

CHAPTER 6

Scoping — Foundations for Effective Environmental Impact Assessment

Martin Ward*

Introduction

Scoping is the process of defining and prioritising the issues to be covered in environmental impact assessment. It is the foundation for effective environmental impact assessment, of which Assessment of Environmental Effects is one, project-based, variant. In the Resource Management Act (RMA) context, inadequacies in scoping can be shown to lead to poor assessment of effects, inadequate consultation, and requests for further information. This can result in a difficult, sometimes attenuated, and often more expensive consenting process.

The development of scoping practice is described in this chapter, with reference to experience in New Zealand, the United States and the Netherlands. Three principle scoping methods are presented and evaluated in the context of large and small projects. Some signposts to potentially significant issues arising from practical experience are given.

The chapter comments on the constraints on effective environmental assessment (including scoping) within the context of the RMA, and the roles of council staff in response to resource consent applications.

Definitions

Scope: The sphere or area over which an activity operates or is effective; the field covered by a branch of knowledge, an inquiry, concept, etc. Extent in space, spaciousness. Hence, scoping (Shorter Oxford Dictionary).

Environmental Impact Assessment: Environmental impact assessment is a process whereby a conscious and systematic effort is made to assess the environmental consequences of choosing between the various options that may be open to the decision-maker. Environmental impact assessment must begin at the inception of a proposal, when there is a real choice between various courses of action including the alternative of doing nothing. It must be an integral part of the decision-making process, proceeding through all the development stages of a proposal to actual implementation. (Commission for the Environment, 1971).

Assessment of Environmental Effects: *“(An application for a resource consent shall be in the prescribed form and shall include) ... an assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated.”* (Section 88, Resource Management Act, 1991).

* Environmental Advisor, Christchurch

Sequence

Scoping is the first and founding step in the sequence of activities that comprise environmental impact assessment (EIA). In summary, these activities are generally considered to be:

- scoping;
- impact prediction;
- assessment of impact magnitude;
- selection between alternatives; and
- management and mitigation planning.

While this is a well-defined sequence, the process overall is highly iterative, and prior stages may be revisited. It is clear, therefore, that if a formal scoping step is missed, or a scoping study is incomplete or misdirected, an incomplete environmental impact assessment will result. Inadequate or inappropriate decisions on siting, design, or operational set up, may result as a consequence.

The role and importance of scoping is also well-illustrated by the definition of environmental impact assessment noted above. This is taken from the New Zealand Government's Environmental Protection and Enhancement Procedures of 1971, the forerunner of the Assessment of Environmental Effects provisions in the Resource Management Act 1991 (Fourth Schedule).

Environmental impact assessment has been recognised as a project analysis tool since the introduction of the US National Environmental Policy Act (NEPA) in 1969. In a useful review of its modern application internationally, Canter (1996) observes that most commentators have cited its objectives as:

- to provide decision-makers with information about the beneficial and adverse effects of projects, programmes, plans and policies; or
- to ensure that environmental factors are able to be considered alongside economic, technical and political considerations on decision-making.

To meet these objectives, a rigorous approach must be taken; one that must also involve the public as a source of knowledge and valued opinions. As much as scoping is the essential foundation of effective EIA, so public participation is fundamental for its effective operation and successful conclusion. A comprehensive step-wise analysis of EIA is shown in Figure 1.

In New Zealand, with rare exceptions, environmental impact assessment is formally applied only to projects, and this is through the application of the Assessment of Environmental Effects requirements for resource consents under the Resource Management Act, 1991. In other jurisdictions environmental impact assessment is specifically applied to programmes, plans and policies.

Purpose

The purpose of scoping is to identify, in advance, the full range of social and physical

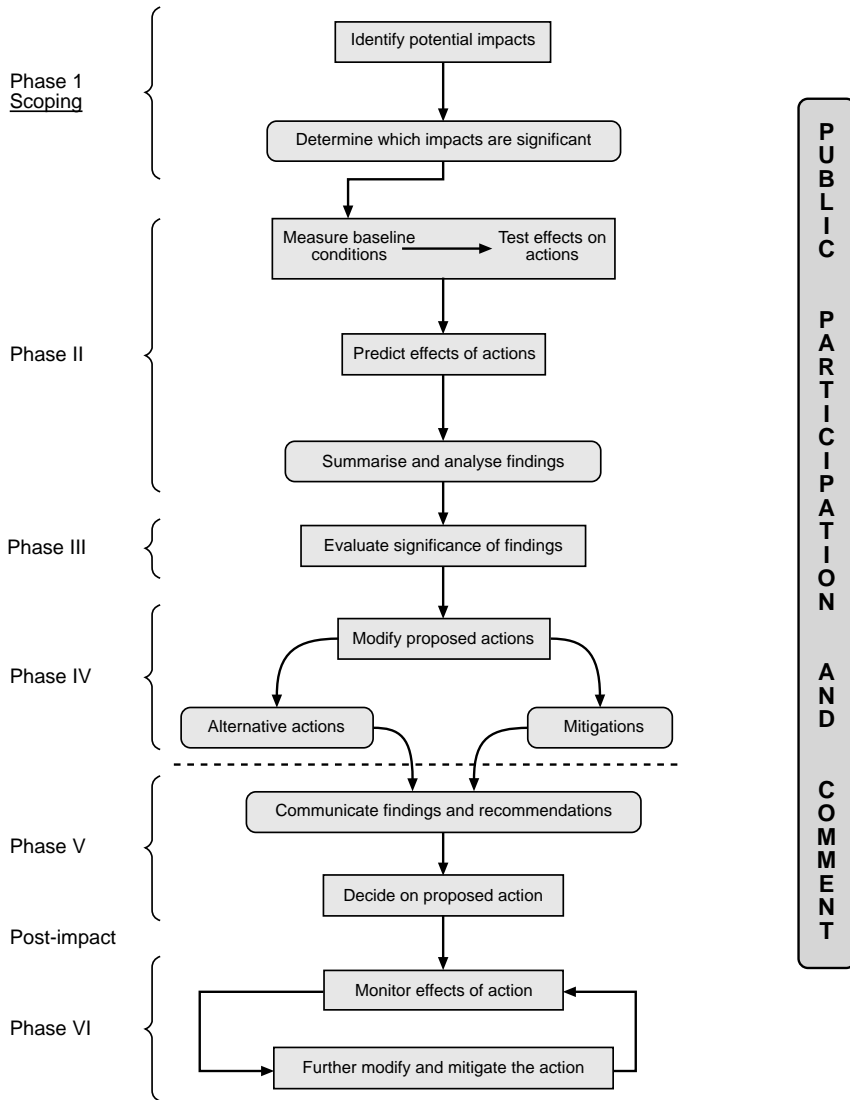


Figure 1: Phases of impact assessment (after Westman, 1985 in Canter 1996)

issues that need to be studied and assessed to effectively understand the nature and extent of the environmental impact of a project. Where alternative locations are being considered a comparative component is added.

The international literature is surprisingly silent on the definition of scoping. A recent reference with a suitable reflection of the ‘people and communities’ focus of the RMA is in a paper by Taylor et al (1998):

Scoping: Initial public involvement and identification of issues, establish variables to be described/measured, and links between biophysical and social variables, and likely areas of impact and study boundaries.

This definition was developed with reference to social assessment, which is an important subset of environmental impact assessment. No changes are needed to apply it to EIA, although the purist might choose to relegate 'initial public involvement' to the end of the definition.

Scoping must also satisfy another, potentially opposing, objective and that is focusing. As well as canvassing the breadth of potential environmental concern, scoping must involve a focusing mechanism to start to identify the areas of more important potential conflict between the proposal and its setting — the ones that require the most intensive or longest period of study.

Scoping was first formally recognised in statutory procedures in the USA. A National Environmental Policy Act regulation was brought in nine years after the Act in recognition that there should be an early, initiating process to enable agencies and others to pinpoint significant issues warranting study and analysis — a response to early environmental impact statements that tended to be information rich but analytically poor. The NEPA regulation describes scoping as “an early and open process for determining the scope of issues to be addressed and for identifying the significant issues relating to a proposed action”.

Benefits

The benefits of thorough scoping can be considerable. Substantial savings of time, money and community goodwill can be achieved. Savings arise from:

- avoiding unnecessary investigations or surveys;
- early understanding of priority issues to assist design or site selection decisions;
- including all matters relevant to EIA at the outset thus avoiding delays while matters overlooked have to be revisited later (this is particularly important for inter-seasonal studies); and
- involving all interested communities from the outset reduces the possibility of public opposition.

Including some form of public consultation in the scoping study is clearly necessary to capture these benefits.

Scope

If one takes as a starting premise that EIA is an iterative process, it follows that the initial scoping work will be revisited as new information or options come forward. Further, as EIA is a flexible process, it can be concluded that fixed or arbitrary boundaries between stages are neither necessary nor helpful.

However, there is a paradox in these statements, because the objective of scoping is to reduce and ideally eliminate the need to revisit issues or to introduce others at a later time. This tension between creating boundaries around a set of environmental assessment studies and keeping the study programme open to relevant new issues is frequently reflected in a similarly tense relationship between the project proponent (and

the manager of the EIA programme) and the regulator and auditor of the EIA report.

In New Zealand, formal guidance on scoping first appeared in a draft Ministry for the Environment publication prepared to assist with better implementation of the Environmental Protection and Enhancement Procedures, but set aside with the pending arrival of the RMA. Scoping was proposed as a very wide-ranging activity as follows (Ministry for the Environment, 1988):

- “ (a) to identify the possible effects of the proposal on the environment;*
- (b) to identify the possible effects on people of predicted environmental changes;*
- (c) to inform potentially affected people of the proposal;*
- (d) to understand the values held by individuals and groups about the quality of the environment that might be affected by the proposal;*
- (e) to evaluate concerns expressed and the possible environmental effects for the purpose of determining how or whether to pursue them further;*
- (f) to define the boundaries of any required further assessment in terms of time, space and subject matter;*
- (g) to determine the nature of any required further assessment in terms of analytical methods and consultation procedures;*
- (h) to organise, focus and communicate the potential impacts and concerns, to assist further analysis and decision making.”*

This list appears without amendment in the Ministry for the Environment scoping guideline produced in 1992 to assist with the interpretation and use of the Resource Management Act.

At first glance, the list appears to be a somewhat over-comprehensive prescription for moving into the further stages of EIA. However, there is no element that can be readily edited out. It is an excellent guide. In a contemporary AEE, professional lack of focus on these core elements would lead to a loss of professional rigour that would do scoping and EIA a disservice.

In summary, it can be stated that scoping must identify and bring into the environmental impact assessment study the full range of issues of potential concern, and help focus attention on the ones that require closest examination.

This would include, in particular, issues requiring multi-season longitudinal study and those of greatest magnitude in terms of adverse social and/or biophysical impact. The communities that might be affected by any aspect of the proposal must be identified and methods adopted that are most appropriate to both project type and community interests so as to identify their values and concerns and involve them in decisions.

Approaches

Internationally, approaches to scoping are understandably influenced by the legislative framework for the whole EIA procedure. Many countries require the regulatory body,

not the project proponent, to undertake the scoping. This leads to formal advice to the project proponent on what must be included in the EIA report. This advice can be from officials, or from a specially convened panel.

In the International Study of the Effectiveness of Environmental Assessment, Sadler (1996) finds that ‘objectives-led’ or ‘decision-orientated’ scoping is important “*to set out the appropriate terms of reference and to assist participating agencies, as well as the public, to focus on their key responsibilities and mandates*”. In their scoping advisory role to project proponents, the Netherlands Commission for the Environment includes “reasonable” alternatives to the proposed activities that must be studied as well.

The Ministry for the Environment (Ministry for the Environment, 1988) offers practical advice on some basic steps as follows:

- Develop a communication plan (decide who to talk to and when).
- Assemble information that will be the starting point of discussions.
- Make the information available to those whose views are to be obtained.
- Find out what issues people are concerned about (make a large list).
- Look at the issues from a technical or scientific perspective in preparation for further study.

The guidelines note that the circumstances of a particular proposal will determine the extent (and depth) to which they are followed.

Information Requirements

There are two fundamental sets of information needed before scoping can commence. These are:

- a clear idea of what the proposal is — its physical and social characteristics and its resource needs; and
- the site or locational requirements of the project. This embraces both physical and social factors.

It is from the repeated and open-minded examination of the interaction between these two elements that the scope of environmental impact assessment study is determined.

These two aspects of the scoping study bear further analysis.

What is the proposal?

Wherever possible the proposal should be expressed in outcomes terms. This keeps options open as long as possible. For instance, if the project that is subject to an EIA is a hydroelectric power development, the environmental impact assessment, commencing with scoping, needs to start back with the outcome of ‘electricity production and delivery’. This allows the possibility that, in the course of examining environmental and engineering issues, means of electricity generation other than hydropower might turn out to be more attractive.

Such an approach also ensures that areas of possible environmental (and economic) trade-off around visual and other effects of high tension power transmission lines, are also on the table and at an early enough stage for effective evaluation.

Even if the outcome is narrowed to hydroelectric power generation, an open approach to the proposal in this example ensures that instead of an EIA for a particular dam site, (probably at a specified dam height) the scope includes different dam locations, dam heights and impoundment areas and even different operating regimes such as run-of-the-river, peak demand generation, base load, etc.

On a different scale, an outcomes approach to a proposal to take groundwater for irrigation would help ensure the scope of the EIA covers such things as sources of water other than groundwater (surface water, treated sewage or industrial waste water, etc.), the most efficient irrigation methods, the most effective time of application of irrigation water (night time, light winds, etc.), and even the use of alternative crops that may need less water.

What are the site requirements?

The site or locational needs of the proposal is the second requirement for effective scoping. This is quite straightforward for a mineral deposit or geothermal resource, which has a more-or-less fixed location, although there will often be some site flexibility for processing and off-site aspects of the project. However, for many types of development there is considerable scope for alternative locations.

Accordingly, the desired site characteristics should be set out and used as the basis for scoping. These might include, for instance, such things as proximity to labour, transport corridors and process water, as well as remoteness from residential neighbourhoods, important recreational areas and Maori cultural sites.

The site demographics and social and cultural characteristics will influence the scale and type of social assessment and the most appropriate methodologies.

Scoping Methods

There is a well established body of literature covering scoping methods, although they often appear under different titles and group labels. The commonly accepted scoping methods presented here in summary are:

- checklists;
- matrices; and
- networks.

These are illustrated in Figures 2, 3, 4 and 5. The three methods lend themselves to different scales and complexities of projects and to different levels of experience in environmental impact assessment practice. They can also usually be 'extended' to contribute to further stages in the EIA process.

Checklists

Checklists are literally what they appear to be. That is, comprehensive lists of the sources

and sites of environmental impacts relating to a particular type of project. They lend themselves to more straightforward proposals or ones that are frequently addressed. To be effective they cannot be incomplete.

Examples of checklists are shown in Figures 2 and 3. The first is an extract from an Oregon State Government Environmental Assessment Guideline for small reservoir projects, a good illustration of an application for a relatively complex but more frequently undertaken project. The second is from the Canterbury Regional Council guidance document on preparing Assessment of Environmental Effects.

Potential applications in New Zealand for checklists for guiding AEE preparation in-

Instructions										
Answer the following questions by placing an "x" in the appropriate YES/NO space; consider activity, construction, operational, as well as indirect impacts.										
Use the "explanation" section to clarify points or add information.										
A. NATURAL BIOLOGICAL ENVIRONMENT										
1. Might the proposed activity affect any natural feature or water resource adjacent to or near the activity areas? _____ NO <u> x </u> YES										
If YES, specify natural feature affected:										
	Direct	Indirect	Synergistic	Short Term	Long Term	Reversible	Irreversible	Severe	Moderate	Insignificant
(1) Surface water hydrology	(x)	()	()	()	(x)	()	(x)	()	()	(x)
(2) Surface water quality	(x)	()	()	()	(x)	()	(x)	(x)	()	()
(3) Soil/erosion	(x)	()	()	()	(x)	()	(x)	(x)	()	()
(4) Geology	(x)	()	()	()	(x)	()	(x)	(x)	()	()
(5) Climate	(x)	()	()	()	(x)	()	(x)	(x)	()	()
2. Might the activity affect wildlife or fisheries? _____ NO <u> x </u> YES										
If YES, specify wildlife or fisheries affected:										
(1) Wildlife habitat	(x)	()	()	()	(x)	()	(x)	(x)	()	()
(2) Ecology of fisheries	(x)	()	()	()	(x)	()	(x)	(x)	(x)	()
3. Might the activity affect natural vegetation? _____ NO <u> x </u> YES										
If YES, specify vegetation and acreage(s) affected.										
B. ENVIRONMENTAL HAZARDS										
1. Might the activity involve the use, storage, release of, or disposal of any potentially hazardous substances? <u> x </u> NO _____ YES										
If YES, specify substance and potential effect.										
2. Might the activity cause an increase or probability of increase of environmental hazards? <u> x </u> NO _____ YES										
If YES, specify type.										
3. Might the activity be susceptible to environmental hazard due to its locations? <u> x </u> NO _____ YES										
If YES, specify type.										
C. RESOURCE CONSERVATION AND USE										
1. Might the activity affect or eliminate land suitable for agricultural or timber production? _____ NO <u> x </u> YES										

Figure 2: Sample modified checklist for small reservoir projects in Oregon (Canter 1996)

- (a) Adverse effects of taking water on other water users (3).
- Downstream water permit holders.
 - Upstream water permit holders with a downstream minimum flow site.
 - “Permitted users” (those taking water for domestic use, stockwater or for firefighting).
 - non-consumptive water users, e.g. “instream” fish farms, hydro-electric schemes.
 - Groundwater users (where stream/river flows “recharge groundwater”).
- (b) Adverse effects of taking water on aquatic ecosystems (2,3).
- Raised temperatures (unsuitable for some fish and plants).
 - Less oxygen (unsuitable for most animals).
 - Reduced access to stream-side vegetation (e.g. for whitebait to lay their eggs).
 - Reduced fish passage (e.g. insufficient water to get upstream).
 - Reduced space for plant and animals to live in.
 - Reduced ability to dilute both natural (e.g. silt) and artificial (e.g. herbicides) contaminants.
 - Reduced availability of mahinga kai (traditional Maori food and other resources, e.g. eels, freshwater crayfish, whitebait, flax, puha).
 - Reduced variation in flows (may be unsuitable for some fish and plants), and
- The following adverse effects of the abstraction method.
- Un-screened pump sucking in juvenile fish.
 - Un-screened diversion resulting in fish being stranded in an irrigation race or paddock.
- (c) Adverse effects of taking water on amenity values (1,4).
- Recreational passage and use, e.g. less water for boating, rafting, swimming.
 - The way a river, lake or wetland looks, e.g. more dry riverbed visible.
 - Cultural attributes, e.g. the Mauri (“life-force”) of a waterbody, waahi tapu (sacred or extremely important places) and waahi taonga (special places).
 - Non-Maori spiritual attributes.

Figure 3: Checklist for surface take water (Canterbury Regional Council 1999)

clude irrigation groundwater takes, farm dams, waterway modifications, and discharge of effluent onto land.

Matrices

Matrices are a more flexible method allowing scoping of a very wide range of proposals with reasonable certainty of identifying all issues. The Leopold Matrix, the first EIA tool to appear in publication, followed close on the heels of the US NEPA, the first statutory EIA requirement. It remains a model of comprehensiveness. A part of the matrix, which has 8,800 cells, is shown in Figure 4. Smaller matrices have been produced by numerous organisations for application in particular jurisdictions or for different categories of project or types of settings.

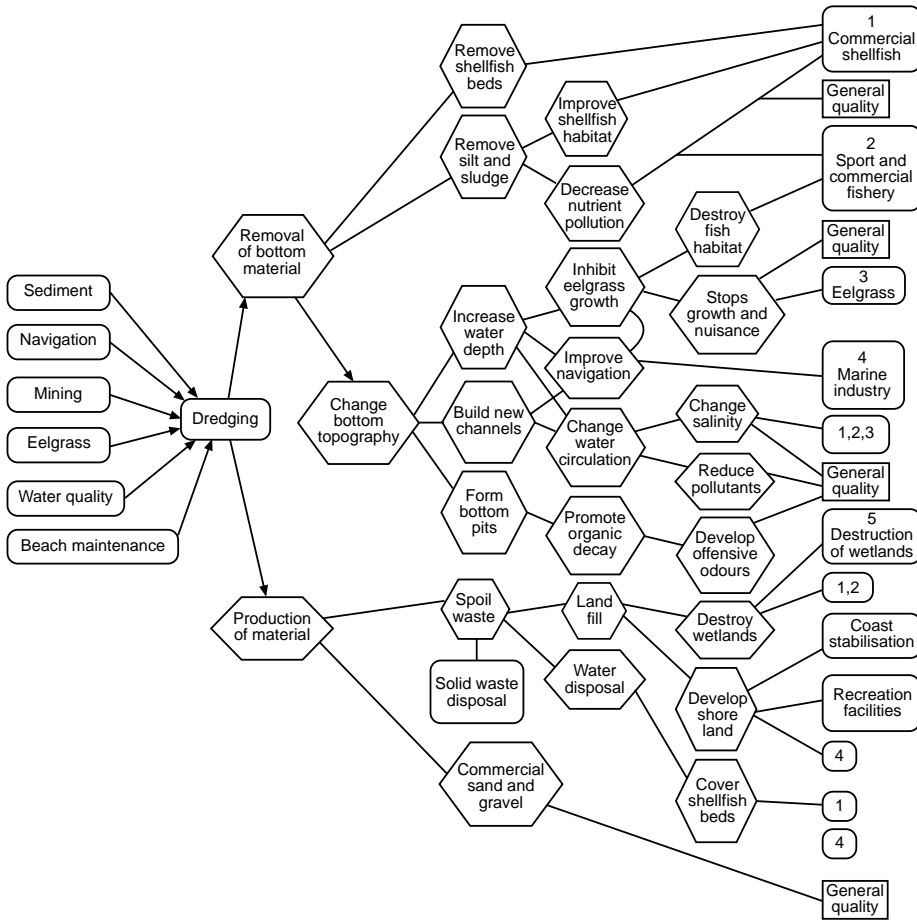


Figure 5: Example of a network (Sorenson, as presented in Canter, 1976)

beyond the need to use these tools. They ignore them at their peril, or more correctly at the expense of their client and businesses, and perhaps the environment.

Communication and Public Participation

The public is involved in EIA in three key ways. It is a source of knowledge, part of the potentially affected environment, and a participant in the EIA process to be addressed in scoping. It is no surprise, therefore, that four of the five basic steps identified in the Ministry for the Environment guidelines, cited above, address aspects of communication and public participation.

There is a wealth of experience and a large body of professional literature on public involvement of this type. The key scoping question is what model of public participation is going to be most effective in the social assessment study? Figure 6 illustrates

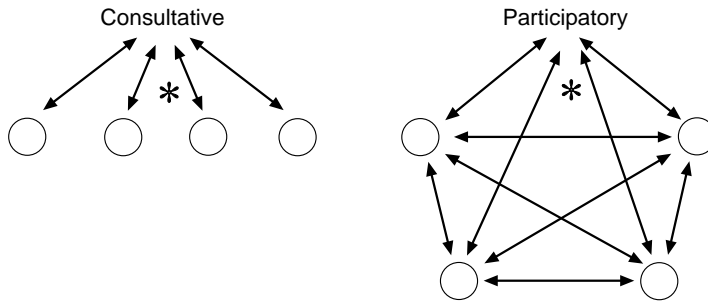


Figure 6: Consultation modes

two widely-used models, Consultative and Participatory. The tools or methods to be used need to be selected with a view to their continued involvement through all stages of the EIA.

Frequently discounted in EIA is the value of different individuals and groups in the community as a source of knowledge about the biophysical characteristics of a location. Scoping, therefore, needs to identify different user groups (or knowledge groups), some of whom may live away from the locality. Environmental NGOs are important contact points with the community.

Communication methods need to take account of different communities, subject content and stages in the EIA. Scoping should address these needs.

Some Professional Guidance

From almost 25 years in the EIA business, and scoping projects in both the applicant and the auditor's role, the author recommends two aspects of scoping that should always be addressed early. They are stressed sites and studies beyond the project location.

Stressed Sites

The wine industry well knows the benefits in terms of fruit quality of slightly stressed grape vines. Stress is a key word in EIA scoping, with evidence of stress an important indication of unusual or unique ecological niches.

Soils with extreme characteristics of pH, chemistry and physical properties derived from parent rock with distinctive characteristics will host a restricted and adapted flora and often fauna as well. Combine this with weather or aspect extremes such as low rainfall and/or proximity to salt laden or geothermally gassy air, and some of the most distinctive ecological niches can be found.

These complex sites will frequently reveal rare or endangered species on close examination. Studies by appropriate scientists can be planned accordingly. Social scientists mount similar arguments around communities.

Study beyond the project location

Related to the areas of special ecological character noted above is the issue of the actual area for study in site selection or preferred site survey work. It is at the scoping stage that the areal extent of the study area(s) is or should be agreed. This should always be much larger than the footprint site of the project. It is only common sense that the more intensively an area is studied the more its special character becomes evident. For want of study of the general area the preferred site can quickly become unique.

It is equally sensible that in order to properly assess the significance of a site, it is necessary to do so within the context of its surroundings, not just at an alternative (perhaps distant) location.

The message is straightforward — study a wide area around the site being assessed to be sure about the extent of environmental values that may potentially be at risk.

Scoping and the Assessment of Environmental Effects

Much more real than apocryphal, is the story of the project manager calling in the company solicitors to assist in applying for the resource consents for a new project, and the solicitor on return to his or her office handing over the task of preparing the Assessment of Environmental Effects to a staff solicitor. How much further from a scoped EIA approach to project planning and development can one get?

The emergence through legislation of a prescription for environmental impact assessment under a heading “Assessment of Environmental Effects” has guided practice from the process to the product. The Resource Management Act requirements for “*an assessment of any actual or potential effects that an activity may have on the environment...*” set out in section 88 have, by virtue of the title of the Fourth Schedule (“Assessment of Environmental Effects”) narrowed the scope of the assessment from being a considered action throughout planning and design to a virtual checklist for completion at the conclusion of both.

In New Zealand, the AEE has tended to become a post-design record of a set of decisions, not a process of investigation and enquiry. Frequently it is a document of advocacy. The lack of Environmental Court scrutiny of AEE documents, because of its *de novo* hearing approach, means there is little critical appraisal of AEE quality in the public record. Scoping (and other) inadequacies remain unchallenged.

Surely, much of the concern on both sides of the consent authority counter, about time of receipt of applications, requests for further information and a raft of timeline and cost issues arise, from this misplaced focus. Scoping is at least part of the answer. However, scoping is a term that has been almost universally absent from the Ministry for the Environment and council guidelines for preparation of AEE since the completion of practice guides immediately following the introduction of the Resource Management Act.

Scale and Significance, and Closure

Section 88 of the RMA requires that “*Any assessment ... shall be in such detail as*

corresponds with the scale and significance of the actual or potential effects that the activity may have on the environment ...". Scoping clearly has a contribution to make to determining scale and significance.

In the pressured world of commercial development, project developers need to set aside time and money for all the work associated with their venture, and professionals are requested or required to put forward firm costings on resource consent application work including the assessment of environmental effects. The question of "scale and significance" is in close focus and frequently leads to pressure on consent authority staff to give full and final advice on this question.

What is enough? This is a question that has challenged virtually every EIA system in the world. Giving an unqualified assurance that a particular list of matters is the full scope of matters to be assessed, prior to an audit or appraisal, has been a much sought after objective.

Consent authorities cannot be expected, and should not give closure of this sort, to a project assessment brief at the scoping stage unless there is a well-funded and deliberative formal approach such as the Dutch use. The role of the EIA process overall is to ask and answer this question. (Exceptions to this rule would be for small or routine activities in locations that have been thoroughly studied previously.)

What consent authorities often do, and may need encouragement to do more often, is to give checklists that can be used in the scoping process to help identify relevant and priority issues for the project in question.

A rigorous formal scoping is needed and it is, in the end, the job of the applicant.

References

- Canter, L W and Clark, E R, 1995. "Scoping in the EIA Procedures in the United States" in *Report of the EIA Process Strengthening Workshop*, Canberra. Environmental Protection Agency, Australia.
- Canter, Larry W, 1996. *Environmental Impact Assessment*, McGraw-Hill Inc.
- Canterbury Regional Council, 1999. *Preparation of Assessment of Environmental Effects*, Christchurch.
- Gilpin, Alan, 1995. *Environmental Impact Assessment (EIA): Cutting Edge for the Twenty-first Century*, Cambridge University Press.
- Leopold, L B et al., 1971. "A Procedure for Evaluating Environmental Impact.", *Circular 645*, US Geological Survey, Washington DC.
- Ministry for the Environment, 1971. *Environmental Protection and Enhancement Procedures*, New Zealand Government, Wellington.
- Ministry for the Environment, 1988. *Draft Guide for Scoping and Public Review Methods in Environmental Impact Assessment*, New Zealand Government, Wellington.

Ministry for the Environment, 1992. *Scoping of Environmental Effects*, New Zealand Government, Wellington.

Parliamentary Commissioner for the Environment, 1995. *Environmental Management by Local Authorities under the Resource Management Act, 1991 - Assessment of Environmental Effects (AEE): Administration by Three Territorial Authorities*, Parliamentary Commissioner for the Environment, Wellington.

Sadler, Barry, 1996. *Environmental Assessment in a Changing World: Evaluating Practice to Improve Performance*, Final Report of International Study of the Effectiveness of Environmental Assessment, Canadian Environmental Assessment Agency.

Taylor, C Nicholas, Goodrich, Colin C and Bryan, C Hobson, 1998. *Social Assessment in Environmental Methods Review ; Retooling Impact Assessment for the New Century*, Army Environmental Policy Institute, Georgia, USA.

