

ENVIRONMENTAL MANAGEMENT AND IMPACT ASSESSMENT:

**Some Lessons and Guidance
from Canadian and International Experience**

**David Marshall, Regional Director, Pacific Region,
Federal Environmental Assessment Review Office**

**Barry Sadler, Consulting Associate, School of Management,
Banff Centre**

**Jon Selter, Manager, Planning and Assessment Branch,
British Columbia Ministry of Environment**

**John Webe, Director, Corporate Programs, Pacific Region,
Environment Canada**

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Introduction

Environmental Impact Assessment (EIA) is a major activity in project planning and resource management in Canada. It encompasses, for the purposes of this paper, the assessment of biophysical and socio-economic impacts induced directly or indirectly by either small scale or large scale developments. During the past decade the techniques for impact assessment have become increasingly sophisticated and a range of innovations in procedure and process have been introduced. These advances in practice have contributed to an improved record of safeguarding resource potentials and preventing environmental values from being lost or foregone as a result of development proposals. At the same time, there remains room for a conservative interpretation of the contributions of EIA to decision-making, and a hard look is warranted on a number of fronts.

This background paper, which is prepared especially for the New Zealand Workshop, examines certain deficiencies in impact assessment and introduces some of the approaches being pursued in Canada to tackle them. While EIA in this country operates under a variety of legal and policy frameworks, there seems, to be a building consensus on general principles for reform in process and procedures. It is based upon the recognition that impact assessment is an integral part of the broader process of environmental management, rather than as a separate activity. A series of principles for effecting a better linkage have been developed at three recent conferences held at Whistler, Banff and Crete.* The paper draws upon this experience to develop a series of practical steps for strengthening the process of assessment and

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management, which can be implemented within most prevailing institutional frameworks, and in some cases are being tried at present.

The paper is organized into three main sections:

1. An overview of problem areas in EIA and the possible solutions explored at the three conferences previously mentioned;
2. The specification of five steps for improving the effectiveness of EIA, including the areas of decision-making integration and public consultation; and
3. Some suggestions on the next step for advancing the field, including the application and dissemination of enabling conditions to developing countries.

EIA in Wide Angled Perspective

A voluminous literature on EIA is available. It will be taken largely as read for the purposes of the discussion in this section. Our intention is to abstract and highlight certain trends, issues and options. These are consistent themes which have predominated or underlain discussion at recent conferences on the status of the field. During the exchanges at Whistler, Banff, and Crete in particular, there was an important degree of consensus on the emergence of a new philosophy underlying environmental management and impact assessment and on the principles which can give this effect.

Emerging Philosophy and Principles

Environmental protection and economic development are becoming increasingly seen as reciprocals, as consistent rather than conflicting. Sustainable development is the shorthand term for the new philosophy. It is the basis of the World Conservation Strategy

currently being promoted by the International Union for the Conservation of Nature (IUCN) which emphasizes the importance of maintaining the capacity of natural systems to deliver a continuing flow of socio-economic benefits. Amortized over the appropriate intermediate and longer terms, this approach is an investment in natural capital and makes economic sense. The growing realization that economic well being is dependent on a healthy environment was driven home rather dramatically, for developed and developing countries, at the recent World Industry Conference on Environmental Management at Versailles, France.

EIA is recognized as an important tool for ensuring project development is ecologically and socially sound, accompanied by appropriate mitigation and compensation measures. In this context, the application of EIA should occur relatively early in project planning. In this manner both broad and detailed planning and decisions on projects can be influenced or shaped by environmental considerations. When EIA occurs later, especially after a project has been given the go ahead to proceed, the process becomes one of impact management rather than EIA. The fundamental criticism made of EIA in Canada is that it is often applied as a reactive and discrete activity, loosely related to the broader process of environmental decision-making.

The growing acceptance of the need for a new approach is consistent with and contingent upon the development of certain principles for improving the processes and practices of impact assessment in environmental management. Five foundations for a code of practice are advanced here:

1. Encouraging more effective integration of EIA with project planning and the resource management framework under which this operates;
2. Maintaining an adaptive and flexible approach to resolving scientific uncertainty and value-based conflict;

3. **Developing clear lines of accountability for decision-making;**
4. **Fostering a climate of trust and cooperation among the key parties involved, namely government, industry and the public; and**
5. **Striving for more efficient and equitable procedures for the assessment and review of major projects.**

These principles are well known. They received almost universal endorsement from practitioners in the field at the Whistler Workshop. That Workshop clarified and set out an initial statement of these principles. Subsequently they were confirmed and extended at the Banff National Resource Policy Conference and then compared against a wider range of experience, from 25 other countries, at the Crete Seminar. The point to be emphasized here is that the above principles are both responsive to contemporary trends and problems in the field and have acknowledged difficulties associated with their implementation. At present, it could be argued that everyone or no one is presently following them

The next step involves the systematic implementation of these principles which are widely agreed to. Experimental management, which exploits the fact that processes are ongoing and utilizes them as pilot projects to test new approaches, is the preferred mode of implementation. The experience gained in implementation must be disseminated and transferred to other areas including developing countries. A sensible and judicious balance must be struck so that the development so vital to developing countries can proceed without destruction of the vulnerable resource base upon which all of us depend.

Contemporary Trends and Issues

The establishment and evolution of EIA in Canada has been both the product and cause of some far reaching modifications to decision-making processes for developmental planning and resource management. It has functioned as a catalyst of policy and institutional change. A summary of the major trends and innovations associated with this process is provided in Table 1. During the past decade, the application of impact assessment, especially to major development proposals has had three distinguishing characteristics:

- A. **A Progressive Broadening in the Role and Scope of Review** to include socio-economic as well as ecological impacts, and subsequently consideration of the issues and implications of the policy-planning contexts under which specific projects are being analyzed and reviewed. On the other hand, this has resulted in EIA's and their reviews becoming too broad, not focussed and raising people's expectations as to what can be discussed.
- B. **The Increasing Sophistication of Analytical Tools and Techniques** to try and understand and predict the effects of project-induced change on the biophysical and subsequently, the socio-economic systems which are characterized by dynamic complexity, and to determine the probability and order of risk associated with certain technologies. Unfortunately, the reality is that these new tools and techniques are often ignored and consequently not fully utilized to their potential.

PRESENT TRENDS IN PROJECT ANALYSIS AND REVIEW
TABLE 1

<u>APPROXIMATE DATE</u>	<u>INNOVATIONS IN TECHNIQUE PROCEDURE</u>
1. Pre-1970:	Limited use of analytical techniques; largely confined to economic and engineering feasibility studies; narrow emphasis on efficiency criteria and safety of life and property - usually in relation to conventional technology; no real opportunity for public review.
2. c. 1970:	Multiple objective benefit-cost analysis; emphasis on systematic accounting of gains and losses and their distribution; reinforced through planning, programming and budgeting review; environmental and social consequences not incorporated.
3. Early 1970s:	Environmental impact assessment (e.i.a.), primarily focussed on description and "prediction" of ecological/land use change; formal opportunities for public scrutiny and review established; emphasis on accountability and control of project design and mitigation.
4. Later 1970s:	Multi-dimensional e.i.a. incorporating social impact assessment (s.i.a.) of changes in community infrastructure, services and lifestyle; public participation becomes integral part of project planning; increased emphasis on justification in review process, e.g. risk analysis of unproven technology in frontier areas.
5. 1980 Onwards:	Increasing attention given to establishing better links between project impact assessment and policy planning and implementation monitoring phases of decision-making; evaluation of fairness and efficiency of public processes; search begins for more interactive, less protracted forms of consultation based on facilitated negotiation.

Source: Barry Sadler, Project Justification In Environmental Assessment of Major Developments, presented at International Workshop on Environmental Planning for Large-Scale Development Projects, Whistler, B. C., October 2-5, 1983, p. 166. For comparison with developments in other countries, see: T. O'Riordan and W.R.D. Sewell, eds., Project Appraisal and Policy Review Toronto: Wiley, 1981, p. 9.

- C. **Procedural Reforms to Provide Opportunities for Public Consultation in the Review Processes** and develop a greater coordination among participating government agencies. More consultative and less adversarial processes appear to be emerging.

In spite of these constructive and encouraging new characteristics, it appears that EIA in its present form is still hampered by serious weaknesses and constraints. A check list of issues relevant to the discussion at this conference is developed below.

1. **Unclear Policy Frameworks.** The fundamental deficiency of impact assessments in Canada is structural and concerns its role and scope in relationship to other areas of decision-making. Because EIA is usually site and project specific, it requires an appropriate policy-planning context to focus analysis and permit evaluation. This might encompass, for example, specified objectives for environmental management which are given effect through planning systems for resource and land use allocation. For the most part, however, these frameworks are either not yet in place or are insufficiently developed. Their absence has repercussions at two levels:

- a) Impact assessments of major development proposals referred for review become, by default or for reasons of expediency, the surrogate vehicle for public debate on project justification among other things. Since the process is not designed for this purpose, a range of institutional and procedural problems are thereby created which are outlined in section 4;

- b) The great majority of impact assessments, which are less visible and deal with intermediate and small-scale proposals, are undertaken in isolation often against continually degrading baseline conditions. For certain ecosystems, environmental deterioration through cumulative effects of piece-meal development, each one of which may be individually insignificant, is becoming recognized as a potentially serious scientific and institutional problem

The existence of such problems, of course, is less a comment on impact assessment per se and more an indictment of the lack of alternative procedures. It underlines the importance of the adaptive use of EIA as an integral element of resource management and project planning, with particular stress given to the importance of factoring in environmental and social considerations early in the development process.

2. Overlaps and Omissions in Institutional Arrangements. The lines of responsibility governing the conduct of participants in impact assessment and review procedures are considered by many to be overly vague and dispersed among numerous government agencies. A particular problem of interest in this context involves the coordination of the assessment process with subsequent regulatory responsibilities, under which permits and licenses are issued to approved projects. In most cases, a lengthy and complex pathway is followed as applications for development move from the concept to the implementation stage. This often generates considerable frustration for the proponents and is a source of confusion for outside intervenors. Some regulatory bodies, such as the Alberta Energy Resources Conservation Board and the National Energy Board undertake impact assessments as part of the so called "one window approach" to project approval. Even in such instances, however, jurisdictional

divisions within and between national and provincial government responsibilities means that certain projects must undergo duplicate review. This creates inefficient and excessive costs and often imposes unnecessary delays on the conduct of public and corporate business. At the other extreme, jurisdictional and process gaps allow certain projects to partially escape the full force of rigorous review. Preferably EIA should be carried out as early as possible in the planning process and when due to circumstances this is not possible, we would consider it to be environmental design and consequently an integral part of the regulatory process.

3. Residual Questions of Due Process. These are matters to do with the equity and efficiency of impact assessment and review processes which, by definition, do not yield readily to settlement by contending parties. A concerted effort was made during the past several years to build a greater degree of fairness and consistency into the rules of public review processes and foster public consultation with affected communities and interest groups, notably indigenous peoples and minorities. Structural adjustments, such as two-tiered public hearings to try and capture both informality and rigour, have been made and greater support resources provided. Funding for intervenors, presently a restricted and discretionary provision under most impact assessment processes in Canada, remains a stubborn and vexing issue, especially over who pays (i.e. industry or government) and how the monies are best allocated among competing individuals and groups. Under the present political and economic climate, there are increasing concerns about the time and cost of impact assessment review. These processes sometimes take on the appearance of becoming bogged down in insubstantial wrangling and strangled by the sheer weight of paper which is generated in environmental impact statements. It is axiomatic, however, that the widely recognized need to streamline processes and make them more efficient should not be achieved at the expense of gains recorded in

public consultation, fairness and public credibility of the review process being carried out. The notion of due process involves a balanced accommodation between equity and efficiency.

4. Science-based Deficiencies of Impact Analysis. The scientific component of EIA is based upon an exercise in prediction. It involves trying to understand, measure and evaluate the potential changes which occur in biophysical and socio-economic systems as a result of proposed developments. Given the natural variability of ecosystems and the social dynamism which characterizes a community, assessment and interpretation is a difficult task. Scientific uncertainty, an integral companion of impact assessment, is maximized rather than minimized by prevailing approaches. Most predictions, in fact, turn out to be vague and relatively descriptive estimates. Equally critical is the lack of monitoring of effects, either to test hypothesis advanced or to confirm mitigation measures and facilitate the management of unanticipated impacts. As a result the contribution of the environmental impact statement to review and decision-making processes is coming under serious question. Many scientists are striving to improve the rigour of impact predictions. Others are beginning a more radical restructuring of the conventional paradigm essentially suggesting that ecological perturbation is unable to be identified before the fact, and emphasize instead the importance of other aspects of environmental management, such as impact monitoring, mitigation and management, rather than prediction.

5. The Lack of Follow-through and Follow-up. Impact assessments are meant to establish the terms and conditions for project implementation. Yet there is relatively little follow-through to this stage and even less follow-up after the fact. The lack of monitoring, other than surveillance for compliance with the terms of approval, is beginning to be recognized and addressed, as noted above. It is the vital ingredient for sound implementation, through fine tuning the established design and mitigation measures, or for conducting

experimental impact management based on trial and error. The measurement of effects is complemented by post-project audit or evaluation which covers procedural effectiveness as well as the accuracy and relevance of impact assessments. Without this kind of follow-through, systematic attempts to improve EIA processes are handicapped from the start.

Options for Change

There is a growing recognition that environmental impact assessment of proposed projects and resource development schemes must be conducted as part of a broader planning initiative. The utility of environmental impact assessment for its own sake and in isolation of the broader strategic context is questioned and must be regarded as clearly passe. Environmental impact assessment as an exercise is but one of many tools available for use in the multi-disciplinary arena of regional and resource planning and development. Accordingly, it is appropriate to regard and utilize environmental impact assessment as a tool for the shaping of policy, program and project decisions by proponents, regulators and managers of resource development. In order to proceed in this direction and to tackle the types of problems identified above, there are two main routes to reform

1. The first, which is a long term option, is structural reorganization of the process of decision-making to develop the appropriate planning prefix and implementation suffix to impact assessment;
2. The second is a series of interim coping measures which should also ideally smooth the transition to the above goal through various behavioural, political, and bureaucratic obstacles. These are what we are advancing in this paper.

Five Keys to Improvement

1. Area Wide Assessment

A strategic background or framework of regional and resource development and management objectives for areas, regions, and nations should provide the basis for an evaluation of identified and/or predicted environmental impacts. In the absence of such a framework, the attribution of the significance of predicted and identified impacts is difficult.

One of the tools which can be used to develop this required background is "area wide assessment". This is defined as the environmental analysis of an area or region focussing on the implications and consequences of its general development potential or of a number of specific development proposals. Area wide assessment can be conducted at the policy, program or regional planning level. Specific objectives can be varied and include the following:

the identification of resource and development potentials;

the identification of environmental sensitivities and general constraints;

the interactive implications of several types and concentrations of resource development;

the levels and locations allowable and desirable for certain types of resource development;

the potential and constraints of information availability; and

the setting of priorities for those sub-areas and resources that require immediate attention for strategic planning.

The area wide assessment approach has been employed in north eastern British Columbia in relation to multiple proposals for coal development and the infrastructure requirements common to all, and the evaluation of the Beaufort Sea offshore petroleum production and transportation effects involving three companies and one third of North America. On a somewhat smaller scale, this approach is presently being used to consider linear development demands within the heavily constrained Thompson and Fraser River corridors in south western British Columbia, and in the assessment and review of proposals to renew offshore petroleum exploration off Canada's west coast.

As part of, and stemming from area wide assessment is the need for the conduct of strategic planning by those responsible for the development and management of basic natural resources - land, air, water, fish, wildlife and minerals. This involves the establishment of desired objectives for the propagation, management, conservation and preservation of the resource base and for the optimum management of regional development. The projection of project impacts relative to these strategic objectives provides the previously noted basis for the evaluation of significance and impacts. With reference to the evaluation of regional resource development programs and projects these integrated assessment and planning tools lead to a number of important actions including; clearance with or without conditions of certain parts of the assessment area for certain types and levels of development; the specification of investigative programs for varied time horizons with reference to identified gaps and manageable constraints; and the designation of conservation/preservation/hazard areas which either may be excluded or do not warrant future consideration for development proposals.

In summary it is recognized that the approach for the 80's is to ensure that environmental impact assessment programs are appropriately integrated with regional and resource planning processes.

2. Scoping and Focusing on Key Issues

Failure to identify and focus on key issues or to define the scope of assessments and consequently the environmental studies required at the outset of project planning and impact assessment is a common place problem in Canada. It often results in a generalized and voluminous discussion of a wide range of topics at the expense of adequate coverage of the key issues that are important to affected communities, and thus to inefficiencies in analysis and review. The so called "shotgun" approach, the tendency to cover everything, also severely limits the scientific and public credibility of the assessment process.

Efficient assessment begins with scoping or "bounding" the assessment by determining the range of issues to be considered and identifying the geographic, temporal and political scope of the issues under consideration. Effective scoping in this context and as practiced in the United States where it is a mandatory requirement under the National Environmental Policy Act (NEPA) regulations, generally involves determining the issues and concerns at stake and estimating the boundaries for environmental analysis. Elementary consultation and negotiation with key actors is required in order to reach an agreement on an appropriate framework for analysis and review. In this way one can avoid being consumed by issues outside of the general mandate of the assessment process.

Focussing is the extension of this process through the progressive elimination of unimportant concerns and the concentration on significant ones. Subsequent research and analysis focused on the decision critical issues should help avoid, for example, costly delays incurred through insufficient impact assessments which occur as a result of the egalitarian treatment of a wide range of topics. It

should also reduce the time and effort spent in wrangling over the broader policy and planning issues that surround impact prediction and mitigation.

Scoping and focusing, while an intuitive technique which is widely employed, also has a place as a formal exercise during the assessment process. A number of techniques have been used in this context from public meetings through formal simulation modelling exercises. One particular methodology that has had some success is Adaptive Environmental Assessment and Management (AEAM) albeit with a fairly narrowly defined audience. The implementation of scoping as a formal, explicit requirement in public reviews will be characterized by a period of trial and error which deserves careful monitoring and evaluation.

The following checklist of criteria for the implementation of scoping is a distillation of U.S. experience under NEPA. It is meant to provide some general guidance to potential opportunities or drawbacks encountered in the process.

- A. Scoping is a continuing process that will require government agencies to make changes in their customary modes of doing business. In particular, screening agencies must give serious consideration to public inputs in initial planning and assessment prior to major studies or reviews getting underway, thereby according with the purpose of scoping and reducing the possibility of confrontation in the later phase.
- B. Scoping requires adequate information to work properly.
Government agencies and private proponents must be able to:
 - i) identify reasonably accurately the affected and interested parties; and

- ii) provide them with coherent description of the project and its implications, including a preliminary list of environmental issues and an explanation of the role of the public in the scoping process.
- C. Scoping must remain flexible and be tailored to the context and circumstances of each project. It may be carried out via various techniques, depending on the nature of the proposal and the distribution of the affected and interested public. Generally speaking, a reasonable degree of interaction among key groups is desirable. This implies a series of small "round tables" for potentially controversial projects. Drawing the boundaries for involving the public is always troublesome and "interactive scoping" will present particular problems.
- D. Scoping demands active negotiations in relation to set objectives to minimize confrontation. The basic purpose of the exercise is to give early direction to relevant lines of environmental analysis. While this requires adequate policy context, need and alternatives will not usually be open for debate. This is a fine line to draw and places a premium on developing meeting facilitation skills among public officials.
- E. Scoping should be conducted efficiently, consistent with the conditions outlined previously. As a rough rule of thumb, scoping exercises should not cost any more or take any longer than the present process of assessment and review; in fact, it is possible to argue that time and effort will be saved in the long term because this explicit formulation should build agency (and public) responsibility and result in general agreement on how to develop the analyses and reviews.

3. Impact Identification and Management

There is a growing interest within government toward streamlining of regulation and fast tracking of proposals for resource and project development. In the face of demands for shortened review periods, the availability of multi-year periods for environmental data gathering and report preparation prior to project assessment is no longer acceptable. Environmental managers will have to rely upon the derivation of impact hypotheses based on short-term analyses of available facts. Their respective collective professional experience will have to play a greater role. Consequently, increasing attention is being paid to mitigative measures to offset the predicted type and degree of impact and to monitoring programs to verify or refute the hypotheses of impact put forward.

Improving our predictive ability is an important step to more effective EIA but impact management is becoming just as important. Through experimental design and impact management, adjustments can be made to project design and operation to avoid harmful impacts through mitigation measures. EIA should be an interactive process involving a feedback loop from initial project design, predictions, auditing of prediction and impact management to subsequent changes in project design. If it were to evolve in this direction, future EIA's would be better equipped to deal with uncertainty, and actual impact could be more effectively mitigated and avoided through the application of EIA consisting of two major components; prediction and management.

This overall approach has been referred variously as 'adaptive environmental assessment' and 'experimental environmental management'. It is another mandatory trend of our profession for the 80's. In recognition of this growing trend to truncate the degree of environmental impact assessment possible at the front end of projects, impact management approaches and tools for use during project development will be required as essential elements for use at the "back end" of project planning and development. These include:

the clear incorporation of environmental requirements into design plans and contract specifications as employed by the Canadian National Railways with its twin tracking project in Western Canada;

the use of manuals, guidelines and codes of environmental practice for specific project types or particular ecosystems in specific latitudes as developed by the B.C. Hydro and Power Authority for use in transmission line construction;

the practice of sound environmental surveillance and supervision to assure compliance with environmental specifications and requirements during project construction and operation as employed by the Northern Pipeline Agency in the southern prebuild gas pipeline in Western Canada; and

conduct of specified monitoring programs which can lead to project revision and update each as to environmental protection and sound resource management.

There is already a developing body of literature in each of these areas. A priority task for the 80's is to advance the development of the required tools and techniques, notably the manuals, codes of environmental practice for use on a regional, national and international basis.

4. A Disciplined Process of Public Review

A major change has occurred in the political and economic climate that governs environmental assessment and review. Its overall effect is to place a greater emphasis on process and procedural efficiency.

Improved efficiency in public reviews can take place without impairing the standards of fairness for which EIA has striven in the past few years. This search, for example, is not inconsistent with new notions

of conflict resolution which are beginning to percolate the public participation movement.

The fundamental problems of the public phase of environmental impact assessment stems from the blurred and elastic place of this process in project planning and decision making and the different set of expectations this creates among initiators, proponents and intervenors. Assuming an inability to correct the larger structure, it follows that we should try and reorganize EIA to better meet the conditions and circumstances of different situations. This has been done on an individual basis in the past and undoubtedly a premium will remain on operational flexibility and ingenuity in the future. The reorganization suggested below amounts to no more than a formalization of present practice in Canada.

The basic approach is that different types of reviews will allow strategic choices to be made about the role and scope of environmental impact assessment. It is meant to help improve the substantive and procedural effectiveness of review processes by clarifying their function and establishing clear ground rules for all participants. Figure 1 illustrates the general position of the three types of reviews on the spectrum of environmental management which runs from planning to regulatory oriented models, i.e. from proactive direction to reactive control of development. Area wide assessments would be undertaken to deal with relatively open-ended planning and management issues; project impact assessment per se would usually take place within reasonably well developed policy/planning frameworks; and mitigation and design reviews would occur only under certain limited preconditions.

Generally speaking the criteria for selection of a public review stream would be:

FIGURE 1

Impact Assessment Functions & Government Decision Making

PLANNING:	AREA WIDE	CONVENTIONAL	MITIGATION &	REGULATION:
PROACTIVE	ASSESSMENT	IMPACT ASSESSMENT	DESIGN ASS	REACTIVE
AREAWIDE				SITE-SPECIFIC
LONG- TERM				IMMEDIATE

**ESTABLISHES
FRAMEWORKS**

- . management principles
& objectives, priorities
- . baseline & trend analyses
- . use classification
- . resource allocation
- . development guidelines
- . cumulative impact concepts
& perspectives

**LEADS TO
IMPLEMENTATION**

- . design modifications
- . contingency planning
- . surveillance
- . effects monitoring
- . pilot experiments
- . post audit

- a) the degree of scientific uncertainty about environmental (and social) processes and the limits of confidence in predicting change and loss;
- b) the complexity and controversiality of the issues measured in terms of public response and/or political stress; and
- c) the adaptability of the institutions with direct responsibilities for the proposal to develop the frameworks in which impact assessment can be conducted as intended.

Project impact assessment would be much the same as at present, except there would be a continuing requirements to negotiate planning prefixes and monitoring suffixes, implement procedural innovations, and maintain quality controls as subsequently outlined. It is anticipated that the majority of review processes will still fall within this category.

Mitigation and design requirements are more restrictive. The basic intent is that candidate projects for this track will have broader management issues satisfactorily dealt with already; for example, through prior reference to area wide or conventional assessments, or to strategic or regional land use planning programs. It is vital, in other words, that larger questions of project justification are settled earlier by an acceptable process. For smaller projects, preliminary or initial environmental assessments would be utilized to predict effects and provide the basis for impact mitigation and management. The purpose of the review would then be to establish accountable and responsive measures, including compensation and monitoring programs. Mitigation and design assessments, by definition, are fast tracking procedures, which are much more limited

in time and intensity than conventional and regional assessment, and require only minimal levels of public consultation and negotiation.

The continuing attempt to clarify the issues at stake in assessments at all three levels can benefit from the evolution of innovative approaches to conflict resolution. The U. S. experience in environmental mediation is of considerable interest in this regard. A recent workshop at the Banff Centre examined how negotiation might profitably be built into institutionalized assessment and regulatory processes in this country. The general conclusion was that there was positive advantages in pursuing this initiative but it would have to be implemented very carefully.

Environmental issues subject to review, for one thing, involve many parties and multiple view points. This makes coordination of negotiations for settling disputes particularly difficult. It is not clear, for example, who should be involved in negotiations with whom in what fashion, to which ends, and even under whose auspices. There are particular problems associated with maintaining accountability of panels, boards and commissions which administer public review processes.

At the same time, however, there are opportunities inherent in the fact that:

- a) negotiation is a voluntary process and can be utilized as necessary in EIA reviews;**
- b) negotiation is a non-adversarial process and so is easily integrated into EIA reviews;**

- c) negotiation is appropriate in situations where there are reasonable assurances that responsible authorities will be in a position to implement agreements reached by parties involved.

The motivation for experimentation with negotiations between adversarial parties is to resolve differences that presently impede efficiency and effectiveness. It is possible to envisage agreements being reached at a number of levels relating to conflicts of fact and value. At the Beaufort Sea Public Hearings, for example, scientists representing the proponents, government and interest groups met under secretariat auspices to reach agreement on the order of risk probability. The message is that certain arguments which consume time during hearings can be set aside to side rooms, or even undertaken prior to public sessions. Similarly, opponents with diverging ideologies may reach consensus on the scope of the issues if they follow the principle of effective negotiation, which is to focus on interests and not on positions. Ideally, this should become the leit motif for the EIA process, but the first step is for process administrators to test the effectiveness of this approach and acquire the skills to implement it.

5. Project Implementation and Evaluation

The link between environmental impact assessment and project implementation is not well developed. In some cases, environmental predictions made at the EIA stage are not always translated into clear instructions for project management or for the monitoring programs needed to identify impacts. Without this linkage EIA ceases to become an integral part of environmental management. It is difficult to either properly utilize impact assessments in project management and implementation or to document actual environmental changes resulting from projects. This, in turn, effects our predictive capability for future assessments and impedes efforts to effectively manage impacts.

Although surveillance monitoring helps to improve the link between impact assessment and project implementation, nevertheless, it is considered to be a necessary evil by proponents rather than as an effective management and learning tool. Project proponents must assume the philosophy that good environmental management practices make good economic sense and thus must develop procedures for linking impact assessment and project implementation.

No environmental impact assessment, regardless of how well it is conducted, can predict all the impacts, or their relative nature, which will occur as a result of a proposed development. Indeed some would say meaningful impact predictions are the exception rather than the rule. Where predictions have been made, post project audit carried out during the later stages of project implementation allows EIA practitioners to determine the usefulness of and degree of effectiveness of the impact predictions made and the adequacy of the techniques used to make them. In addition, audits are useful in determining whether all the impacts known to have occurred were indeed identified at the assessment stage. In order for EIA to progress, it is imperative that we learn from past experience and to the degree possible codify and extrapolate these lessons to other situations. Post project audit accomplishes this goal. Without such an analysis the rationale for EIA can be called into question.

An evaluation of EIA methods and processes at the project implementation stage may focus upon a number of areas including the following:

- the accuracy of the ecological and socio-economic predictions made;
- the suitability of the mitigation and compensation measures proposed;

the relevance of the procedures employed for public involvement; and

the adaptability of impact management to account for and cope with unanticipated effects.

In all of the above, it is important to recognize that to undertake an effective audit of a project EIA, the evaluation itself must be kept in mind at the beginning of the assessment process, i.e. during baseline studies, the formulation of predictions, writing of the EIAs, the design and implementation of monitoring schemes and the design of mitigation measures. To do otherwise has proven to be unsuccessful.

The conduct and completion of post project evaluation presupposes certain enabling conditions. First and foremost, are the kinds of monitoring programs discussed earlier in the paper. An initial element is the requirement for the regular measurement of both bio-physical and socio-economic effects to determine the degree to which the protection of environmental resources, community values and land use opportunities have been actually safeguarded. This kind of information is absolutely essential to establish cause and effect hypotheses. It must also be recognized, of course, that government funded research on long term baseline monitoring and the development of functional knowledge of processes is a prerequisite for improved predictive capability. More than anything else, however, the lack of commitment to post project monitoring has constrained the advance of the field. This is unfortunate given the number of projects which have undergone assessments in the past 15 years in Canada. A conference (scheduled for October, 1985) sponsored by Environment Canada and the Banff Centre, School of Management, on EIA audits represents the first major attempt to address this problem

Another requirement is the need for criteria for the evaluation of the effectiveness, efficiency and equity of inhouse administrative and public review procedures. These have been the subject of consideration at a recent Australian-Canadian review of EIA, and specifically with respect to the fairness of these processes in Canada at a conference* convened by the Canadian Institute of Resources Law and the Federal Environmental Assessment Review Office. Empirical analyses, based upon the explicit recognition that various actors in the process of environmental impact assessment vary in their perceptions and attitudes on success and limitations, are still in their infancy compared with critiques incorporating ideological positions. It is apparent that these analyses or evaluations will vary according to the magnitude and the nature of the review process being examined and to the forces and constraints encountered during the duration of the review. Nevertheless, administrative agencies are encouraged to develop and implement effective process and procedural evaluation methods as soon as possible in order to continually update and improve their review processes as EIA continues its evolution.

Conclusions

The key message of this paper is that the principles for integrating and streamlining impact assessment within environmental management are now well documented and quite widely agreed to among the various parties involved in the process; public, industry and government. The structural reform of institutional arrangements for developing a better fit between EIA, regional planning, and effects monitoring is probably required in the longer term. In the interim however, there are a series of steps which can be taken to move in the desired directions immediately.

* Fairness In Environmental and Social Impact Assessment Processes, February 1-3, 1983.

The implementation of widely known and accepted key principles is now required. One of the critical requirements, identified in this paper, is careful evaluation of the benefits and costs associated with the application of innovations. EXPERIMENTAL MANAGEMENT is the recommended route. We would recommend further that Canada, Australia and New Zealand pool their resources to mount a series of comparative experiments in the application of any of the principles outlined in this paper.

There is also a larger job yet to be done. There is a need for the packaging and dissemination of advanced practice to developing countries to help them avoid laboriously going through the trial and error phases that technologically developed countries have followed during the last decade to get to where we are now. At the recent World Industry Conference on Environmental Management, the Prime Minister of Jamaica offered his country as a "working laboratory" to test out processes and procedures for more effective environmental management. In Canada we have already taken steps to initiate some action in this direction. The Banff Centre, School of Management and the Centre for Environmental Management and Planning at Aberdeen, University in Scotland are currently preparing for a major conference in Jamaica in April, 1986 at which a number of representatives from developing and developed countries will come together to discuss this subject further. We extend an invitation to all here to join us there.