

Environmental conflicts

Sacred land, mineral wealth, and biodiversity at Coronation Hill, Northern Australia: indigenous knowledge and SIA

Marcus B Lane, Helen Ross, A P Dale and Roy E Rickson

This paper is concerned with the role of social impact assessment (SIA) in the resolution of an environmental conflict involving demands for the conservation of an ecologically significant area, a proposal to exploit mineral wealth, and the concerns of indigenous custodians who feared damage to sacred lands. This is a case in which the knowledge claims of key protagonists were deeply politicized and contested, and in which the process of decision-making was itself the subject of controversy and debate. The paper reviews the case, emphasizing the roles of western and indigenous epistemologies in decision-making. It presents an approach to SIA that addresses these epistemological issues and ensures the articulation of indigenous knowledge to governmental decision-makers.

Keywords: indigenous knowledge; participation; SIA; indigenous people; environmental management; mining

Marcus Lane is Assistant Professor in the Department of Urban and Regional Planning, University of Wisconsin-Madison, 925 Bascom Mall, Old Music Hall, Madison, WI, 53705, USA; E-mail: mlane@facstaff.wisc.edu. Helen Ross is a Professor in the Department of Natural Rural Systems Management, University of Queensland, Gatton, Australia, Allan P Dale is the general manager of resource policy, Department of Natural Resources and Mines, Government of Queensland, Australia, and Roy E Rickson is a Professor on the Faculty of Environmental Sciences, Griffith University, Australia.

GREAT CONFLICTS LEAVE a residue long after they have passed. So it is with great environmental contests that have a tendency to leave new ideas and suggestions for environmental management. This paper emerges from one such conflict over sacred indigenous land, mineral wealth, and biodiversity conservation in northern Australia.

The area now known as Kakadu National Park has long been bitterly contested ground. For decades this landscape has been the subject of frequent and acrimonious conflict over ownership, resource use, and management. One such conflict, a proposal to mine at Coronation Hill (see Figure 1), was joined by three forces responsible for fashioning much of the political landscape of contemporary Australia: indigenous people; conservationists; and the mining industry.¹

This paper is concerned with the role of social impact assessment (SIA) in the resolution of an environmental conflict in which the knowledge claims and values of key protagonists were deeply politicized and contested, and in which the process of decision-making was itself the subject of controversy and debate. This, as we will show, was a case in which the application of both scientific and indigenous epistemologies provided valuable inputs to decision-making.

Indeed, the SIA described here was designed to overcome the tension in SIA methodologies between the so-called political approach that emphasizes values and diverse understandings, and so-called technical approaches emphasizing positivist methodologies and the expert collection of data.² This SIA helped elucidate the value-based dimensions to the conflict



Figure 1. Alligator Rivers region, Northern Territory
 Source: Dr Clive Hamilton, The Australia Institute

that had hitherto been obscured by a discourse dominated by scientific and economic arguments.

The paper will show that it is methodologically feasible for SIA to both conduct technical analyses of social change, and to communicate indigenous knowledge to decision-makers. We will show that such an approach can serve to illuminate issues and complexities that might otherwise be opaque.

Contested environmental decisions

A common complaint about the practice of SIA is its tendency to consistently and perversely de-emphasize the adverse consequences of development

while highlighting the potential positive consequences³ (Ross and Lane, 2001). Some have explained this problem with reference to the political economy of corporate–state relations in land development; suggesting that these relations transform social impact studies into exercises in project advocacy (Lane and Dale, 1995).

Others have suggested that efforts to rigorously understand the potential socioeconomic changes to a given environment through scientifically based methods of impact assessment tend to privilege the interests of developers and the State, by using the lens of science to interpret local environments and human–environment interactions. The marginalization of alternate value systems is, according to this

argument, a central source of bias in SIA. This latter perspective reflects a pervasive problem in the wider fields of environmental management and policy: how to grapple with complex interplay between science and values.

In SIA, these debates catalyzed an alternative to positivist, technical social assessment. The dominant, 'technical' approach to SIA practice is concerned with the objective measurement of the possible social consequences of a given development, and communicating these findings to decision-makers whose decisions rely on this 'value-free' information. Reflecting a wider trend toward citizen participation in policy and planning, and recognizing the value-laden, political dimensions of environmental decision-making, the 'political' model of SIA seeks to understand the explicit and implicit value dimensions involved in land development (Craig, 1990).

The two models therefore embody contradictory assumptions about the process of decision-making and the function of technical adjudication versus the importance of symbolic or value-based systems of knowledge. These assumptions deserve further explication.

The alternate model assumes that decision-making about land use, environment, and development is a fundamentally political process in which different groups compete for influence or bargain over outcomes (Howitt, 1989). A range of participatory approaches to SIA that reject the technical, predictive approaches have emerged in the past 20 years (for instance, O'Faircheallaigh, 1999). These participatory approaches regard technical approaches as problematic because they empower government with information, rather than the communities that must cope with imposed changes.

Alternative models seek to empower communities with information, enhance their participation in the political processes that shape land-use outcomes, and (in some models) negotiate over the terms of development. In short, alternative approaches assume that effective SIA must seek to shape the outcomes of policy decisions at the local level (Howitt, 2001).

In relation to the second assumption, the obvious must be set out: scientific assessment assumes that it is possible to measure and understand environments in all of their awesome complexity and dynamism through objective techniques of measurement. Scott (1998) has recently attacked this claim with great theoretical and empirical detail. Reviewing some of the grand plans of history, Scott shows that these efforts either failed or had catastrophic consequences for local peoples because their planners could not account for the nuanced complexity of the locality with their scientific toolkit.

In humanized environments, local knowledge of place, the histories and practices of resource use and management stored in memory and communicated in conversation, and religious and ethical bases of action that incorporate and draw on local landscapes are at once signals of the complexity of human-

environment interactions and the importance of local knowledge in understanding local environments. Overcoming the limitations of science by incorporating these indigenous knowledge systems (that is, incorporating both cosmology — ways of knowing — and specific environmental knowledge) and utilizing the wisdom of local people has become an agenda for reconceptualizing environmental management⁴ (Berkes and Folke, 1998). Perhaps not surprisingly, this issue most frequently emerges in contexts where ethnic diversity or other questions of difference obtain.

The issue here, of course, is how both indigenous and western knowledge systems, including values, perspectives and technical knowledge, might be incorporated into decision-making. The great failure of rationalism, Pascal wrote, "is not its recognition of technical knowledge, but its failure to recognize any other" (quoted in Scott, 1998, page 340). "Indigenous" or local knowledge refers to that knowledge that is contextualized socially embedded, experiential, and territorially oriented. While both indigenous and western-scientific knowledge are based on observation, in the former the construction of the knowledge is holistic, territorially oriented and concrete, whereas western science is abstract, reductionist and separates the human from the natural (Norchi, 2001).

Scott (1998) draws on Plato and Aristotle to distinguish technical knowledge or *techne*, and indigenous knowledge or *metis*. "*Techne* is characterized by impersonal, often quantitative precision and a concern with explanation and verification," he explains, while *metis* is concerned with personal, experiential knowledge and practical results (Scott, 1998, page 320). For Scott, the scientific 'measurement' (of a landscape) is a process of rendering it legible; however the scientific lens provides only for selective vision, and the crucial elements of that landscape, including people and their customary practices are thus rendered illegible. Technical knowledge simultaneously sharpens our focus and obscures our vision.

The problem of how both indigenous and technical systems of knowledge may be effectively utilized in environmental decision-making is not, of course, confined to the fields of social and environmental

The problem of how both indigenous and technical systems of knowledge may be effectively utilized in environmental decision-making is not confined to the fields of social and environmental impact assessment, nor is it simple

impact assessment. Nor is it simple. Kellert *et al* (2000) found almost no evidence to support the contention that decentralized environmental governance improves the utilization of indigenous *and* modern ecological knowledge. Others suggest that there exists in environmental management a “wide chasm indeed between a managerial language emphasizing scientific expertise as a legitimating force in policy-making and a communitarian alternative espousing direct citizen action and influence as primary”(Williams and Matheny, 1995, page 9).

The literature is unhelpfully divergent: it promotes indigenous knowledge on the one hand, and laments the lack of scientific rigor in decision-making on the other. While the contours of the problem have been thoughtfully sketched, “no one appears to have a clear sense of how the two halves of the policy whole should be put together” (Foreman, 1998, page 61).

Introduction to case analysis

The SIA described here was initiated by an Australian Federal Government inquiry that was commissioned to advise Government on how a dispute over a proposal to mine gold, platinum and palladium at Coronation Hill should be resolved. This proposal was bitterly resisted by many of the Jawoyn, an indigenous group with custodial rights to the area, who were concerned about its sacred nature, as well as by a diversified environmental movement, which sought the area’s inclusion in an expanded Kakadu National Park.⁵

While the dispute had simmered for nearly a decade, by the late 1980s it had escalated to the point that the Federal Government initiated a public inquiry to advise it. The SIA we describe here was one research activity among a suite of projects (Altman and Smith, 1990; Keen and Merlan, 1990) that were designed to inform and advise government. The terms of reference for the study were (Lane *et al*, 1990):

- To compile a comprehensive profile of the socio-economic environment of the region.
- To discern potential socio-economic and cultural impacts of development by examining how the community works, the cumulative effects of past developments, and the combined effects of new developments, and identify alternative potential development options.
- To explore how people themselves perceive events and their impacts using appropriate participatory techniques.
- To enable the SIA process to become part of the peoples’ means of defining their goals and aspirations.
- To relate peoples’ aspirations to the context of development in the region, including potential new development and new populations.

This brief therefore reflected recent thinking that SIA needs to understand how affected communities work; that participation of the people affected is essential if the impacts are to be properly assessed; that effective SIA could not be based on the principles of ‘value-free’ science; that impact assessment should take a cumulative view recognizing a combination of past and current influences, and that impact assessment should be integrated with planning processes, for the communities concerned (Ross, 1990; 2001).

Methods

The methodology used had three major components. First, the participatory component, strategic perspectives analysis (SPA), was designed to gather important qualitative data on the nature and interests of relevant stakeholders.⁶ In addition, this method provided a vehicle for the articulation of local interests and concerns to the decision-making agency.

Second, a suite of standard SIA techniques was employed to provide decision-makers with information about the potential social impacts and impact management strategies. These ‘technical’ aspects of the study (such as demographic analyses, socio-economic profiles, and analogous studies) were applied concurrently with the participatory element of the research. An effort was made to situate these data in relevant social theory, thus improving the predictive power of the analyses presented.

The third component of the approach involved the application of a community response model (Blishen *et al*, 1979). This model emphasizes the importance of three broad indicators — social vitality, economic viability and political efficacy — in developing an understanding of community structure and process. The three indicators are used to develop an understanding as to whether a community is likely to be prone or resilient to adverse impact, and whether it will be receptive to positive impacts that may be associated with a given development.

Strategic perspectives analysis

In terms of the participatory aspect of the method, we concluded that integrating technical and participatory data in a fashion that would enhance the articulation of social assessment with planning required a participatory method that would:

- fully involve *all* groups with an interest in land-use outcomes within the study area: this would require the identification of people’s perceptions of possible land-use outcomes as well as an understanding of their underlying values and beliefs; and
- improve the ability of different interest groups to have an input in the inquiry process through the promotion of their values and concerns directly to relevant decision-making bodies.⁷

SPA is a technique for participatory planning. It has much in common with other participatory approaches. SPA can be used to articulate stakeholder interests, systematize resulting data, and strengthen the nexus between SIA and planning. In applying the principles of strategic planning, SPA helps interested actors to formulate their own preferred land-use strategies for the area affected by a particular development proposal. By asking stakeholders to consider these strategies in relation to those articulated by others in the planning community, the procedure achieves better integration of plural perspectives with planning processes and outcomes.

In this case, SPA was used as a framework for identifying all stakeholders and exploring their interests. It was used to assist disenfranchised indigenous interest groups to articulate their own land-use vision, objectives and strategies to assist them to consider and respond to the development proposal. By using a strategic planning framework to structure the dialogue, it proved useful in helping affected stakeholders with information and advice about improving their positions within decision-making processes.

We sought to ensure that social impacts would be assessed from the perspective of the interest groups themselves, rather than defining them from the 'objective' stance of the analyst. Moreover, care was taken to identify all relevant actors and recognize differentiation within categories of actors. For instance, Aboriginal people were not treated as undifferentiated; instead the approach to stakeholder analysis enabled recognition of a variety of indigenous organizations and actors whose responses to the mine differed.

Similar care was taken to differentiate other categories of actors, including government and environmentalists. In all, over 60 actors were interviewed using the SPA technique. Each stakeholder was interviewed three times: an introductory discussion to explain the process and develop rapport; a detailed interview or workshop; and a final meeting to recheck the information provided.

Understanding the social environment

The terms of reference for the study required the compilation of a profile of the socio-economic environment of the region, including services, facilities and infrastructure, and an exploration of the potential socio-economic and cultural impacts of development in social, historical and regional contexts. This is a standard approach to collecting 'baseline' data both to provide background information and as a comparison point for future monitoring. The risk is over-reliance on accessible secondary data, which may or may not be relevant to the assessment of impacts. This is a legacy from when SIA was in its infancy, when measurable variables assumed unwarranted importance simply because they were available, and numbers were considered more 'scientific' than qualitative processes.

For these sections of the brief, we were expected to rely mainly on existing information sources. One of the difficulties encountered was relating the data that was available to the questions at hand. The J-woyn people have suffered a great deal of disruption and pain as a result of non-Aboriginal occupation of their lands, but so have their immediate neighbors and most other indigenous peoples.

What was it about this history that could influence the future impacts they might suffer, or the gains they might make, from mining in the area? Health, housing, employment and education status among the Aboriginal people of the region were as shocking as anywhere else, but what possible relevance had this to a mining proposal?

The researchers reacted against the simplistic acceptance of accessible profiling statistics. While the material poverty of local indigenes could not be dismissed as irrelevant, the nature of any relationships between these pathologies and the mining proposal needed to be analyzed. These issues forced us to consider how and why these indicators were relevant. Our answer was a chain of possible responses linking the:

- Cultural context: Aboriginal spiritual association and responsibilities towards the proposed mine site, founded in their knowledge system;
- Psychological dimension: related to the cultural beliefs, of fear of cataclysm, which would follow disturbance of sacred sites, and helplessness in the face of inability to fulfill cultural responsibilities;
- Health context: the vulnerability of key individuals (and the population at large) to illness and early death as a result of psychological impacts, disease levels and self-neglect (diet, alcoholism); and
- Social context: community leaders' motivation and credibility to lead in the face of the cultural, psychological and health impacts, and likely community responses to their leadership.

This systems analysis of relationships among cultural, psychological, health and social factors identified the roles of statistically measurable variables alongside qualitative factors, and enabled us to predict the impacts probable, for each stakeholder, from a decision to mine, or not to mine, at Coronation Hill.

By combining technical and participatory data in this way, the study was able to consider more seriously the impacts of various land-use outcomes on different groups with interests in the region. This 'integration' of both local values and beliefs with more conventional SIA techniques provided a more powerful understanding of the differential impacts that mining might have.

As a framework for both understanding and interpreting our data, we relied on a model of community response used in indigenous domains in Canada: the Blishen-Lockhart model. It is to this we now turn.

Using the Blishen–Lockhart model

The Blishen–Lockhart model (Blishen *et al.*, 1979), developed for use in cross-cultural contexts, emphasizes the importance of three broad indicators: social vitality; economic viability; and political efficacy. These three concepts provide a framework for understanding of community resilience or susceptibility to adverse impact-stemming change. The model provides a critical link between the quantitative and qualitative data in developing an accurate baseline, it assists in disaggregating the local populations and differentiating the impacts likely to be felt by differing components of the local population, and it sensitizes researchers to the factors that determine resilience or susceptibility to impact.

We also emphasized the importance of the value system of the affected community, by incorporating aspects of the Little and Krannich (1988) model. This model views community values as driving the community structure, activities and processes that are crucial to determining social impact and contribute to social well being. If our assessment of impacts was to be insightful in this cross-cultural context, we reasoned that the value sets of local people needed to be considered explicitly.

Social vitality

Social vitality, the first of the three elements of the framework, is the degree to which individuals can respond effectively to imposed problems. The ability of a community to adjust is largely dependent on the degree of integration or cohesiveness within that community. Highly privatized (minimal links with wider society) communities might adjust in a variety of ways, from showing strength and resolve, to personal disorganization and pathological behavior. Adjustment to project development (such as a mine) is more likely to be constructive in a social environment where there exist strong social support networks, local role models, and social interdependencies, including institutional integration with mainstream society.

The Blishen–Lockhart model for cross-cultural contexts emphasizes the importance of social vitality, economic viability, and political efficacy, which provide a framework for understanding community resilience or susceptibility to adverse impact-stemming change

The locus of community status and authority, and the robustness of local institutional authority structures, is another key factor here. In a community in which internal (customary) authority structures are important, change that undermines this authority and these individuals, is likely to limit a community's ability to adjust to change in a constructive way.

The Jawoyn, like many Aboriginal groups in the region, were relatively cohesive. There was a strong sense of Jawoyn identity, of being Jawoyn, and of being Aboriginal. Although the Jawoyn live in a series of spatially disparate communities and camps, they exhibit multiple ties, including kinship ties and community ties. There was, however, a diversity of opinion on a range of issues, including mining, and unanimity of opinion was not common. Conflicts over impending developmental change reflected deeper social divisions among the Jawoyn, including issues such as the role of tradition and the relevance of belief systems in contemporary life (Lane *et al.*, 1990).

At the time of this study, levels of alcohol and substance abuse as well as violence and crime were very high. The community health profile of the Jawoyn, like other major Aboriginal groups in the region, was more characteristic of third world populations, rather than the wealthy first. Poor health is particularly important with regard to social vitality, because it is both a symptom and a cause of diminished vitality.

Jawoyn society was also poorly integrated with mainstream European–Australian society and culture. This represented an opportunity to withstand the considerable forces of acculturation. However, it also represented a disadvantage for individuals in adjusting and adapting to structural changes. Adjustment and adaptation in a social environment that is poorly integrated with mainstream society must occur via local support systems, and, if these are impaired, personal maladjustment and disorganization may result.

With this lens, it was possible to discern several ways in which Jawoyn society was vulnerable to impact. There were many indicators of social disorganization in the communities in the region. Pathological behavior in these communities demonstrates that social support structures fail to provide a mechanism for total community and individual adjustment. Further dramatic impacts to Aboriginal belief systems were likely to produce similar effects: resilience to impact in some individuals, through to social disorganization and pathology manifest in other elements of the community.

Economic viability

Economic viability refers to the degree to which communities and individuals are able to earn income from external sources, either public or private. This aspect of community life is important because a community that is:

“dependent upon one or two large, externally controlled sources of economic survival tends to lose or be unable to develop, the ability to generate internal alternatives. ... [D]ependency tends to undercut the development of processes by which the community can evolve a sense of collective security, initiative and potency. ... [T]he individual’s perception of vulnerability, apathy and powerlessness within a privatized and uncaring community is much reinforced.” (Blishen *et al.*, 1979, page 54)

In this case, the economic viability of the communities in the region was extremely limited. Since 80–90% of all Aboriginal adults in the region were unemployed, there was heavy dependence on welfare payments. New possibilities for employment and economic opportunity were limited and generally confined to whatever benefits capital-intensive mining development might bring.

The proponent’s optimistic statements about potential Aboriginal employment at the mine were compared with the actual record of Aboriginal employment throughout the Australian mining industry. At this time, there were 26,000 jobs in mining in the remote north of Australia, and yet only 1.8% of those jobs were held by Aborigines who, in turn, comprised approximately 25% of the total population (Cousins and Nieuwenhuysen, 1984).

Political Efficacy

Blishen *et al.* (1979) suggest that one of the critical indicators of political efficacy is the level of participation in political processes both internal and external to the community. In this case, the Jawoyn proved to be effective political participants in the wider land-use and mining debate. Those Jawoyn opposed to mining mobilized through a number of indigenous and non-indigenous representative groups. These groups were successful in gaining national attention for the Aboriginal concerns about mining in the area. The pro-mining Aboriginal people sought and utilized other actors to achieve their ends.

There were, of course, significant obstacles to indigenous political participation. The Jawoyn were constrained by the remoteness of their homes, by the cross-cultural gulf in communication and by other factors such as education, financial capacity to participate, and transport. This is a common pattern in the Australian context.

The central issue here is that, despite the pessimistic nature of the social profiles compiled by this study and the number of important constraints on the political efficacy of the Jawoyn, they proved pivotal to the resolution of the conflict. Representatives of both viewpoints proved capable in mobilizing and formulating strategies to achieve their objectives. Ultimately indigenous issues proved central to the decision of the Federal Government not to mine.

Moreover, the ability of the Jawoyn to place the land-use debate on the national agenda augured well for effective participation in future impact management and monitoring.

Synthesis

Our approach combined a comprehensive socio-economic profile with rich qualitative information by the use of SPA. The former enabled us to identify how background factors such as poverty, marginalization and poor health could combine with new circumstances arising from the project proposal to create social impacts. SPA allowed us to recognize differential impacts on diverse actors.

In addition, a theoretical framework (the Blishen–Lockhart model) helped us interpret the data in terms of the Jawoyn people’s (and different sub-groups) vulnerability or resilience to impacts. We found that those who adhered strongly to the Aboriginal knowledge system founded in responsibilities for land and belief in the powers of sacred sites were vulnerable to the succession of cultural, psychological, health and social impacts. We also concluded that those who sought economic development were likely to be disappointed, since the mine was unlikely to provide high levels of employment or other development opportunities.

Recommendations, monitoring, mitigation

We made recommendations in relation to a number of possible decisions about future land use. These included mitigation measures for all stakeholders, since most likely outcomes would create ‘winners’ and ‘losers’ among the Jawoyn and other Aboriginal people. We also recommended a participatory monitoring process to scrutinize social impacts and assist adjustment.

Since the mine was not approved, neither formal mitigation nor monitoring programs were deployed. The Jawoyn themselves achieved a high degree of reconciliation between the previously competing groups and effectively pursued economic development pathways. This included cooperation with a mine on a site that was not sacred to them (thus demonstrating that they were not opposed to *all* mining) as well as pastoral, national park management and tourism endeavors (Ross, 2001).

Conclusions and reflections

The Coronation Hill controversy was a complex and highly politicized context for a social impact assessment. It put the knowledge systems, especially the beliefs and values, of all key parties — mining, Aboriginal, conservation and government — at the core of the impact assessment, despite being handled

largely within the 'technical' domain of a government inquiry. We sought an approach that was flexible and robust enough to allow us to operate within the institutional constraints of a government inquiry yet one that would also incorporate and articulate Aboriginal belief systems, knowledge and aspirations.

Our approach was to combine a theoretical framework of community dynamics and response, a comprehensive (statistical) socio-economic profile of the region, with rich, structured participatory data. Our experience was that the community response model (Blishen *et al.*, 1979) proved highly informative in guiding our data collection and assisting our analysis. Another innovation in this study was that we contributed a systems analysis, linking cultural impacts related to the sacredness of the Coronation Hill site (or to some, perceived lack of sacredness) with individual, health, and social interactions. This enabled a considered identification of secondary impacts.

When the Prime Minister of Australia announced his decision to conduct a comprehensive inquiry into land use and development in the area of Coronation Hill, the debate between conservationists and advocates of mineral development, which had been simmering for some years, was both acrimonious and contentious. The discursive focus for much of this time was concerned with 'balancing' the area's environmental significance against the potential economic benefits of mineral extraction.

By the time the inquiry had concluded, the parameters of the debate had changed immeasurably. The contest between miners and 'greenies' was now understood to involve still greater complexity: the social impacts of land-use change and development had moved to center stage. Moreover, the impacts of land-use change on the belief system and lifestyles of the Jawoyn had become a central and politically strategic issue.

The SIA described here, combined with a hitherto unprecedented commitment to citizen participation on the part of the assessment agency, had ensured that this additional knowledge and complexity was brought to bear. Given the consistent marginality of indigenous peoples in resource development decision-making, this was itself a significant milestone.

By the end of the inquiry, the social impacts of land-use change and development had moved to center stage and the impacts of land-use change on the belief system and lifestyles of the Jawoyn had become a central and politically strategic issue

The final report of the inquiry provided the Federal Government with a series of options ranging from limited to extensive resource development, conversion of the land around the proposed mine to conservation tenure, through to legal recognition of indigenous custodial land interests.

It did not provide a recommendation as to the final appropriate land use for the area; instead it emphasized that the decision was one that ultimately required grappling with diverse and competing value-sets. The Federal Government chose not to allow mineral development to proceed and to recognize indigenous land interests and the need for conservation. The rationale the Government provided for this decision in the days following emphasized the spiritual significance of the area to local indigenes, and the potential for profound social impacts should mineral development proceed.

It is important to note however, that, as the memoirs of a retired senior politician show, political imperatives far removed from the substantive issues at hand were the overriding determinants of the final decision (Lane and Rickson, 1997). This should not be surprising: social and environmental impact assessments serve an advisory function as part of the planning apparatus of state decision-making. In this case, the real importance of SIA was its contribution to public debate and understanding. It shed light on alternative ways of understanding this landscape and the people who inhabited it.

Yap (1990) has made a similar observation: the most important function of social and environmental impact assessment may be in creating a forum for democratic debate. In this case, the SIA contributed to this societal conversation in a significant way and, in so doing, helped organize attention to a range of policy alternatives that hitherto had not been central to the debate. The most important aspect of the SIA in this respect was its articulation and integration of the local indigenous values, beliefs, and worldviews in the analysis of social impact.

By first systematically describing the values and interests of the Jawoyn and by also conducting 'technical' analyses of social change (some of which validated local concerns and fears), the SIA provided new bases for policy formulation in the public debate. The technical discourse that had dominated the debate and had served, as Scott (1998) might say, to render aspects of the landscape illegible, had been widened by illuminating the indigenous knowledge of the Jawoyn.

Lessons

For those concerned with the practice, promise, and potential of SIA, this case has three lessons. First, SIA can be made an appropriate vehicle for the systematic collation and articulation of indigenous knowledge and its communication to decision-makers. Second, in doing so, SIA can (and should)

help decision-makers understand landscapes in all of their complexity and thus help ensure that environmental decisions are just. Third, adopting this agenda need not involve retreating from technical analysis of social and economic change that has dominated SIA practice, but does require greater sophistication in research design and conduct.

This is not to suggest however, that the tensions and difficulties associated with these two epistemologies are necessarily resolvable: complex problems remain. The call for the 'integration' of indigenous and western knowledge in environmental decision-making simply ignores the vast epistemological differences (Nadasdy, 1999). Whereas the former is holistic, territorially oriented and concrete, the latter is abstract. There are, in other words, no commensurate units that might enable 'integration'. Second, power is an inevitable accessory to the discussion of knowledge. As Agrawal argues (quoted in Howitt, 2001, page 38):

"the question is one of power. Who has access to resources and can deploy them in order to disadvantage others? Clearly, it is not the holders of indigenous knowledge who exercise the power to marginalize. ... The criterion of power will triumph when local, traditional, or practical knowledge is contrasted with global, modern, or theoretical knowledge."

While SIA cannot resolve the epistemological dilemmas involved in the deployment of knowledge for policy-making, it can and should seek to communicate indigenous knowledge to decision-makers. This paper has shown that this is methodologically feasible and that such efforts can serve to illuminate issues and complexities previously obscured.

Notes:

1. Some key references to the historical and contemporary dimensions to the contests over this area include, *inter alia*, Press *et al* (1995); those interested in the dispute to which this article refers are directed to Lane and Rickson (1997) and Toyne (1994).
2. The study referred to here is Lane *et al* (1990); the methodology used is described in detail in Lane *et al* (1997).
3. The literature suggests that this is particularly pronounced in relation to the interests of indigenous peoples in Australia: see Howitt (1989); Lane and Dale (1995); Ross (1990).
4. This is also a response to the sustained critique of modernism, particularly from feminist and subaltern theorists who have attacked modernity's "commitment to a single, universal truth and unitary single subject" (McDowell, 1995, page 285).
5. Kakadu National Park was intended to encompass an entire set of river catchments, through progressive acquisition of properties. The site of the proposed mine was within an area to be acquired as the third stage of the Park. Several pre-existing mining leases are excluded from the Park, although within the protected catchments.
6. For a complete description of SPA as procedure for participatory social assessment and planning, see Dale and Lane (1994).
7. We were thus influenced by the Mackenzie Valley Pipeline Inquiry (Berger, 1988).

References

- Altman, John C, and Di Smith (1990), *The Possible Economic Impacts of Mining and Tourism in the Kakadu Conservation Zone on Aboriginal People* (Resource Assessment Commission Kakadu Conservation Zone Inquiry Consultancy Series, Australian Government Printing Service, Canberra).
- Berger, T R (1988), *Northern Frontier Northern Homeland: The Report of the Mackenzie Valley Pipeline Inquiry* (Douglas and McIntyre, Vancouver).
- Berkes, Fikret, and Carl Folke (editors) (1998), *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience* (Cambridge University Press, Cambridge).
- Blishen, Bernard R, Alexander Lockhart, Prudence Craib and Elizabeth Lockhart (1979), *Socio-Economic Impact Model for Northern Development, Volumes 1 and 2* (Canadian Department of Indian and Northern Affairs, Ottawa, Canada).
- Cousins, David, and John Nieuwenhuysen (1984), *Aboriginals and the Mining Industry: Case Studies of the Australian Experience* (Allen and Unwin, Sydney).
- Craig, Donna (1990), "Social impact assessment: politically oriented approaches and applications", *Environmental Impact Assessment Review*, 10(2), pages 37–55.
- Dale, Allan P, and Marcus B Lane (1994), "Strategic perspectives analysis: a procedure for participatory and political SIA", *Society and Natural Resources*, 7(3), pages 253–267.
- Foreman Jr, Christopher H (1998), "Blended rationality and democracy: an elusive synthesis for environmental policy reform", *Science Communication*, 20(1), pages 56–61.
- Howitt, R (1989), "Social impact assessment and resource development: issues from the Australian experience", *Australian Geographer*, 20(2), pages 155–167.
- Howitt, R (2001), *Rethinking Resource Management: Justice, Sustainability and Indigenous Peoples* (Routledge, London).
- Kellert, S R, J N Mehta, S Ebbin and L L Lichtenfeld (2000), "Community natural resource management: promise, rhetoric, and reality", *Society and Natural Resources*, 13, pages 705–715.
- Keen, I, and F Merlan (1990), *The Significance of the Conservation Zone to Aboriginal People* (Australian Government Printing Service, Canberra).
- Lane, Marcus B, and Allan P Dale (1995), "Cross cultural project assessment: the Australian indigenous experience and the need for reform", *Australian Journal of Environmental Management*, 2(1), pages 19–30.
- Lane, Marcus B, and Roy E Rickson (1997), "Resource development and resource dependency: Australia's Jawoyn Aborigines and mining at Coronation Hill", *Society and Natural Resources*, 10(2), pages 121–143.
- Lane, Marcus B, Allan Dale, Helen Ross, Allan Hill and Roy E Rickson (1990), *Social Impact of Development: an Analysis of the Social Impact of Development on Aboriginal Communities of the Conservation Zone Region* (Resource Assessment Commission Kakadu Conservation Zone Inquiry Consultancy Series, Australian Government Printing Service, Canberra).
- Lane, Marcus B, Helen Ross and Allan P Dale (1997), "Social impact research: integrating the technical, political and planning paradigms", *Human Organization*, 56(3), pages 302–310.
- Little, Ron L, and Richard S Krannich (1998), "A model for assessing the social impact of natural resource mobilization on resource dependent communities", *Impact Assessment Bulletin*, 6(2), pages 21–35.
- McDowell, L (1995), "Understanding diversity: the problem of/for 'theory'", in R J Johnston, P J Taylor and M J Watts (editors), *Geographies of Global Change: Remapping the World in the Late Twentieth Century* (Blackwell Publishers, London).
- Nadasdy, Paul (1999), "The politics of TEK: power and the 'integration' of knowledge", *Arctic Anthropology*, 36(1–2), pages 1–18.
- Norchi, Charles H (2001), "Indigenous knowledge as intellectual property", *Policy Sciences*, 33, pages 387–398.
- O'Faircheallaigh, C (1999), "Making social impact assessment count: a negotiation-based approach for indigenous peoples", *Society and Natural Resources*, 12, pages 63–80.
- Press, T, D Lea, A Webb and A Graham (1995), *Kakadu: natural and cultural heritage management*. (Australian Nature Conservation Agency and North Australia Research Unit, Australia National University, Darwin).
- Ross, H (1990), "Community social impact assessment: a framework for indigenous peoples", *Environmental Impact Assessment Review*, 10(1–2), pages 185–193.

Ross, H (2001), "Social impact assessment: Coronation Hill", in R Baker, J Davies and E Young (editors), *Working on Country: Contemporary Indigenous Management of Australia's Lands and Coastal Regions* (Oxford University Press, Sydney).

Ross H, and Marcus B Lane (2001), "The Commonwealth's Resource Management and Social Assessment: trapped in an epistemological corner?" in Allan Dale and Marcus Lane (editors), *Institutionalizing social assessment in resource management in Australia and New Zealand* (CSIRO, Melbourne).

Scott, James C (1998), *Seeing Like a State: How Certain*

Schemes to Improve the Human Condition Have Failed (Yale University Press, New Haven CT).

Toyne, P (1994), *The Reluctant Nation: Environment, law and politics in Australia* (ABC Books, Sydney).

Williams, B A, and A R Matheny (1995), *Democracy, Dialogue, and Environmental Disputes: The contested languages of social regulation* (Yale University Press, New Haven, CT).

Yap, M (1990), "Round the peg or square the hole? Populists, technocrats and environmental assessment in third world countries", *Impact Assessment Bulletin*, 8, pages 69–84.