AREA WIDE ASSESSMENTS

A DISCUSSION PAPER

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Environment Canada
Atlantic Region
Dartmouth, Nova Scotia

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1. INTRODUCTION

In a recent report by Beanlands and Duinker (1983) one key factor, the scientific integrity of EIA, was identified as being the source of a major concern that the concept of impact assessment could degenerate into an exercise in public relations and government lobbying. We would suggest that the scientific integrity is not the only serious problem but rather that the objectives and benefits of impact assessment are not well understood nor is the general approach appropriate for meeting its objectives. To date there has been little agreement on the objectives for impact assessment. That remains to be done. It is the purpose of this paper however to suggest another approach to EIA.

The normal approach to impact assessment is to have an environmental impact assessment prepared on a project specific basis. The regional ramifications resulting from the incremental additions of similar and different projects (i.e., the cumulative impacts) are generally not addressed, let alone predicted. In the absence of this information, the potential long term social and environmental effects likely to occur in a given geographical area cannot be fully incorporated into the planning process by governments and industry.

As an example, it could be argued that it is the responsibility of the agency granting leases for offshore exploration activities to assess, in concert with industry, the environmental impacts. Other examples could include coal and port development. This would represent the first major step in the planning process leading to production. An EIS at this stage would document baseline conditions in an ecological rather than in a catalogue sense before any activity took place, and would describe potential impacts of seismic, exploration and production activities in general terms.

There may be occasions wherein there is no environmental rationale for withholding approval for a specific project, yet the potential exists for significant impacts if pressures resulting from similar projects or a number of ancillary developments continues in an area. In such situations, the initiating agency should begin a process aimed at establishing the threshold limits of that environment to possible stresses so that decisions can be made well in advance of reaching a critical point in the overall development of the area. This approach would prevent the foreclosure of options in the future.

It seems clear for these types of projects that meaningful progress in impact assessment will only be made when a broader approach which integrates the interests of the environment, industrial development scenarios and the continued use of renewable resources is applied. To this end, an appropriate mix of area assessments and project specific assessments would contribute to a better scientific understanding of the ecology of a region and thus to its management. Such an approach should be promoted as fitting "hand in glove" with strategies for economic recovery, particularly as they apply to marine areas.

2. AREA WIDE ASSESSMENTS

Government (Lancaster Sound) and industry (Wallace, et al., 1981) have advocated the concept of area assessments for initiatives which are likely to influence the environmental and social character of a geographic area. These assessments are particularly useful in areas such as the Beaufort Sea, Lancaster Sound, Sable Island area, Bay of Fundy, Gulf of St. Lawrence and the Strait of Georgia.

The United States Department of Housing and Urban Development recently developed a guidebook for preparing area-wide assessments. We have developed an approach, partially based on this guidebook, which provides a systematic framework for assessing alternative future developments within a given geographic area. The framework itself is broad and conceptual since it must satisfy assessment requirements at varying geographic scales and may be applied to many different actions. In designing this framework several purposes were considered:

(a) to establish a common area wide assessment approach based on prevailing state-of-the-art techniques for regional planning, management and impact assessment;

(b) to create a consistent set of procedures for the performance of area wide assessments;

(c) to provide for thorough and complete treatment of assessment needs without creating standards for excessive study and documentation;

(d) to provide for environmental assessments within a framework already understood and recognized by public decision makers;

(e) to expedite preparation of project specific assessments, avoiding the need for each area to develop its own methodology, but without inhibiting local adaptation of the approach;

(f) to focus attention on those policies, development trends, natural/cultural resources and potential impacts or hazards of greatest significance.

The specific steps in performing an area assessment are as follows:

(a) Identify Area Wide Development Alternatives

The present and future development plans (potential plans may serve as a "worst case" scenario) and general growth scenario for the area must be identified to determine the spatial and temporal dimensions and rates of change expected in a given geographic area. It is not intended, as part of this phase to identify specific projects proposed for a particular study area. Rather identifying area wide alternatives involves a synthesis of existing economic, technical and political information to forecast possible scenarios of development.

Since this synthesis will reflect the current economic and political climate, the scenario will have to be periodically reviewed and updated to reflect changes that will undoubtedly occur. This analysis should focus on the type, quantity, timing and location of anticipated development and resource utilization. These factors ultimately serve as the principal assumptions to predict potential impacts.

(b) The Determination of Need and Feasibility for an Area-Wide Assessment

The need to conduct an area-wide assessment is determined from the magnitude of the proposed development, the likelihood of this development occurring and socio-economic indicators (e.g., population growth statistics). Need is also determined by the current state of the environment and its sensitivity, the expression of environmental and resource utilization concerns, and the possibility of cumulative impacts resulting from development pressure.

The feasibility of preparing an area-wide assessment can be evaluated on the basis of a number of factors:

(i) ability to influence regional planning and decision-making;

(ii) availability of expertise; and,

(iii) availability of information.

The ultimate determination of feasibility is largely judgemental with no hard and fast rules governing the decision. Discussions with major players and the public will provide the basic information on which a recommendation can be made.

(c) Identifying Area-Wide Study Boundaries

If reasonable boundaries can be established to delineate the study area, the collection of data, scoping of relevant issues and the conduct of the environmental analysis will be a more manageable task. The study area can be delineated on the basis of administrative, jurisdictional, and ecological factors. Considerations in the development of boundaries should, in decreasing order of preference, include:

(i) Ecological boundaries from a temporal and spatial perspective (i.e., temporally, they should reflect the response and recovery times of affected systems and spatially, these boundaries must reflect transport/migration mechanisms). Attention should also focus on the level of resolution at which various ecosystem components are examined within designated boundaries. The ecological land classification system could provide a basis for setting boundaries where land is a major component for the EIA.

(ii) The temporal/spatial limits dictated by project proposals (e.g. the duration of construction and operational phases of the project and the spatial extent of physical structures including transportation corridors).

(iii) Administrative boundaries and the consequent limitations on the utility of the assessment (e.g., political jurisdiction, transboundary pollution).

(d) Scoping

The scoping process involves a preliminary review of environmental issues, the identification of key project/environment interactions and likely impacts which result from each development/alternative identified within the study area. The preparation of a data overview document, which synthesizes historical information in the study area, would provide a useful background document to complete the scoping exercise.

Specifically the objectives of scoping are to:

(i) identify issues of greatest importance to the development area;

(ii) identify those issues which warrant further analysis because insufficient data are available for the analysis (without further definition of the issues, an area assessment could either become a study without end or take on a shopping list approach);

(iii) identify appropriate analysis units.

In support of the scoping exercise, a study group consisting of agencies or individuals knowledgeable in the area under investigation should be organized. This group could include members from government, industry and the general public. The study group should be charged with identifying and priorizing key issues, data needs and study requirements. Public consultation will be necessary at this stage to ensure that all important issues are addressed in the EIA. It will be necessary to review the availability of historical and current information and determine its relevance in satisfying the objectives of the area assessment and contributing to the better understanding of key issues. This information can then be used to identify data needs, develop relevant study programs and re-define boundaries.

The principal product of the scoping process is to focus the future course of the assessment to ensure that only those issues most crucial to decision making and those impacts which are likely to be most significant, are addressed.

(e) Environmental Analysis

The net result of this step is to predict, for each significant area wide alternative, key environmental impacts within a stated level of accuracy. In support of this, major environmental issues and resource conflicts are explained, an environmental data base is developed, data requirements are identified and a data collection program is implemented.

Invariably when performing an area wide study, there will be a need to collect data and examine impacts on some smaller portion of the total study area (i.e., analysis units). The need to establish analysis units is increased in heterogeneous environments where significant bio-physical diversity is evident. These factors suggest the need to create smaller geographic analysis units. As is the case for establishing the total study area boundaries, there are no fixed rules to delineate these units. The same factors used to create the study area boundaries can be considered in light of specific anticipated analysis needs required to define the characteristics, dimensions and location of analysis units. In support of this phase, it will be necessary to develop a cost effective and relevant data collection program. In order to do this, it will be necessary to:

(i) determine the adequacy of an existing data base (or bases) to perform an area wide assessment. If, for example, an adequate data base exists and it is readily accessible, the task of completing the area wide assessment is greatly simplified. Alternatively, if such a data base does not exist, then there must be a concerted effort to identify data deficiencies and collect additional information unless a decision is made to simply accept a lower level of precision in the analysis itself.

(ii) prepare historical summaries and overviews involving a compilation of relevant field studies. These summaries should provide a comprehensive description of existing information including the current status of broad disciplinary (i.e., biological, chemical, geographical, physical) and very specific studies (e.g., histopathology, toxicology, trace elements, etc.) completed or underway in the study area.

(iii) ensure that the ecological principles which govern the functions of the area under investigation are well understood. (This information should be apparent once the scoping analysis has been completed).

In addition, existing literature, both published and unpublished (e.g., BEIRS) available data sets, as well as relevant on-going and projected research activities and programs should be compiled and evaluated.

The evaluation should include some statement as to the pertinence and reliability of the available information. This data should be synthesized in relation to the issues and analysed to generate specific recommendations for the design of study programs to address identified data gaps. The greatest value is realized from these summaries only if they are reviewed and updated on a periodic basis for the duration of each regional study. Once data requirements and research needs have been identified, data is collected by conducting reconnaissance studies which can be considered to fall into two categories:

(i) The first deals with broad area characterizations measuring a limited number of key or indicator parameters. These can best be described as large scale surveys to determine major physical, chemical and biological characteristics of the study area.

(ii) The second type, while still somewhat general, are more site specific, short-term studies designed to gather qualitative information which focus on well defined areas of special interest or concern. These studies are frequently the earliest ones initiated commonly in response to suspected potential impacts on such things as unique biological assemblages and critical habitats. They are extremely useful in delineating natural hazards. While reconnaissance studies may provide information adequate to fulfill EIA objectives, they are more often the first step in the development of a strategy to identify the components of more cost-time effective sampling programs to be undertaken by a proponent when a project specific assessement is required. The principal output from this component would be to distinguish levels or grades of environmental sensitivities and to identify key environmental impacts resulting from each development alternative.

(f) Impact Evaluation/Recommendations

Once the environmental analysis has been completed, the study results must be synthesized to evaluate the various available alternatives. To this end, the environmental impacts resulting from each significant area wide alternative are aggregated from the unit analysis to the area wide scale (if the unit is not already at that scale). The net effect of this evaluation is to identify "trade-offs" between alternatives and to formulate recommendations for decision-makers and administrators. These recommendations should be directed toward:

(i) identifying, on the basis of environmental grounds the preferred area wide development alternative (if possible) in terms of siting, timing and environmental limitations;

(ii) identifying the need for more detailed impact assessment investigations into mitigation design and the need for the development of standards.

3. PROJECT SPECIFIC ASSESSMENTS

One of the principal advantages in preparing an area assessement is to focus the proponents' attention on assessing and resolving specific environmental problems related to defined projects. The project specific assessments would remain the responsibility of the proponent (i.e., industries). However, the focus of their studies could now be directed toward specific aspects of the immediate environment as well as on fate and effect studies which would tend to save time and money. These studies should also lead directly to the determination of mitigating measures. They are:

(a) Benchmark Studies

These studies are essentially survey programs which are intended to provide a statistically, scientifically sound characterization of key environmental aspects identified during the course of completing an areawide assessment (i.e. including physical, biological, and chemical aspects). The objective is to establish the range of variation of critical parameters that will reflect for example, the impact of oil and gas exploration and development activity. This benchmark will be used as the framework for comparision of measurements made during monitoring surveys. Benchmark data will also be useful in defining the environment with which we are dealing, and in evaluating the longer-term natural variability of environmental parameters. We believe that benchmark studies will assist in addressing critical questions that the decision-maker will need to have answered for specific developments.

(b) Fate & Effects Studies

These studies are required to determine the transport, dispersal, biological, chemical, and physical alteration, and final disposition of contaminants related to, for example, petroleum development and the chronic and acute effects such as contaminants impose on the marine ecosystems. Fate and effects data are useful in evaluating potential hazards to the environment resulting from oil/gas exploration and additional development activities. This information is also required in assessing potential impacts of contaminants on organisms. The fate and effects studies are important in the interpretation correlation of benchmarks and site-specific monitoring programs which are primarily physical and ecological, in nature. The studies should focus on key species in the food web or those species which are valued by man.

4. MONITORING

The final aspect of the program would involve a monitoring study designed to evaluate the predictions and to measure changes over time for scientific and regulatory reasons.

A small area, multi-sampling survey program designed to examine the extent, duration, and effects resulting from, for example, exploration or operations at a specific site should be initiated. The objective of monitoring would be to determine the source type and fates of contaminants associated with the development to identify the effects within the vicinity of the development.

As indicated in the discussion of benchmark studies, sites that are selected for monitoring are compared to the results of the benchmark studies to determine the representativeness of the site selected. Other criteria applied to the selection of sites include proximity to unique or sensitive environments, timeliness of operations, duration of operations, and anticipated applicability of results in a broader context. Significant site-specific monitoring studies will generally only come in the later stages of development. It is at that time that more permanent facilities will be constructed that will act as potential continuous point sources of pollutants. Exploratory operations generally do not last long enough to obtain any meaningful data or do any significant damage.

5. RECOMMENDED DEPARTMENTAL POSITION

It seems clear that meaningful progress will be made only through a long term and broader scale approach to development planning that integrates the interests of environmental concern, industrial development and the continued use of renewable resources. An appropriate mix of area assessements and project specific assessments would contribute more effectively to a better scientific understanding of the ecology of a region and thus to its management.

Environment Canada advocates the concept of area assessments when and where new initiatives are likely to influence the environmental and social character of a geographic area.

While accepting that the accuracy of predicted impacts will be limited, their consideration in a broader context will ensure that the environmental implications are considered on an equal footing with industrial strategies, employment plans, fiscal measures and social studies.