

## I. INTRODUCTION:

This report provides background information about the New Brunswick Environmentally Significant Areas (ESA) project. The inventory of ESAs is stored and maintained in a database created using dBase IV.

The project was based on a broad definition of "environmentally significant", encompassing everything from pristine habitat to colonial bird nesting sites to rare plant sites and interesting geological features. Thus, Environmentally Significant Areas are distinctive areas contributing to the biodiversity of the province. They may contain rare species, unique or rich assemblages of species, superior habitat or other features of scientific interest. Human activities may compromise the integrity of these ecosystems.

The project was organized around the province's seven Planning Regions identified in Figure 1. A listing of ESAs has been prepared for each of these regions. These are purely administrative units. Boundaries follow county and parish lines to create seven regions reasonably equivalent in area, and centred on the seven major population centres. The database allows sites to be organized along more ecological lines, such as natural regions and watersheds.

The work was guided by a steering committee whose participants represent the three project partners: the Nature Trust of New Brunswick, the Department of Environment, and the Department of Natural Resources and Energy. The membership of this group is presented in Appendix A.

In assembling ESA listings, data were gathered from published sources and through interviews with naturalists, provincial rangers, museum personnel, fish and wildlife biologists, botanists, and ornithologists familiar with the natural features of the province. The information provided in the database is based upon the best available current knowledge; in some cases it is extensive, in others less than complete.

While every effort has been made to ensure that the data included in the database are accurate, The Nature Trust of New Brunswick, Inc. does not accept responsibility for any errors or omissions that may have occurred, nor for the interpretation of the information by the user.

It is important to note that this is a preliminary listing, based largely on secondary sources and oral information. It is hoped that as our knowledge of the province increases the database will be updated, with new sites being added and others deleted. The database should evolve continually as our understanding of the environmental significance of various species and ecosystem types.

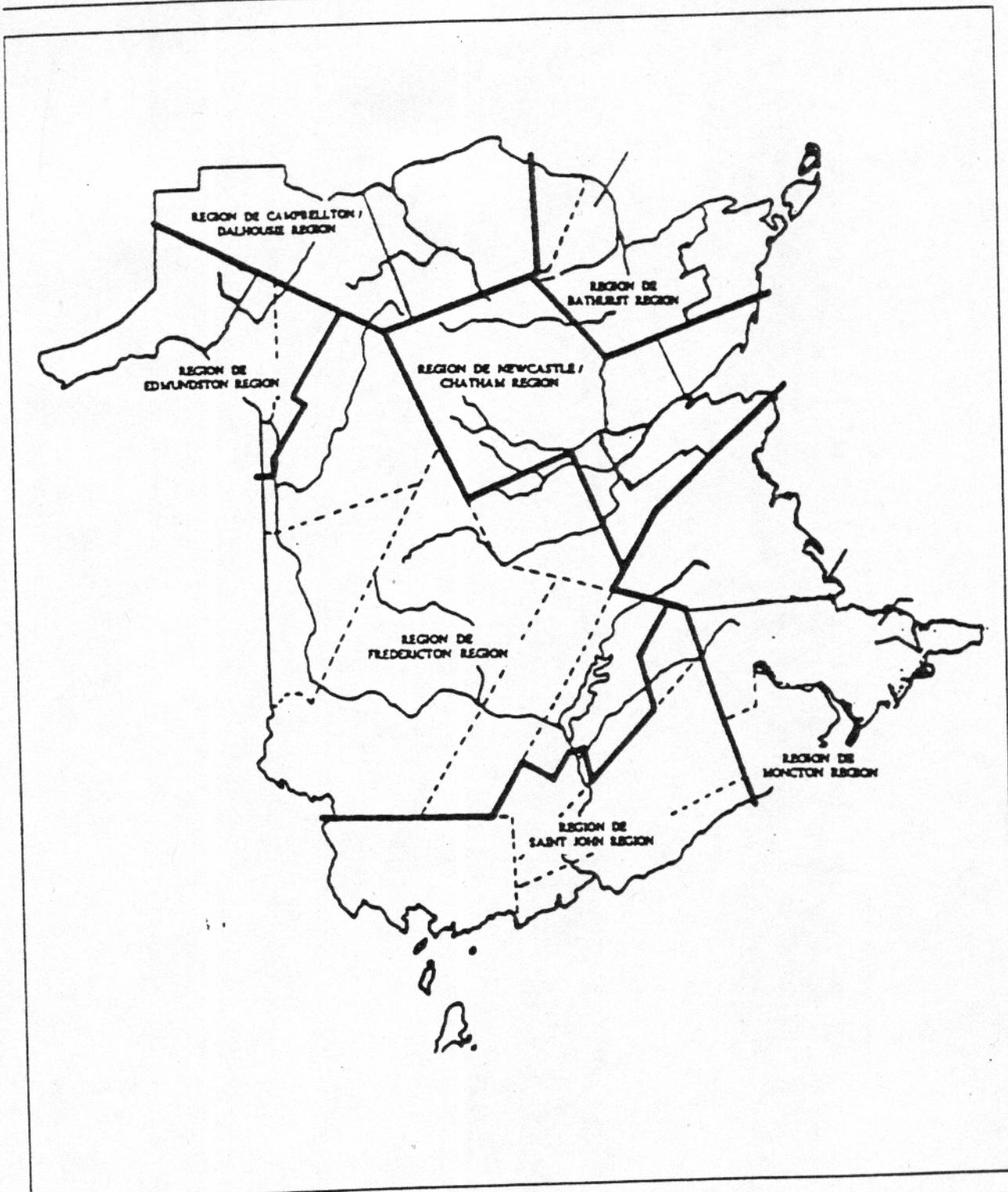


Figure 1: PLANNING REGIONS OF NEW BRUNSWICK

## II. PROJECT BACKGROUND:

This project was undertaken by the Nature Trust of New Brunswick, Inc., funded through the New Brunswick Environmental Trust Fund, and co-sponsored by the Department of Environment and the Department of Natural Resources and Energy. It proceeded under contract according to the following timetable:

January-March 1993:	Newcastle-Chatham Region;
April-December 1993:	Bathurst Region, updates of Saint John and Fredericton Regions;
January-March 1994:	Edmundston Region;
April 1994-March 1995:	Campbellton-Dalhousie and Moncton Regions.

From the 1970s there has been a growing recognition of the need to identify and protect the province's unique and special natural areas. The identification of these areas has been an on-going task, with the results published over the years in the following key documents:

- Taschereau. *Ecological Reserves in the Maritimes* (1974);  
Wein and Jones. *Ecological Reserves in New Brunswick* (1975);  
Department of Environment. *Environmentally Significant Areas in the Saint John Planning Region of New Brunswick* (1982);  
Dionne et. al. *Critical Natural Areas in New Brunswick* (1988);  
Department of Environment. *Environmentally Significant Areas in the Fredericton Planning Region of New Brunswick* (1990).  
Department of Environment. *Environmentally Significant Areas in the Newcastle-Chatham Planning Region of New Brunswick - DRAFT* (1990).  
Department of Environment. *Environmentally Significant Areas in the Bathurst Planning Region of New Brunswick - DRAFT* (undated).

These documents have historically been used in a variety of ways. The Department of Environment has used them to assist in its watershed planning exercises and in its screenings and assessments of undertakings under the Environmental Impact Assessment Regulation. The Department of Natural Resources and Energy has used the information in these documents in developing the Ecological Reserves program. The Department of Municipalities, Culture and Housing has referred to some of the ESAs in draft Planning Statements. Consultants and other interested groups have requested copies of the Saint John and Fredericton Region reports, suggesting the importance of making site data available to a wider public.

This document and the associated database build on these efforts. One of the goals of this project was the creation of an easily accessible database which would make environmental information more widely available to a greater number of potential users involved in land use planning and decision-making. It is hoped that as more people use the database they will provide updated information on existing sites, suggestions for additional sites and comments on means of improvement.

### III. ESA DEFINITION:

A literature review, especially of those sources listed above, along with input from people contacted during the initial needs assessment phase of the project, led to the definition below. For the purposes of this project, Environmentally Significant Areas are defined as

places that are distinctive because (a) they contain rare species of animals or plants or a rich diversity of species representative of an ecological zone; (b) their disturbance would have serious ecological consequences, or; (c) they contain geological or other features of specific scientific interest.

The database is intended for use as an information source of ESAs, to alert decision makers to the special nature and significance of these areas and to help them to make informed decisions. The areas identified are not protected under any specific legislation, although the Environmental Impact Assessment Regulation lists "activities or programs affecting any unique, rare or endangered feature of the environment" as undertakings that must be registered under the EIA process. To date, there has been no attempt to define management objectives or to suggest modification to activities occurring in or near ESAs. Planners or other decision makers are encouraged to use the information, together with information from other relevant sources and contact with experts, in designing their land use strategies.

### IV. ESA CRITERIA:

An important element of this project was the drafting of criteria, to provide a guide for deciding which sites are significant. A review of the literature from other jurisdictions provided a starting point. Extensive discussions between the research team and the members of the steering committee led to the development of a list of criteria suited to conditions in New Brunswick and to the purposes for which the database was developed.

The criteria that evolved are as objective and detailed as possible given that this project aimed at defining ESA in a broad sense. The criteria, listed below, are generally ordered with the more objective criteria and those associated with ecological or measurable values first. Those sites displaying a high diversity of habitats and those supporting rare and endangered species (Criteria 1-4) can usually be readily identified. Criteria 5-12 address the value of habitat and incorporate the concepts of representative, unique, and remnant. Criteria 13 and 14 represent educational and scenic sites.

The criteria help to define the key features of each ESA in greater detail. The key concept of each criterion is highlighted in bold.

1. The area supports an unusually high diversity of plant and/or animal communities.
2. The area supports rare, vulnerable, disjunct or relict species. (See Appendix B)
3. The area supports threatened or endangered species. (See Appendix B)
4. The area is a type locality, i.e. a site where a plant, animal, rock or fossil type was first

- recognized and described.
5. The area contains plant and/or animal associations, and/or habitats which make it an outstanding example as a representative of its type.
  6. The area contains unique or distinctive plant and/or animal associations, and/or habitats, and/or landforms.
  7. The area contains plant and/or animal associations, and/or habitats, and/or landforms of limited representation in the region, or which may be remnants of once-larger habitats that have virtually disappeared.
  8. The area supports a viable core population or significant number of one or more species which require an extensive range.
  9. The area supports a viable core population or significant number of one or more species which are unduly sensitive to human disturbance.
  10. The area is vital to the maintenance of the regional hydrological balance.
  11. The area is a critical habitat of limited range, providing a breeding, shelter or feeding site for wild life.
  12. The area serves as a linking unit providing a corridor for the movement of wildlife.
  13. The site serves a scientific or educational purpose, or has been the subject of considerable documented scientific research.
  14. The area has unusual scenic beauty.

**Application of Criteria:**

This section provides a brief outline of the way in which the above criteria were applied to the sites in the database. It should be noted that while some of the criteria have a subjective element, they were used with considerable rigour, applying the key concepts to the best available information on each site. Also, as suggestions for new sites and sources of information were received throughout the duration of the project, the project team was able to refine the application of criteria at regular intervals. This was especially necessary as the project expanded from its initial single region to cover the entire province.

**Criterion #:**

1. Has been used sparingly, applied only to those sites reported as encompassing significant diversity (no specific measure of diversity has been attempted). Where field work has been done, the number of different plant species encountered gives some measure.
2. Rare and vulnerable species are primarily those listed in Hinds' 1983 National Museum of Canada publication The Rare Vascular Plants of New Brunswick and Clayden et. al.'s 1984 New Brunswick Museum publication Rare and Vulnerable Species in New Brunswick. Other species may be deemed rare via Hinds (1986) Flora of New Brunswick. On-going field work, since the publications by Hinds, has added species to the known flora of New Brunswick, and has also caused the status of listed species to be modified. Some species have been found to be more common than was known in 1983 and are no longer listed as rare; others have been determined to have been extirpated from the province. The same on-going assessment of species status is true of the taxa listed by Clayden et. al. Very few disjunct or relict species have been identified.

3. This criterion, recognizing threatened and endangered species, is stronger than #2. It has been used only for those species designated (in any category) by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or by the New Brunswick Endangered Species Act.
4. There are very few type localities in New Brunswick. Mostly they encompass fossil sites discovered in the nineteenth century e.g. Fern Ledges in Saint John. Holland Lake, near Harvey, is a type locality for the recently described quillwort *Isoetes prototypus*.
5. It is a long term objective of this program to identify sites which might be excellent examples to represent the province's natural regions. This criterion has been applied primarily to the Ecological Reserves proposed by Wein and Jones (1975), as it is the mandate of the Ecological Reserves program to identify sites that best represent the province's natural regions. It has also been used to identify the thirty bogs listed as potential Ecological Reserves by 3-D Geoconsultants Ltd. (1988). In other cases this criterion has been applied to sites suggested as being particularly fine representatives of their type.
6. This criterion has been used predominantly for geological and fossil sites, and caves, or for other environmental features that are particularly unusual in a given region. Some liberty has been taken with the term "unique", as it is unlikely that any sites are the only examples of their type.
7. This criterion has been particularly useful in describing the regional variation of the province. It is used to describe, for example, peat bogs in the northwest and mature hardwood stands in the northeast, ecological features that are not rare provincially, but are uncommon and of interest in certain parts. Based on their limited representation in a region, these sites may harbour unusual plant communities or species at the limits of their range.
8. This criterion was included as a means of identifying areas important for the province's larger mammals, and has been applied to very few sites.
9. This criterion has been applied only to sites supporting species which are particularly sensitive to human disturbance and whose known distribution is restricted, such as the shrews listed in Clayden et. al. (1984), or the very few caves in the province that serve as bat hibernacula.
10. This criterion has been applied very sparingly, primarily to streams or lakes that have been identified as important sources of cold water that sustain salmon and trout runs. It is acknowledged that every wetland or source of running water is vital to the hydrological balance, but it is not feasible to list every stream, along with each of the over 35,000 wetlands identified in the provincial Wetland Atlas. It is assumed that the provincial watercourse setback regulations provide some level of protection to the province's waters.
11. This criterion identifies sites which are important habitats for various species at certain critical stages of their annual and life cycles. It has been used to identify bird colonies, feeding grounds, bat colonies, deer wintering areas, etc.
12. Wildlife corridors are difficult to identify, especially given the lack of information available on fauna other than large game species. This criterion identifies migratory bird sanctuaries, and other stop-over sites listed by the Canadian Wildlife Service as "Critical Migratory Bird Habitats".
13. This criterion has been used when it is known that a site serves as an important teaching site, such as St. Louis Maillet Experimental Forest, Currie Mountain, Regent Street Bog or Daly Point Reserve.
14. "Beauty is in the eye of the beholder". This criterion has been hotly debated; many people have felt it is far too subjective and should be deleted, while others have felt that scenic sites should be given very high priority. It has been used sparingly, mostly to describe features such as waterfalls or particularly interesting geological formations.

## V. METHODS:

### A. PROJECT DEVELOPMENT AND INFORMATION GATHERING

The project began with a survey of potential database users. Persons contacted were asked for input in defining Environmentally Significant Areas and criteria for their selection. With respect to the database, they were asked to comment on the following: (a) uses for the data; (b) types of information users would expect to encounter in the database, and; (c) any known similar databases already in use, the software being used, and the potential for information sharing. They were also asked to suggest sources of information and to recommend resource people. Appendix C lists people contacted during this initial phase of the project along with sources consulted in defining ESAs and criteria. The ideas and comments generated were incorporated into the work of the project team during the first contract, so that the definition, criteria, and database structure evolved continually.

The identification of sites in each region began with the key documents listed under Section III (Project Background); rare plant sites were identified through a systematic search of the herbaria of the University of New Brunswick and the New Brunswick Museum; some of the other major information sources that have provided useful information are listed in Appendix D. In addition, the UNB library holdings were searched using keywords such as parish names, major river names or other important features.

In order to identify additional ESAs, a list of knowledgeable persons was compiled. Contacts from within government included district forest rangers, wildlife and fisheries biologists, and geologists. Additional information was solicited from within the membership of the Nature Trust of New Brunswick, Inc., and from organizations and institutions such as the New Brunswick Museum, Canadian Wildlife Service, New Brunswick Federation of Naturalists, University of New Brunswick, Université de Moncton, forestry companies and local naturalist groups. A list of people who have been contacted for site information over the course of the project is included in Appendix E.

Contact people were asked to identify natural areas which in their knowledge and experience were consistent with the definition of ESA and the criteria. Contacts often made notations directly on topographic maps provided by the project staff, and sometimes they supplied copies of their databases, maps, survey information, files, reports or other relevant information. Occasionally, more than one contact person identified the same area; for example, lakes identified by one expert as producing excellent fish stocks might be identified by another as important waterfowl breeding habitats; sites of geological interest may contain rare plants, and so on.

Following the interviews, sites were re-evaluated against the criteria and then entered into the database. Sites which informants regarded as potentially significant but for which little information was available were entered into the database to avoid loss of the reference. However, no criteria were assigned to these "preliminary sites", and should not be until the site is confirmed, either through a field visit or additional information from other sources. This could provide an inventory of sites for future field work.

Additional information was then determined from Topographic maps and other locational and ecological references; property ownership information was gathered from the New Brunswick Geographic Information Corporation.

1. Advisory Committee:

In July 1994 the project Steering Committee initiated a review of the project, in two phases. The first phase was a conceptual review in which people were invited to serve as members of an ad-hoc Advisory Committee. Members of this committee were asked to comment on the general purpose and design of the project, the criteria used to select sites and the format of the database entries. Appendix F lists people who were asked for comments. Each received an earlier version of this report; ten sample site reports were included which demonstrated the variety of types of sites, of information sources, and completeness of documentation found in the ESA database.

Feedback from the Phase I: Conceptual Review indicated where clarification was needed in the report; this Final Report has benefitted from those comments.

The second phase of the project review, begun in January 1995, was a scientific review. Most individuals who participated in the conceptual review expressed an interest in reviewing and commenting on site listings; others felt that they did not possess the required scientific expertise, but wished to be kept informed on the progress of the database project. In this phase of the review process advisory committee members were asked to comment on the scientific content, and in particular on the site descriptions, the completeness and accuracy of the data, and on any gaps in the information. They were provided with dBASE information on areas which were compatible with their geographic and/or scientific expertise. Database listings were corrected or updated based on the comments returned during this phase. Appendix G lists people who received information packages in the Phase II: Scientific Advisory Review.

B. FIELD WORK

The contract for the project included funding for field studies in the summers of 1993 and 1994. During the summer of 1993, two people were hired for eight weeks each. This period was used as a pilot study during which field procedures were developed and tested, in consultation with Hal Hinds, Curator of the UNB herbarium, and the team members of Department of Natural Resources' Ecological Reserves Program, and the Fundy Model Forest Gap Analysis project. In 1994, funding was provided for two field staff at twenty weeks each. In selecting sites to survey, priority was given to northern sites, where little detailed field data existed, and to sites harbouring rare species. Good relations with the Irving St. Leonard office provided unlimited access to the large block of Irving freehold lands in that area. Also, as the 1993 field season was anchored fairly close to Fredericton, an attempt was made to explore sites throughout the province. A few sites in the Fundy Model Forest were surveyed with the members of the Fundy Model Forest Gap Analysis team, and a few sites, suggested by REPAP, were surveyed in the Miramichi area. See Appendix H for a listing of sites visited during 1993 and 1994.

Initially an attempt was made to collect comprehensive field data on the areas visited. This involved determining the species in sample plots and transects, to give quantitative data, obtaining soil information from soil pits, taking tree core samples and determining canopy cover, as well as obtaining general information on the physiography and ecological zones of a site. After a trial period and evaluation of our field methods, however, it was determined that with only two field workers the amount of extra information obtained by these methods did not justify the amount of time spent at any one site. Certain

information appeared to be critical - information which was not necessarily revealed by sample plots or transects. Many species occur in small pockets which are often not represented in sample plots. The most effective approach in the field surveys was found to be a "walk-through" in which the crew follows a path through the site carefully chosen to capture the full range of species and ecological zones. This method allows flexibility to investigate interesting features that may not have been anticipated in the pre-visit mapping exercise.

Sites for the field survey were selected carefully to realize the greatest value from a limited budget. Generally, priority sites were those that presented the greatest possibility of significant discoveries, as well as those in need of verification.

#### 1. Field Preparation:

Prior to visiting a selected site, a certain amount of basic information was gathered.

A standard report was supplied from the ESA database for each site. It provided all known information about the site, including a written description, detailed locational references, notes on access and a listing of any rare species known from the site.

Forest Development Survey maps and colour aerial photos, both obtained from DNRE, were used to identify the site's major vegetation and ecosystem components. The aerial photos also helped in the location of trails and structures not shown on topographic maps, and in the identification of points of greater interest within large sites, such as small wetlands or pockets of forest which stand out from the surrounding area. This information helped in the planning of an approximate route through these sites. The goal for each field visit was to ensure that all interesting features and the variety of ecosystems within a site were surveyed and characterized.

Ortho-photos were used to create a scaled site map for use in the field. Information gleaned from the aerial photos was transferred to this field map; it thereby became a useful tool which allowed staff to orient themselves in the field and to travel more efficiently through the site. It also provided an accurate base map on which to locate sample plots, ecological zones, rare species and other interesting features.

If any rare plants were recorded as occurring at the site, specimens were studied at the Connell Memorial Herbarium of University of New Brunswick, so that they could be recognized on site.

#### 2. Site Visit:

The area covered during each site visit depended on the size and complexity of the site. The site's distance from home, the travel time on foot to reach the site from the closest access point, terrain type and the thickness of vegetation were also factors which impact on the amount of time the field team was able to spend at a site. One day of field work was generally required for each site, although two or more days were sometimes warranted for larger or more varied sites. The following steps were carried out at each location:

On arrival, the field map was oriented to reference points such as roads, buildings, hydro corridors and streams.

Ecological zones, identified as described above, were surveyed, described, and their extent estimated in relation to site features and adjacent ecological zones.

While on site, an attempt was made to identify and record as many species (plant and animal) as possible, along with other features of interest to this project. Plants that could not be identified with certainty in the field were collected for identification later with the assistance of Hal Hinds, Curator of the UNB herbarium.

Photographs were taken of representative and interesting site features. Tree bore samples or tree circumference data were taken of outstanding mature specimens.

### 3. Report Writing:

Following a site visit, tree bore samples were examined, tree circumference data analyzed and plant samples identified. A report was prepared describing in detail the zonation, significance and any obvious site disturbance. A separate plant species list was prepared for each zone identified; these were divided into the following categories: trees; small trees, shrubs and woody vines; grasses, sedges and herbaceous plants; ferns and fern allies; mosses, lichens and liverworts. For each zone, a physiography chart was also completed. Finally, a detailed map and photographs were included for the site as a whole. These reports are stored at the offices of the Nature Trust of New Brunswick. See Appendix I for a sample field report from each season.

It should be noted that to date field work has proceeded with a built-in emphasis on flora over fauna. This is partly a result of the interests and expertise of the members of the Steering Committee; partly a result of flora being stationary and more readily identified, and; partly a function of the time available at each site and the abilities of the field staff. No suggestion should be inferred that fauna are less important than flora. Flora are indicators of site character, geomorphology and hydrology, and, it is possible that an experienced naturalist will be able to predict the fauna that are likely to inhabit the sites based on the ecosystems and flora described in these field reports.

## VI. THE DATABASE:

The database is compiled on dBASE IV, version 1.5. The database represents the results of the two year project, with approximately 900 records currently listed. Sites are stored in seven separate databases - one for each planning region. These can easily be appended into one database for the province. The range of fields in the database structure provides power and flexibility, allowing different users to extract only that information that meets their specific needs. Each field can be a useful key in creating complex indices and queries, used to search and sort the contents of the database.

Sites included in the database are listed with respect to several locational references, and the criteria which they satisfy. Memo fields provide unrestricted space for written descriptions, sources of information and

names of contact people. Sites are classified according to natural region, forest administration region, watershed and predominant ecosystem types. Where available, the database includes information on rare, disjunct, vulnerable and endangered species. Species lists are included where appropriate, but it is intended that these be supplemented by site surveys.

Sites included in the database are also classified by category. Three fields are available which describe the site's main feature(s) or reason(s) for inclusion in the database. The categories currently identified are listed below:

AESTHETIC	Sites with outstanding aesthetic appeal.
AMPHIB	Sites important for amphibians.
BIRD	Sites important for birds.
FISH	Sites important for fish.
FOREST	Sites with high quality, unusual or representative forest stands.
FOSSIL	Sites with fossils.
GEOLOGY	Sites with other interesting geological features.
INVERT	Sites important for invertebrates.
MAMMAL	Sites important for mammals.
PLANT	Sites important for plants (including those identified for rare plants).
REPTILE	Sites important for reptiles.
WETLAND	Sites identified as high quality, unusual or representative wetlands.
UNIQUE	Sites with unique features (e.g. Kedron Lake burrballs).

The categories above work in tandem with the criteria in defining the characteristics of the sites, and in providing search mechanisms within the database.

All sites have been assigned a SITEID number. The map accompanying this report displays all the sites currently listed in New Brunswick; the SITEID provides the link to the site descriptions contained in the database.

The database structure and database dictionary are presented at the back of this report. The database structure lists the types and sizes of the fields found in the database. The database dictionary is an essential tool for the user. It explains the meaning of the field names, describes the type of information meant to be entered in each field, the source of that information, and the format of entries for each field.

Referring to the database structure, "Group A" consists of the first 32 fields. These are the essential fields for naming, describing and locating a site, and for indicating sources, the name of the compiler of the data and the date of the entry. Group A is complete for all sites in the database.

"Group B" consists of fields 33 - 63. These fields provide for an ecological description of a site. Site surveys may be required to describe sites adequately in these fields, but few field surveys have, as yet, been completed. In most cases, at least one ecotype has been filled in for each site. Species lists and the data entered under the fields for entry of rare, vulnerable and endangered species represent what is currently known about these sites. For some records comprehensive data exist in these fields; for others they are empty.

"Group C" consists of fields 64 - 83. It comprises several fields broadly concerned with site "management", including ownership, size, usage, legal designation, etc. For all sites, ownership has been searched at the New Brunswick Geographic Information Corporation. Other fields are mostly empty, with a few exceptions for well documented sites such as Portage Island. These fields will probably only be filled if formal proceedings are initiated with landowners to identify exact boundaries, establish monitoring programs or if legal protection is pursued. Also included in this group are cross-references to previous reports including *Ecological Reserves in New Brunswick*, *Critical Natural Areas in New Brunswick*, and DOE's *Environmentally Significant Areas* reports; these latter fields are complete.

#### 1. Database Management:

Where hard copy data such as photocopies of relevant articles, maps, bird counts, field reports etc. have been acquired, site files were established, and reside at the Nature Trust offices.

From time to time it may be determined that a site no longer meets the criteria for entry in the database. When this occurs a data sheet should be printed from the database, and then the record deleted; this ensures there is a record of sites that have been deleted, and that they can be re-entered in the future, should this be necessary. Sites may be deleted for many reasons, among them the correction of false information; forest stands being cut; birds abandoning former colonies; adjacent sites being combined under one entry, or, new information forcing the re-evaluation of the relevance of an entire type of sites. An example of this last reason occurred when the project team acquired from DNRE a current map of the Deer Wintering Areas (DWA) in the province. At the outset of the project wintering areas were envisaged as one type of area that could be classed as environmentally significant, meeting Criterion #11. And, the Department of Environment's listing of ESAs in the Fredericton Planning Region (September 1990) listed over forty such areas. However, it became difficult to justify listing these forty when the provincial map identifies over 800 deer wintering areas. It made more sense to refer database users interested in deer wintering areas directly to DNRE, and therefore to remove any sites that had been entered solely on the basis of their being DWA's. Similarly, we have not included all Mature Coniferous Forest Habitat (MCFH) blocks, nor all of the ~35,000 wetlands in the provincial wetland database; this would be a clear duplication of effort.

#### 2. Uses of the Database:

At the outset of the project, only a few reasonably obvious uses for the database were envisaged, each reflecting the objectives of the members of the Steering Committee. Its primary purpose was to provide the Department of Environment with a listing of potentially significant sites that warranted consideration in the review processes for Environmental Impact Assessments and Watercourse Alteration Permits. The Nature Trust of New Brunswick was interested that decision makers would be made aware of these special places. Incidentally, the Trust also anticipated the identification of particularly significant sites which might be suitable for conservation. The Department of Natural Resources saw the project as an input to the provincial forest management GIS system, and possibly as a source of information for the Ecological Reserves program.

As word of the project has spread the number and variety of requests for information has grown. The following list, divided into three main user group types, provides a sampling of the requests that have been received to date:

GOVERNMENT & OTHER INSTITUTIONS:

CANADIAN FOREST SERVICE: information on sites within Fundy Model Forest to be included in the Gap Analysis project.

ENVIRONMENT CANADA: copy of full database for coastal emergency response planning, and to enhance the information contained in the Assessment Information Management System (AIMS).

DEPARTMENT OF MUNICIPALITIES, CULTURE AND HOUSING: environmental information input to Basic Planning Statements for various Local Service Districts.

MIRAMICHI RIVER ENVIRONMENTAL ASSESSMENT COMMITTEE: listing of sites in Miramichi watershed re: preparation of 1996-97 action plan of Miramichi River Environmental Assessment Committee.

NEW BRUNSWICK MUSEUM: listing of old growth or mature forest sites that could be useful sites for researching lichens.

INDUSTRY:

C.P. RAIL SYSTEM: listing of sites along rail routes from Grand Falls to Saint John proposed to be decommissioned or sold at the end of 1994.

J.D. IRVING LTD.: information on sites on Irving freehold lands.

MIRAMICHI PULP AND PAPER: information on sites identified on Crown licence lands, corresponding to REPAP listing of "Unique Areas".

CONSULTANTS:

FIANDER-GOOD: information on sites within the new boundaries of the Village of Belledune.

JACQUES WHITFORD ENVIRONMENT LIMITED: several requests for information on critical wildlife habitat as input to pre-screening Environmental Impact Assessment reports.

NEIL & GUNTHER: listing of sites on or near Department of National Defence properties in Newcastle-Chatham area; several requests for information related to assessment and closure planning of rural waste disposal sites.

It is hoped and anticipated that use of the database will continue to expand. At the time of this writing there are at least two "dream projects" discussed sporadically within the conservation community - this

database could be an important input to a computerized botanical inventory linking the herbaria at UNB and NBM. It could also be a key source of information for a provincial Conservation Data Centre.

### 3. Dissemination of Information from the Database:

This database assembles information about important and potentially vulnerable natural areas in the province. For this reason the Steering Committee has felt that, while the database is most useful when widely available, some controls are required on the release of information. A simple protocol has been established which is aimed at preventing information from being released haphazardly. Thus, people outside government are asked to put their request for information in writing, addressed to Jane Tims, Secretary of the Steering Committee and stating the reason for the request, the type of information required and the use that will be made of it. If the request appears to be for a valid reason, the information is extracted and forwarded. Copies of the request and the response are forwarded to all members of the Steering Committee. Only "Group A" database fields are provided on initial requests from outside government. Additional information is made available if required.

### 4. Priorization of Sites:

Several members of the Advisory Committee who participated in the Phase I: Conceptual Review of the project suggested that a logical conclusion to the process should be the prioritization of sites. While recognizing that this would be valuable, the Nature Trust's mandate was to provide a listing of ESAs in the seven planning regions. Prioritization would require considerably more field work, validation of data as well as an objective system for determining priorities. While no direct prioritization has been undertaken it might be reasonable to assume that sites which meet a number of different criteria warrant special consideration. By providing detailed site information as well as powerful sorting capabilities, the database allows users to filter the ESA listings through their own priorities.

The lack of prioritization also reflects the variety of types of sites listed and the widely divergent values that different users may place on different sites. It is extremely difficult to rate, for example, the importance of a Piping Plover beach against a salmon spawning ground against a rich fossil location against a bog harbouring numerous orchid species. Different people will place different values on each of these, depending on the perspective of the agency they represent or the particular project on which they are working. It is also possible that some sites might be considered extremely vulnerable and therefore priorities at certain times of year and less vulnerable at others: a Piping Plover beach might be classed as a "priority site", off limits to any disturbance during the summer nesting period, while it could tolerate more use at other times of the year.

Prioritization remains a long-term goal and should be addressed when adequate information on a large number of sites is available. The most efficient method of prioritization would probably be to consider sites by type, i.e. priorities among hardwood hills; priorities among bogs; priorities among salt marshes. In this way detailed criteria and evaluation standards could be developed.

### 5. Links to Geographic Information Systems (GIS):

Geographic information systems are important tools for the management and mapping of geographically referenced information, and can be valuable decision-making tools. Near the end of the second year of the project the database was linked to the (ArcInfo) GIS at the Department of Natural Resources. This system was used to generate the map that is included with this report. The Nature Trust of New Brunswick is aiming to have an in-house GIS in operation by the end of the contract, and the Department of Environment will ultimately enter the database on its recently installed (CARIS) GIS. This proliferation of systems point to the need for a master copy of the database and for the identification of procedures to update these systems on a regular basis.

## VII. RECOMMENDATIONS:

1. The database should not be considered complete. It is an on-going project requiring periodic updates as new information becomes known about sites and the status and distribution of species. This requires that lines of communication, established under this project, be maintained with the scientific/academic, government and naturalist communities.
2. Field surveys are required to verify the significance and to identify boundaries of sites listed in the database.
3. There must be one master copy of the database. New information and requests for information should be presented to the manager of this copy. The database manager should ensure that major users receive updated copies on a regular basis.
4. Data from this database should be made widely available for legitimate environmental research and conservation purposes.
5. Priorities for conservation can be inferred by the clustering of sites in close geographic proximity.
6. The SITEID numbers serve as the link to the computerized ESA map and should not be altered. When adding new sites to the database, SITEID numbers should be assigned chronologically following the last highest existing number. i.e. At present, there are 907 sites listed; the next site added to the database should be assigned number 908. And, for the sake of simplicity, if, for example, site number 573 is deleted from the database the number should not be re-assigned.
7. The database manager should make use of the COMPILER and DATE fields to track who has entered new sites, and when the latest information updates have been added.