC Act (1999).

Mitchell Ross & Zsuzsa Banhalmi-Zakar

James Cook University: Townsville, QLD, Australia

Abstract

Strategic environmental assessment (SEA) is part of the family of impact assessment tools that seeks to influence decisions at the strategic level of policies, plans and programmes, rather than at the project-level. In recent years, SEA has become an increasingly collaborative and sustainability led process. While much research has focused on the effectiveness and efficiency of SEA in practice, the strategic nature of SEA has received less attention; even though it has been recognized that SEA is not fulfilling expectations as a strategic tool. This study assessed the strategic nature of 12 SEAs in Australia, carried out under Australia's key environmental regulation, the EPBC Act of 1999. The study found that the Australian system is not always truly strategic. Incorporation of sustainability aspects and adaptiveness were strengths of the Australian system in most instances, while components such as cumulative impact assessment and assessment of alternatives were often absent or insufficiently addressed. To make SEAs more strategic would require enhancing existing legislation and endorsement criteria with more explicit guidance on developing strategically focused SEA. The strategic criteria developed as part of this study is not specific to Australia and could be used by other SEA systems to identify, monitor and improve the strategic nature of SEAs on a global scale.

1. Introduction

Strategic environmental assessment (SEA) is a process that aims to assist the incorporation of environmental and other sustainability issues in higher-level planning and decision-making (OECD [1] 2006; Bina, 2007; Fischer 2007; Sheate and Partidário, 2010; Lobos and Partidario, 2014). Unlike project-level assessments such as environmental impact assessment (EIA), SEA is conducted earlier in the project planning phase, focusing on strategic level processes: policies, plans and programmes (PPP) (OECD [1] 2006; Bina, 2007; Fischer 2007; Sheate and Partidário, 2010; Lobos and Partidario, 2014). Although the concept of SEA and EIA were both introduced in the 1960's, as part of The National Environmental Policy Act (NEPA) in the United States, the practice of SEA only increased substantially in the 1990's as a means to respond to the perceived shortcomings of EIA and other project level assessments (Figure 1).

Late integration into project life cycle leading to decisions without environmental consideration

Lack of consideration of project alternatives

Limited assessment of cumulative impacts

Focus of mitigation rather than prevention of impacts

Minimal stakeholder and public participation in the planning process

Seen as a hurdle to overcome for approval

Figure 1: Shortcomings of EIA that SEA was hoped to remedy

Source: Author's own, based on Bina, 2007; Partidário, 2007; Baker et al., 2013; Morrison-Saunders et al., 2014; Patel and Giordano, 2014; Noble and Nwanekezie, 2017

1.1 Evolution of SEA practice

Although the definition and application of SEA has varied since its introduction; today SEA definitions often include statements on sustainability and collaboration (Wallington, Bina and Thissen, 2007; Morrison-Saunders *et al.*, 2014; Baresi, Vella and Sipe, 2017; Cape *et al.*, 2018). For example, “SEA refers to a range of analytical and participatory approaches that aim to integrate environmental considerations into policies, plans and programmes and evaluate the inter linkages with economic and social considerations” (OECD [1] 2006). The true function and validity of SEA is still questioned by some authors; however, generally it is now widely accepted and has been incorporated into the political systems of many countries, including Australia (Banhalimi-Zakar, *et.al.* 2018; De Montis, Ledda and Caschili, 2016; Baresi, Vella and Sipe, 2017; Noble and Nwanekezie, 2017; Cape *et al.*, 2018; Pope *et al.*, 2018).

1.2 SEA in Australia

SEA in Australia is regulated as strategic assessment (SA) under the Federal government’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Compared to other developed countries that have implemented SEAs since the early 2000s, Australia is a relative newcomer, having completed the first SA under the EPBC Act in 2010 (Whitehead, Kujala and Wintle, 2017; Pope *et al.*, 2018). SAs are currently undertaken voluntarily, initiated when a proponent submits a policy, plan or program proposal (Pope *et al.*, 2018). The incentive for proponents to undertake a SA is that once a strategic plan has been endorsed, future projects under the plan will only require simplified EIAs under the Act (1999) (Pope *et al.*, 2018). This is different to other SEA systems such as the EU’s Strategic Environmental Assessment Directive, where SEA is obligatory when triggered in circumstances as defined by Directive 2001/42/EC, the so-called SEA Directive.

Sustainability, which includes both environmental and socio-economic factors, is a major component of Australian SAs. The guidelines on SAs clearly promote “ecologically sustainable development outcomes” (EPBC [1], 2013). A SA can only receive endorsement from the minister, if it meets the endorsement criteria set out by these guidelines and meet the specific terms of reference which are agreed upon between the proponent and the government (EPBC [1], 2013). Currently, 24 SAs are either completed or currently underway (Table 1).

Table 1: List of completed and in-progress Strategic Assessments (as of 2018)

Complete	Underway
Offshore petroleum activities in Commonwealth waters	Strategic assessment of the National Carp Control Plan
Gungahlin	Eastern Broadacre
Molonglo Valley Plan	Lower Hunter
West Belconnen	Upper Hunter
Heathcote Ridge, West Menai	Offshore petroleum activities in Northern Territory coastal waters
NSW road and traffic management works	Mount Peter Master Planned Area
Western Sydney growth centres	Offshore petroleum activities in South Australian coastal waters
Great Barrier Reef (Region) Great Barrier Reef (Coastal)	Irrigation development throughout Tasmania
Fire management policy	Solomon Heights, North Sunshine
Midlands Water Scheme	Browse Basin LNG Precinct
Melbourne's urban growth boundary	Hamersley Iron Ore Pty Ltd (Rio Tinto) iron ore mining in the Pilbara
BHP Billiton mining iron ore in the Pilbara region	Perth and Peel region

Limited literature exists which assesses SEA in Australia aside from a small number of studies focusing on specific cases (Beckwith, 2012; Marsden, 2016; Whitehead, Kujala and Wintle, 2017).

1.3 Developing the criteria: What makes SEAs 'strategic'?

Nomen est omen, (i.e. by definition) SEAs are intended to be strategic. Strategic is defined as "relating to the identification of long-term or overall aims and interests and the means of achieving them" (Oxford Dictionary). However, assessing strategic level documents or processes does not necessarily make an assessment tool strategic and SEA has been criticised for underperforming as a strategic tool and not living up to its core *raison d'être* (Bina, 2007; Wallington, Bina and Thissen, 2007; Bidstrup and Hansen, 2014; Baresi, Vella and Sipe, 2017). This leads to the question; what makes SEAs strategic? (which was explored at length through a literature review but is only summarised here). According to Cherp *et al.* (2007), SEA needs to allow for strategic change towards sustainable development and emphasised that it needs to produce strategically relevant knowledge through the SEA process and be communicated to all stakeholders. One clear focus of SEAs is to promote and facilitate sustainable development; therefore SEAs should identify long-term goals relating to sustainability and the means to achieve them (Wallington, Bina and Thissen, 2007). Depending on the plan, policy or program, 'long-term' could mean decades to the indefinite future (Partidário, 2007). Partidário (2007) suggests using the generational time scale to assist with meeting this requirement. 'The means to achieve these goals', relates to the way in which the decision-making processes of PPPs and related planning actually play out. The argument for the strategic nature of SEA can become complex because jurisdictions apply a wide range of assessment processes ranging from so-called 'pure procedural' to a 'pure transformative' approaches (Lobos and Partidario, 2014; Cape *et al.*, 2018). The procedural approach can become non-strategic because vital decisions have already been made without identification and consideration of sustainability goals (Wallington, Bina and Thissen, 2007). A Strategic SEA is one that directly influences initiatives and decisions which lead to the development of PPPs and offers choices (alternatives and analysis) (Slunge and Loayza, 2012; Noble and Nwanekezie, 2017).

Exploration of 'strategic thinking' in SEA led to the formulation of twelve, measurable criteria that were used to assess the 12 Australian SEAs against (Table 2). The criteria represent two main groups: those that relate to specific issues that need to be present, considered, or addressed in SEAs (such as the sustainability focus of the goals, the presence of cumulative impact assessment and the consideration of several alternatives), and those that are more holistic in nature and relate to the way the SEA process is conducted (such as collaboration and collection and use of strategically relevant data).

Table 2: Criteria used to assess the strategic nature of SEA, with explanation and sources

No.	Criteria	Explanation	Reference/Source
1	Goals focus on sustainability	SEA goals should focus on all aspects of sustainability (environmental, social & economic)	(Partidário, 2007; Wallington, Bina and Thissen, 2007; Lobos and Partidario, 2014; Cape <i>et al.</i> , 2018)
2	Strategically relevant data collection	Collection of sustainability relevant baseline data and other information (to allow for consideration of alternatives and appropriate decision making)	(Lin <i>et al.</i> , 2006; Partidário, 2007; Cape <i>et al.</i> , 2018)
3	Strategic spatial scale and prioritisation process	Should be appropriate for the type of project (localised – global) and adequately assessed	(Fischer, 2007; Partidário, 2007; González <i>et al.</i> , 2011; Baresi, Vella and Sipe, 2017; Torrieri and Bata, 2017; Ustaoglu <i>et al.</i> , 2017; Whitehead, Kujala and Wintle, 2017)
4	Strategic time scale	Strategic assessment time scale should be multi-generational	(Partidário, 2007; Lamorgese and Geneletti, 2013; Noble and Nwanekezie, 2017)
5	Future generation consideration	Should assess long-term considerations (sustainability focussed)	(Partidário, 2007; Lamorgese and Geneletti, 2013; Noble and Nwanekezie, 2017)
6	Cumulative impact assessment	Cumulative impact assessment must be involved	(Cooper and Sheate, 2004; Whitehead, Kujala and Wintle, 2017)
7	Assessment of Alternatives	SEA should assess all possible alternatives without predisposed biased for a specific option. Assessment should be future-orientated and include multidimensional analysis.	(Wallington, Bina and Thissen, 2007; Du <i>et al.</i> , 2012; Slunge and Loayza, 2012; Noble and Nwanekezie, 2017)
8	Adaptive process that address uncertainties	SEA should be capable of adapting to unforeseen changes/effects and consider all relevant uncertainties	(Chaker <i>et al.</i> , 2006; Onyango and Schmidt, 2007)
9	Collaborative process	Entire SEA process should be collaborative with active participation and knowledge sharing between all relevant stakeholders	(Fischer, 2007; Wallington, Bina and Thissen, 2007; Partidario and Sheate, 2013; Cape <i>et al.</i> , 2018)
10	Use of tools/methods to enhance sustainability analysis and decision making	To adequately assess aspects of sustainability and their relationships with each other, appropriate tools or methods should be utilised, such as; ecosystem services assessment, cost-benefit impact matrices, life-cycle assessment and others	(Finnveden <i>et al.</i> , 2003; Lin <i>et al.</i> , 2006; Wallington, Bina and Thissen, 2007; Baker <i>et al.</i> , 2013; Honrado <i>et al.</i> , 2013; Kumar, Esen and Yashiro, 2013; Bidstrup, 2015; Nieminen and Hyttinen, 2015; Torrieri and Bata, 2017; Wu and Ma, 2018)
11	Sustainability in the decision-making	Decision making should be based on sustainable development	(Fischer, 2007; Kørnøvn, 2009; Torrieri and Bata, 2017)
12	Strategically appropriate decisional time scale	SEA should aid in the decision making (screening and scoping) of PPPs – not simply support an existing decision (integration before decision-making)	(João, 2007; Partidário, 2007)

2. Methodology

All 12 completed Australian SAs were evaluated against the strategic criteria in Table 2. Only completed SAs could be evaluated because these had all the documentation necessary to carry out the assessment (the Gungahlin SA was excluded as some documentation related to this proposal was not published online). At least seven different documentation are completed as part of the SA process under the EPBC Act (1999). These documents are publicly accessible and were downloaded from the Australian Government's Strategic Assessment website or relevant state government website. Key features of the 12 SAs are presented (Table 3).

Table 3: Key features of the SAs that were assessed against the strategic criteria

Strategic Assessment	Jurisdiction	Year Begin	Year End	PPP	Sector
Molonglo Valley Plan	ACT	2010	2011	Plan	Urban Development
West Belconnen	ACT&NSW	2014	2017	Programme	Urban Development
Offshore Petroleum	National	2013	2014	Programme	Mining
Road and Traffic Management	NSW	2014	2015	Programme	Infrastructure
Western Sydney Growth Centres	NSW	2009	2011	Programme	Urban Development
Heathcote Ridge	NSW	2011	2013	Programme	Urban Development
Great Barrier Reef Coastal	QLD	2012	2014	Programme	Environmental Management
Great Barrier Reef Region	QLD	2012	2014	Programme	Environmental Management
Fire Management Policy	SA	2012	2014	Policy	Environmental Management
Midlands Water Scheme	TAS	2010	2011	Programme	Environmental Management
Melbourne's Urban Growth Boundary	VIC	2009	2010	Programme	Urban Development
BHP Billiton Mining Iron Ore	WA	2012	2017	Programme	Mining

The 12 SAs in Table 3 represent every State jurisdiction in Australia, except the Northern Territory. Most assessments were completed at the programme level.

Assessment against the strategic criteria was completed after the criteria were refined, based on input from an international SEA academic expert and an Australian SA practitioner who led the SA processes under the EPBC Act (1999). Then a pilot run of two randomly selected SAs was performed (Offshore Petroleum Activities and Molonglo Valley Plan). The pilot runs were successful and resulted in no further changes to the criteria. The documents were searched for terms such as; 'cumulative impact assessment', 'sustainability', 'alternatives' and 'generation', which related directly to criteria. Context of each term was examined to ensure it was relevant and no content was missed. As some documents were over 100 pages long, all documentation for an individual SA was assessed in one session to maximise data retention. SAs were evaluated against five different

categories ranging from 'not present/cannot determine', to 'weak', 'good' and 'best practice'. To assist with assigning SAs into the correct category, a series of descriptors were developed. For example, for criteria 1, 'Goals focus on sustainability', if an SA did not state its goals, it was assessed as belonging to the 'cannot determine' category, if goals were formulated, but did not address sustainability (implicitly or explicitly) it was categorized as 'not present', if it only referred to just one or two components of sustainability it was deemed 'weak', and so forth.

The analyses performed were deemed the most appropriate, given the research aims and small sample size. Frequencies of each criterion's performance across the SAs was calculated to determine the overall presence of each criteria category. All statistical analysis was performed in IBM SPSS Statistics 25.0. Figures were produced using Microsoft Office Excel 365.

3. Results: Performance of SAs against strategic criteria

The strategic nature of the 12 SAs varied widely, ranging from exhibiting ‘best practice’ in some instances to ‘not present/cannot determine’ (Figure 2). The 12 SAs performed best against the criteria for ‘SEA goals focus on sustainability’ and ‘strategically relevant data collection’ (Figure 2).

	SEA Goals Focus on Sustainability	Strategically Relevant Data Collection	Spatial Scale	Time Scale	Future Generation Consideration	Cumulative Impact Assessment	Assessment of Alternatives	Adaptive Process	Collaboration	Use of Tools/Methods	Sustainable Decision-making	Decisional Time Scale
Offshore Petroleum	Yellow	Yellow	Red	Blue	Yellow	Green	Red	Blue	Yellow	Blue	Yellow	Red
Molonglo Valley Plan	Green	Green	Green	Blue	Yellow	Red	Green	Green	Blue	Green	Blue	Blue
West Belconnen	Green	Blue	Green	Blue	Blue	Blue	Blue	Green	Yellow	Blue	Green	Blue
Heathcote Ridge	Green	Green	Green	Blue	Blue	Red	Red	Green	Yellow	Red	Green	Blue
Road and Traffic Management	Yellow	Yellow	Red	Blue	Yellow	Red	Red	Yellow	Yellow	Blue	Red	Red
Western Sydney Growth Centres	Green	Green	Green	Blue	Yellow	Red	Yellow	Blue	Yellow	Red	Green	Blue
Great Barrier Reef Region	Green	Green	Green	Blue	Blue	Green	Green	Blue	Blue	Green	Green	Blue
Great Barrier Reef Coastal	Green	Green	Blue	Blue	Yellow	Red	Red	Blue	Yellow	Red	Green	Blue
Fire Management Policy	Green	Green	Green	Blue	Yellow	Red	Yellow	Green	Blue	Green	Green	Green
Midlands Water Scheme	Yellow	Green	Blue	Green	Green	Yellow	Red	Green	Yellow	Green	Blue	Blue
Melbourne's urban growth boundary	Green	Green	Green	Green	Blue	Red	Green	Green	Yellow	Green	Green	Green
BHP Billiton Mining Iron Ore	Yellow	Green	Green	Green	Green	Green	Yellow	Green	Blue	Green	Green	Blue

Figure 2: Summary of the results showing how each SA performed against the 12 strategic criteria, where red = not present/cannot determine, yellow = weak; blue = good and green = best practice.

There was high variation among SAs in meeting the criteria (Figure 3). 'Strategically relevant data collection' had the highest frequency of 'best practice' (9 SAs) while SAs performed most poorly against the requirement for 'Cumulative Impact Assessment' (CIA), which had the highest frequency of 'not present/cannot determine' (in 7 SAs) and 'assessment of alternatives' (in 5 SAs). Elements of 'future generation consideration' and collaboration was most commonly 'weak' (in 6 and 8 SAs respectively); while 'time scale' and 'decisional time scale' received scores of 'good' most frequently (7 and 8 SAs respectively). Some criteria exhibited more variation than others. For example, CIA and 'sustainable decision-making' had a large variation in performance; whereas 'SEA goals focus on sustainability' only had 'best practice' and 'weak', while 'collaboration' only had 'weak' or 'good'. 'SEA goals focus on sustainability' was the only criteria that lacked transitional performance between 'weak' and 'best practice' and was the only criteria with no 'good' performance present (Figure 3). 'Best practice' occurred in all criteria except 'collaboration', while 'weak' occurred in all except three (spatial scale, use of tools/methods and decisional time scale) (Figure 3). 'Not present/cannot determine' only occurred in half of all criteria (Figure 3).

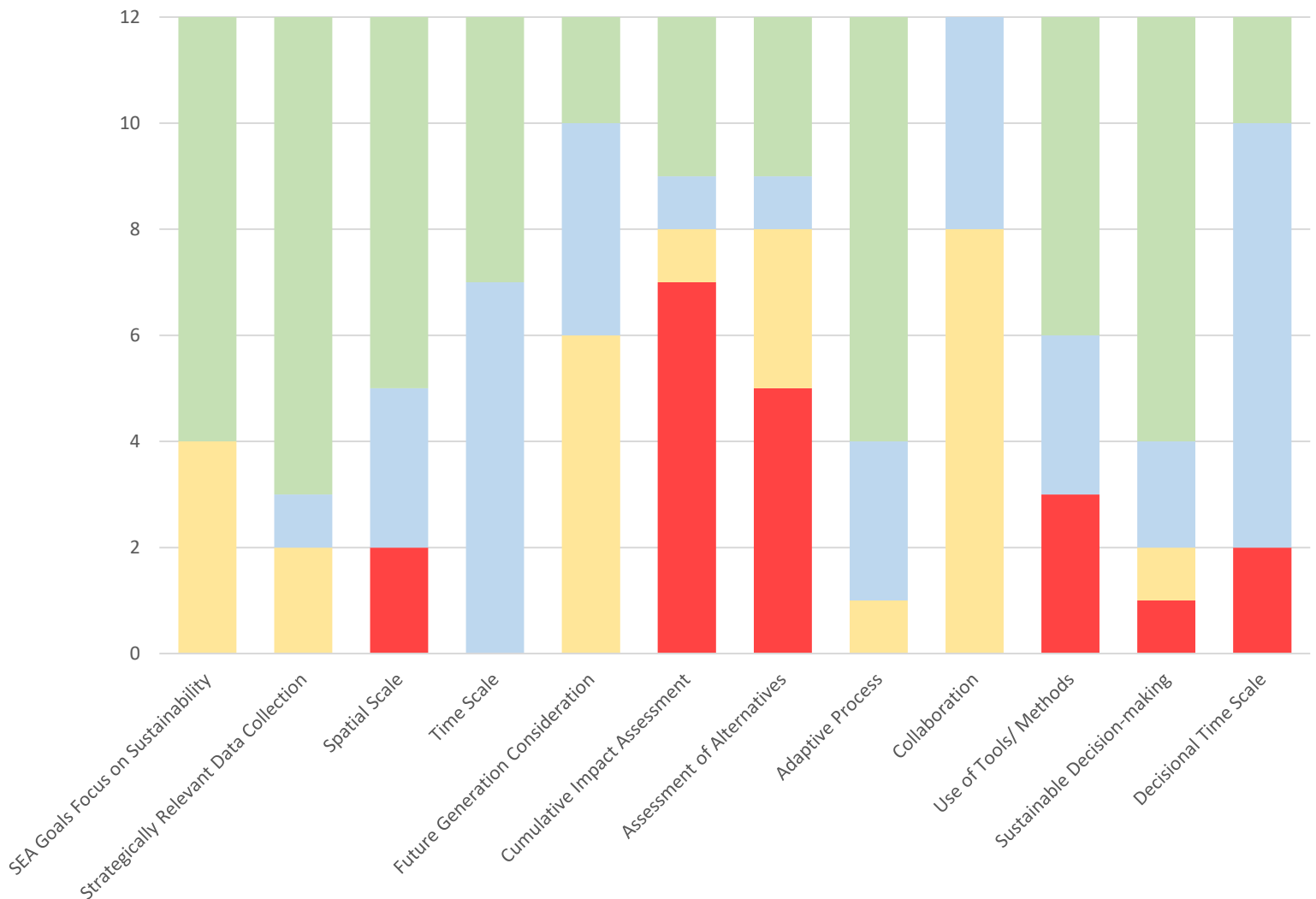


Figure 3: Frequency of each category for individual criteria across all 12 SAs, where red = not present/cannot determine, yellow = weak; blue = good and green = best practice.

4. Discussion

4.1 Strengths and weaknesses of SAs in terms of being strategic

Since all Strategic Assessments in Australia are undertaken under the EPBC Act (1999); it would be reasonable to expect that the 12 SAs performed similarly against the strategic criteria. In other words, the overarching direction and strategic nature of all Australian SAs should exhibit similar characteristics. This is because the way in which SAs are conducted is prescribed in the legislation and follows the guidance document (EPBC [1] & [2] 2013). Yet the results indicate that strategic performance of SAs exhibit a large amount of variation both in terms of specific components and overall processes.

Overall, SAs scored best against criteria relating to sustainability. Notably, most SAs were rated 'best practice' against the criterion 'goals focus on sustainability'. This is not surprising given that sustainable development is at the heart of SEA worldwide, including in the Australian system. Four SAs were still scored 'weak' because their goals focussed mainly on environment and failed to integrate the other two aspects of sustainability; namely social and economic factors. This is despite the guidelines on SAs where the three pillars of sustainability must be considered as part of ecologically sustainable development ((EPBC [1] 2013). The results are supported by a study of the SA of the Kimberley Liquefied Natural Gas Precinct by O'Faircheallaigh (2015), which also found a lack of adherence to the three pillars, which suggests that fulfilling these principles through the entire process is difficult.

The criterion measuring how strategically relevant the data collection process was, received the highest amount of 'best practice' scores. This criterion relates to collecting adequate baseline data for all aspects of sustainability. Best practice performance of SAs reflects Australia's long tradition of environmental science and management, and well-developed data collection, storage and visualisation systems. The criteria 'sustainable decision-making' and 'time scale' were also often assessed as 'good' or 'best practice'. 'Sustainable decision-making' is strongly linked to the concept of ecologically sustainable development, which is central to the EPBC Act (1999) and has been prevalent in impact assessment practice for nearly two decades. A key strength of the Australian system is its adequate consideration of 'time scale'. All SAs considered timeframes of at least one generation, making 'time scale' the only criterion where none of the SAs were scored as 'not present/cannot determine' or 'weak'. At the same time, not many SAs scored high against the criterion on consideration of future generations. This criterion assesses whether value is actually given to future generations. We found that half of the SAs performed 'weak' here because they did not explain the value of, or ways to achieve intergenerational equity. In contrast, other SAs with 'good' or 'best practice' scores described the value for future generations and how intergenerational equity will be ensured.

Criteria relating to several tools, techniques, methods and assessments including 'Cumulative Impact Assessment' (CIA), 'assessment of alternatives' and 'collaboration', were 'not present' or 'weak' in SAs. The SA guidance document specifically states that cumulative impacts relating to EPBC Act triggers should be considered or described and analysed in SAs. Yet several SAs did not have a CIA, such as the Molonglo Valley Plan; even though it was required in the Terms of Reference (2010, pg.10). Assessment of cumulative impacts was one of the problems of EIA that SEA was supposed to remedy (Banhalimi-Zakar et al. 2018; Bina, 2007; Noble and Nwanekezie, 2017). How PPPs can continue to be endorsed in the absence of CIA in Australia remains a key weakness of the Australian SA process. 'Collaboration' was addressed by SAs but only to a limited extent. The minimum requirement for public engagement within the EPBC Act (1999) is consultation, which refers to the

release of a draft report to the public for comments. All SAs met this legislative requirement. Only four SAs (Molonglo Valley Plan SA, Great Barrier Reef Region SA, Fire Management Policy SA and BHP Billiton SA) went beyond the minimum requirement to demonstrate 'good' collaboration. This indicates that proponents tend to strive for meeting only the minimum requirements and hence, it would be important for the legislation and guidance on SAs to advocate for higher standards that are truly collaborative.

The 'adaptive process' criterion was one of the most frequent criteria to perform at 'best practice' with most SAs scoring 'good'. Adaptiveness is vital for strategy as it influences the PPPs ability to achieve long term goals (Chaker *et al.*, 2006; Onyango, 2016). High performance is attributed to the focus of adaptive management in the EPBC Act (1999), which is required for endorsement under the ToR.

4.4 Limitations

Due to the relatively recent implementation of SEA in Australia, only a limited number of complete SAs were available for assessment. This made it impossible to test against variation by jurisdiction, sector, PPP, or trends over time in a meaningful way. Future studies could perhaps investigate such trends once currently incomplete assessments are completed. Another limitation was the transparency of the assessment process. We assessed the SAs using all available documentation; however, there is no information about what may have occurred 'behind the scenes' as such deliberations are excluded from the documentation. Political influence, discussions between stakeholders and considerations of potential alternatives are just some examples of what may have been omitted from or not within the scope of the documentation (Petts, 2004; Wallington, Bina and Thissen, 2007; O'Faircheallaigh, 2015). Future studies could include interviews with SA practitioners or consultants involved in developing SA documentations and decisions. We were also unable to evaluate the actual performance of PPPs upon endorsement (approval). Similarly to EIA, SEA is a predictive tool, therefore the actual performance of the PPP will likely vary to some extent from what is described in the documentation. Future studies could utilise monitoring reports, audits and interviews to evaluate the performance of SAs against the strategic criteria.

5. Conclusion

This research provided a systematic and comprehensive analysis of how strategic Australian Strategic Assessment processes are. To date, this is the first attempt at such an analysis in Australia and may well be the first in any jurisdiction. A set of criteria was developed based on international SEA literature to assess the extent to which strategic thinking was evident in SEA documentation. The criteria are not unique to the Australian SEA system, rather, it is generic and could be applied to any SEA. It reflects current understanding of SEA theory and practice, therefore it could and should evolve over time.

The evaluation of the 12 Australian SAs reveals a high level of variation in terms of exhibiting strategic characteristics. The number of SAs evaluated was too small to test for or detect any trends, such as whether differences were attributable to geography (i.e. different State that SAs were proposed in), time, length of the SA process and whether the SA was for a plan, policy or programme.

The results point to the need to improve legislation, guidance and monitoring of the performance of SEA in Australia. In some aspects the Australian system lacks the connection between theoretical goals and implementation, as revealed by the difference between performance of fulfilling

sustainability criteria even though sustainability (specifically ESD) is at the core of Australian SA (EPBC [1] 2013). Ambiguity and lack of legislation have been described as key issues with global practice of SEA (Baker *et al.*, 2013; Patel and Giordano, 2014). Legislation and frameworks need to be developed based on the regional context of an area where individual governments are responsible for connecting SEA's theoretical goals with its implementation (Baresi, Vella and Sipe, 2017).

Once way to remedy the shortcomings of SAs is to make the endorsement criteria and guidance documents more explicit, to ensure consistency. A study of SEA in Europe revealed that the key requirements for effective guidelines include: implementation at the earliest possible time in the decision-making process, collaboration, formation of viable alternatives, and effective monitoring strategies (De Montis, Ledda and Caschili, 2016). Although this study focuses on effectiveness overall, not strategy *per se*, the core ideas are the same.

References

- Baker, J. *et al.* (2013) 'Ecosystem services in environmental assessment — Help or hindrance?', *Environmental Impact Assessment Review*, 40, pp. 3–13. doi: <https://doi.org/10.1016/j.eiar.2012.11.004>.
- Baresi, U., Vella, K. J. and Sipe, N. G. (2017) 'Bridging the divide between theory and guidance in strategic environmental assessment: A path for Italian regions', *Environmental Impact Assessment Review*, 62, pp. 14–24. doi: <https://doi.org/10.1016/j.eiar.2016.09.002>.
- Beckwith, J. A. (2012) 'A social impact perspective on the Browse LNG Precinct strategic assessment in Western Australia', *Impact Assessment and Project Appraisal*. Taylor & Francis, 30(3), pp. 189–194. doi: 10.1080/14615517.2012.715830.
- Bidstrup, M. (2015) 'Life cycle thinking in impact assessment—Current practice and LCA gains', *Environmental Impact Assessment Review*, 54, pp. 72–79. doi: <https://doi.org/10.1016/j.eiar.2015.05.003>.
- Bidstrup, M. and Hansen, A. M. (2014) 'The paradox of strategic environmental assessment', *Environmental Impact Assessment Review*, 47, pp. 29–35. doi: <https://doi.org/10.1016/j.eiar.2014.03.005>.
- Bina, O. (2007) 'A critical review of the dominant lines of argumentation on the need for strategic environmental assessment', *Environmental Impact Assessment Review*. 27(7), pp. 585–606. doi: 10.1016/j.eiar.2007.05.003.
- Cape, L. *et al.* (2018) 'Exploring pluralism – Different stakeholder views of the expected and realised value of strategic environmental assessment (SEA)', *Environmental Impact Assessment Review*, 69, pp. 32–41. doi: <https://doi.org/10.1016/j.eiar.2017.11.005>.
- Chaker, A. *et al.* (2006) 'A review of strategic environmental assessment in 12 selected countries', *Environmental Impact Assessment Review*, 26(1), pp. 15–56. doi: <https://doi.org/10.1016/j.eiar.2004.09.010>.
- Cherp, A., Watt, A. and Vinichenko, V. (2007) 'SEA and strategy formation theories: From three Ps to five Ps', *Environmental Impact Assessment Review*, 27(7), pp. 624–644. doi: <https://doi.org/10.1016/j.eiar.2007.05.008>.
- Cooper, L. M. and Sheate, W. R. (2004) 'Integrating cumulative effects assessment into UK strategic planning: implications of the European Union SEA Directive', *Impact Assessment and Project Appraisal*. Taylor & Francis, 22(1), pp. 5–16. doi: 10.3152/147154604781766067.
- Du, J. *et al.* (2012) 'Research on the alternatives in a strategic environmental assessment based on the extension theory', *Environmental Monitoring And Assessment*. 184(9), pp. 5807–5819. doi: 10.1007/s10661-011-2383-1.
- EPBC [1] (2013) 'A Guide to Undertaking Strategic Assessments', *Department of Sustainability, Environment, Water, Population and Communities*. Australian Government
- EPBC [2] (2013) 'Strategic Assessment Prospectus', *Department of Sustainability, Environment, Water, Population and Communities*. Australian Government

Finnveden, G. *et al.* (2003) 'Strategic environmental assessment methodologies—applications within the energy sector', *Environmental Impact Assessment Review*, 23(1), pp. 91–123. doi: [https://doi.org/10.1016/S0195-9255\(02\)00089-6](https://doi.org/10.1016/S0195-9255(02)00089-6).

Fischer, T. (2007) 'Theory and Practice of Strategic Environmental Assessment: Towards a More Systematic approach', *Earthscan*. London.

González, A. *et al.* (2011) 'Applying geographic information systems to support strategic environmental assessment: Opportunities and limitations in the context of Irish land-use plans', *Environmental Impact Assessment Review*, 31(3), pp. 368–381. doi: <https://doi.org/10.1016/j.eiar.2010.12.001>.

Honrado, J. P. *et al.* (2013) 'Can we infer about ecosystem services from EIA and SEA practice? A framework for analysis and examples from Portugal', *Environmental Impact Assessment Review*, 40, pp. 14–24. doi: <https://doi.org/10.1016/j.eiar.2012.12.002>.

João, E. (2007) 'A research agenda for data and scale issues in Strategic Environmental Assessment (SEA)', *Environmental Impact Assessment Review*, 27(5), pp. 479–491. doi: <https://doi.org/10.1016/j.eiar.2007.02.009>.

Kørnøv, L. (2009) 'Strategic Environmental Assessment as catalyst of healthier spatial planning: The Danish guidance and practice', *Environmental Impact Assessment Review*, 29(1), pp. 60–65. doi: <https://doi.org/10.1016/j.eiar.2008.04.003>.

Kumar, P., Esen, S. E. and Yashiro, M. (2013) 'Linking ecosystem services to strategic environmental assessment indevelopment policies', *Environmental Impact Assessment Review*. 40(S1), pp. 75–81. doi: [10.1016/j.eiar.2013.01.002](https://doi.org/10.1016/j.eiar.2013.01.002).

Lamorgese, L. and Geneletti, D. (2013) 'Sustainability principles in strategic environmental assessment: A framework for analysis and examples from Italian urban planning', *Environmental Impact Assessment Review*, 42, pp. 116–126. doi: <https://doi.org/10.1016/j.eiar.2012.12.004>.

Lin, Y. *et al.* (2006) 'Strategic Environmental Assessment On The Shanghai Land Use Master Plan: A System Dynamics Approach', *Asian Geographer*. Routledge, 25(1–2), pp. 145–171. doi: [10.1080/10225706.2006.9684137](https://doi.org/10.1080/10225706.2006.9684137).

Lobos, V. and Partidario, M. (2014) 'Theory versus practice in Strategic Environmental Assessment (SEA)', *Environmental Impact Assessment Review*. 360 PARK AVE SOUTH, NEW YORK, NY 10010-1710 USA: ELSEVIER SCIENCE INC, 48, pp. 34–46. doi: [10.1016/j.eiar.2014.04.004](https://doi.org/10.1016/j.eiar.2014.04.004).

Marsden, S. (2016) 'Strategic environmental assessment of Australian offshore oil and gasdevelopment: Ecologically sustainable development or deregulation?', *Environmental And Planning Law Journal*. 33(1), pp. 21–30.

De Montis, A., Ledda, A. and Caschili, S. (2016) 'Overcoming implementation barriers: A method for designing Strategic Environmental Assessment guidelines', *Environmental Impact Assessment Review*. 61, pp. 78–87. doi: [10.1016/j.eiar.2016.07.006](https://doi.org/10.1016/j.eiar.2016.07.006).

Morrison-Saunders, A. *et al.* (2014) 'Strengthening impact assessment: a call for integration and focus', *Impact Assessment And Project Appraisal*. 32(1), pp. 2–8. doi: [10.1080/14615517.2013.872841](https://doi.org/10.1080/14615517.2013.872841).

Nieminen, M. and Hyytinen, K. (2015) 'Future-oriented impact assessment: Supporting strategic decision-making in complex socio-technical environments', *Evaluation*, 21(4), pp. 448–461. doi: 10.1177/1356389015606540.

Noble, B. and Nwanekezie, K. (2017) 'Conceptualizing strategic environmental assessment: Principles, approaches and research directions', *Environmental Impact Assessment Review*. 62, pp. 165–173. doi: 10.1016/j.eiar.2016.03.005.

OECD [1] (2006) 'Applying Strategic Environmental Assessment' *OECD Publishing*. Paris.

OECD [2] (2006) 'Applying Strategic Environmental Assessment to Develop Cooperation' *OECD Publishing*. Paris.

O'Faircheallaigh, C. (2015) 'ESD and community participation: the Strategic Assessment of the proposed Kimberley LNG Precinct, 2007-2013', *Australasian Journal Of Environmental Management*. 22(1, SI), pp. 46–61. doi: 10.1080/14486563.2014.999726.

Onyango, V. (2016) 'Enhancing environmental integration in strategic environmental assessment (SEA): insight from sensitivity analysis', *Journal Of Environmental Planning And Management*. 59(7), pp. 1149–1167. doi: 10.1080/09640568.2015.1062745.

Onyango, V. and Schmidt, M. (2007) 'Towards a strategic environment assessment framework in Kenya: Highlighting areas for further scrutiny', *Management of Environmental Quality: An International Journal*, 18(3), pp. 309–328. doi: 10.1108/14777830710731761.

Partidário, M. R. (2007) 'Scales and associated data — What is enough for SEA needs?', *Environmental Impact Assessment Review*, 27(5), pp. 460–478. doi: <https://doi.org/10.1016/j.eiar.2007.02.004>.

Partidario, M. R. and Sheate, W. R. (2013) 'Knowledge brokerage - potential for increased capacities and shared power in impact assessment', *Environmental Impact Assessment Review*, 39, pp. 26–36. doi: <https://doi.org/10.1016/j.eiar.2012.02.002>.

Patel, S. and Giordano, T. (2014) 'Environmental assessments for the greening of public infrastructure in South Africa', *Development Southern Africa*. 31(5, SI), pp. 721–743. doi: 10.1080/0376835X.2014.937856.

Petts, J. (2004) 'Barriers to participation and deliberation in risk decisions: evidence from waste management', *Journal of Risk Research*. Routledge, 7(2), pp. 115–133. doi: 10.1080/1366987042000158695.

Pope, J. *et al.* (2018) 'Are current effectiveness criteria fit for purpose? Using a controversial strategic assessment as a test case', *Environmental Impact Assessment Review*. pp. 34–44. doi: 10.1016/j.eiar.2018.01.004.

Sheate, W. R. and Partidário, M. R. (2010) 'Strategic approaches and assessment techniques— Potential for knowledge brokerage towards sustainability', *Environmental Impact Assessment Review*, 30(4), pp. 278–288. doi: <https://doi.org/10.1016/j.eiar.2009.10.003>.

Slunge, D. and Loayza, F. (2012) 'Greening Growth Through Strategic Environmental Assessment Of Sector Reforms', *Public Administration and Development*, 32(3), pp. 245–261. doi: 10.1002/pad.1623.

Torrieri, F. and Bata, A. (2017) 'Spatial Multi-Criteria Decision Support System and Strategic Environmental Assessment: A Case Study', *Buildings*. 7(4). doi: 10.3390/buildings7040096.

Ustaoglu, E. *et al.* (2017) 'Developing and Assessing Alternative Land-Use Scenarios from the MOLAND Model: A Scenario-Based Impact Analysis Approach for the Evaluation of Rapid Rail Provisions and Urban Development in the Greater Dublin Region', *Sustainability*. Basel: MDPI AG, p. 61. doi: 10.3390/su10010061.

Wallington, T., Bina, O. and Thissen, W. (2007) 'Theorising strategic environmental assessment: Fresh perspectives and future challenges', *Environmental Impact Assessment Review*, 27(7), pp. 569–584. doi: <https://doi.org/10.1016/j.eiar.2007.05.007>.

Whitehead, A. L., Kujala, H. and Wintle, B. A. (2017) 'Dealing with Cumulative Biodiversity Impacts in Strategic Environmental Assessment: A New Frontier for Conservation Planning', *Conservation Letters*. 10(2), pp. 195–204. doi: 10.1111/conl.12260.

Whynacht, C. R. and Duinker, P. N. (2015) 'Targeting the transitions: applying stage-gate® thinking in strategic environmental assessment', *Impact Assessment and Project Appraisal*. Taylor & Francis, 33(2), pp. 126–134. doi: 10.1080/14615517.2014.992673.

Wu, Y. and Ma, H. (2018) 'Analysis of strategic environmental assessment in Taiwan energy policy and potential for integration with life cycle assessment', *Environmental Impact Assessment Review*, 71, pp. 1–11. doi: <https://doi.org/10.1016/j.eiar.2018.03.005>.