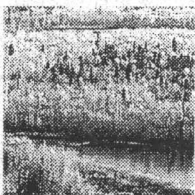


# Canada

# Alberta



## *Northern River Basins Study*



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Barton, B. A

Date Due

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Prepared for the  
Northern River Basins Study  
under Project 3116-A1

by  
B.A. Barton and R.F. Courtney  
Environmental Management Associates

NORTHERN RIVER BASINS STUDY PROJECT REPORT NO. 17  
**FISH AND FISH HABITAT  
BIBLIOGRAPHIC DATABASE  
FOR THE PEACE, ATHABASCA AND  
SLAVE RIVER BASINS**

Published by the  
Northern River Basins Study  
Edmonton, Alberta  
September, 1993

ATHABASCA UNIVERSITY

MAR 23 1995

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## CANADIAN CATALOGUING IN PUBLICATION DATA

Barton, B.A.

Fish and fish habitat bibliographic database for  
the Peace, Athabasca and Slave River Basins

(Northern River Basins Study project report,  
ISSN 1192-3571 ; no. 17)  
ISBN 0-662-20982-6  
DSS cat. no. R71-49/3-17E

1. Fishes -- Peace River (B.C. and Alta.) --  
Habitat -- Bibliography -- Data bases.
  2. Fishes -- Slave River (Alta. and N.W.T.) --  
Habitat -- Bibliography -- Data bases.
  3. Fish  
populations -- Peace River (B.C. and Alta.) --  
Bibliography -- Data bases.
  4. Fish populations --  
Slave River (Alta. and N.W.T.) -- Bibliography --  
Data bases.
  5. Fishes -- Alberta -- Habitat --  
Bibliography -- Data bases.
  6. Fish populations --  
Alberta -- Bibliography -- Data bases.
- I. Courtney, Rick F., 1955- . II. Northern River  
Basins Study (Canada) III. Title. IV. Series.

Z7996.F5B37 1993      016.59709712      C93-099673-9

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## **PREFACE:**

The Northern River Basins Study was initiated through the "Canada-Alberta-Northwest Territories Agreement Respecting the Peace-Athabasca-Slave River Basin Study, Phase II - Technical Studies" which was signed September 27, 1991. The purpose of the Study is to understand and characterize the cumulative effects of development on the water and aquatic environment of the Study Area by coordinating with existing programs and undertaking appropriate new technical studies.

This publication reports the method and findings of particular work conducted as part of the Northern River Basins Study. As such, the work was governed by a specific terms of reference and is expected to contribute information about the Study Area within the context of the overall study as described by the Study Final Report. This report has been reviewed by the Study Science Advisory Committee in regards to scientific content and has been approved by the Study Board of Directors for public release.

It is explicit in the objectives of the Study to report the results of technical work regularly to the public. This objective is served by distributing project reports to an extensive network of libraries, agencies, organizations and interested individuals and by granting universal permission to reproduce the material.

This publication contains referenced data obtained from sources external to the Northern River Basins Study. Individuals interested in using external data must obtain permission to do so from the donor agency.



## NORTHERN RIVER BASINS STUDY PROJECT REPORT RELEASE FORM

This publication may be cited as:

Barton, B.A. and Courtney, R.F., Environmental Management Associates,  
*Northern River Basins Study Project Report No. 17, Fish and Fish Habitat  
Bibliographic Database for the Peace, Athabasca and Slave River Basins,*  
Edmonton, Alberta, Canada, September, 1993.

Whereas the above publication is the result of a project conducted under  
the Northern River Basins Study and the terms of reference for that project  
are deemed to be fulfilled,  
**IT IS THEREFORE REQUESTED BY THE STUDY OFFICE THAT;**  
this publication be subjected to proper and responsible review and be  
considered for release to the public.

  
(Dr. F.J. Wrona, Ph.D., Science Director)

26 August 1993  
(Date)

Whereas it is an explicit term of reference of the Science Advisory  
Committee "to review, for scientific content, material for publication by  
the Board",

**IT IS HERE ADVISED BY THE SCIENCE ADVISORY COMMITTEE THAT;**

this publication has been reviewed for scientific content and that the  
scientific practices represented in the report are acceptable given the  
specific purposes of the project and subject to the field conditions  
encountered.

**SUPPLEMENTAL COMMENTARY HAS BEEN ADDED TO THIS PUBLICATION:** [ ] Yes [✓] No

  
(Dr. P. A. Larkin, Ph.D., Chair)

Sept. 8/93  
(Date)

Whereas it is the duty of the Operations Committee to attend to the day-to-  
day management of the Study on behalf of the Study Board,

**IT IS THEREFORE RECOMMENDED BY THE OPERATIONS COMMITTEE THAT;**

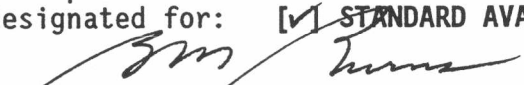
this publication be released to the public and it is reported that

**THIS PUBLICATION HAS BEEN REVIEWED BY THE HEALTH ASSESSMENT COMMITTEE AND  
SUBSEQUENTLY FORWARDED TO APPROPRIATE HEALTH AUTHORITIES:** [ ] Yes [✓] No

Whereas the Study Board is satisfied that this publication has been  
reviewed for scientific content and for immediate health implications,

**IT IS HERE APPROVED BY THE BOARD OF DIRECTORS THAT;**

this publication be released to the public, and that this publication be  
designated for: [✓] STANDARD AVAILABILITY [ ] EXPANDED AVAILABILITY

  
(Bev Burns, Co-chair)

93/09/20  
(Date)



# **FISH AND FISH HABITAT BIBLIOGRAPHIC DATABASE FOR THE PEACE, ATHABASCA, AND SLAVE RIVER BASINS**

## **STUDY PERSPECTIVE**

Understanding and assessing the current state of knowledge about fish distribution, abundance, movement and seasonal utilization of habitats for purposes of growth, rearing, and overwintering is a necessary precursor to any further field work. The Fish and Fish Habitat Bibliographic Database for the Peace, Athabasca, and Slave River Basins compiles available documentation of fish and fish habitat resources within these rivers. Information on the source of data and the pertinent contents of the report or document are available in an electronic format, Dbase IV, to facilitate retrieval on the basis of subject and geographical location given in UTM coordinates. Over 1500 references are identified. Researchers are now able to scan existing literature as well as add to the existing compilation to facilitate planning and design of projects relating to fish and fish habitat.

### ***Related Study Questions***

- 3) *Who are the stakeholders and what are the consumptive and non-consumptive uses of the water resources in the river basins?*
- 6) *What is the distribution and movement of fish species in the watersheds of the Peace, Athabasca and Slave river? Where and when are they most likely to be exposed to changes in water quality and where are their important habitats?*
- 11) *How does and how could river flow regulation impact the aquatic ecosystem?*
- 12) *What native traditional knowledge exists to enhance the physical science studies in all areas of enquiry?*

Information from this project is being used to generate the initial electronic maps on fish distribution, and abundance. Subsequent projects to fill in the gaps of what is known about fish occurrence, distribution, abundance, movement, and critical areas e.g. spawning sites, have utilized this information base.

The project enabled the Northern River Basins Study the ability to quickly assess the availability and accessibility of information on fish and fish habitat in addition to providing a means to maintain an accounting of work relevant to the Peace, Athabasca and Slave River basins. The project provides the public, researchers and managers with a basis for determining the extent of documented knowledge to this point of time. It also sets the stage for integrating traditional knowledge with more conventional knowledge data bases.





## EXECUTIVE SUMMARY

This study was conducted for the Northern River Basins Study (NRBS) to develop a database of all reports pertaining to fisheries and fish habitat in the NRBS Study Area. This area encompasses the Peace, Slave and the Athabasca rivers and all their tributaries.

We collected over 1500 reports for this study. For each report, we have recorded bibliographic information including keywords and a short abstract, biological information on species, lifestage, habitat, and collection methods, and geographic information on waterbody, watershed and location in UTM coordinates.

The use of UTM coordinates increases the functionality of this database. Users can query for all the records within a user-specified distance of any UTM coordinate. For example, a user may ask for all records within 30 km of Fort McMurray.

As part of this project, we developed a simple menu-driven database interface that runs in dBase IV. The interface allows users to edit, input new records, query the database by filling out a form, and print in an easy to use system. The user is insulated from learning complex dBase IV commands by a simple menu system. All menu selections have a prompt at the bottom of the screen to guide the user.

The primary deliverables of this project are a large bibliographic database and a dBase IV application to allow users to easily and quickly access the data. It should prove to be a valuable tool.



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## 1.0 INTRODUCTION

The Peace and Athabasca River systems constitute two of the largest river drainage basins in Alberta, covering a combined area of over 340 000 km<sup>2</sup> (Paetz 1984; Wallace and McCart 1984). The mainstems of the major rivers in the sub-basins of both drainages provide over 8 000 km of riverine fish habitat, excluding the associated tributaries (Paetz 1984; Wallace and McCart 1984). The Peace and Athabasca Rivers join at Lake Athabasca in northeastern Alberta to form the Slave River, which flows northward into Great Slave Lake, Northwest Territories. Except for the Hay River in the northwest, these three river systems drain virtually the entire north half of the province.

Considerable concern has been generated over plans to exploit the aspen forests of northern Alberta for pulp, and the resultant effects of timber harvest and new pulp mills on water quality, fisheries, and other aquatic resources in these major river systems. Thus, a substantial new effort toward better documentation of fish populations and fish habitat to establish baseline data is required.

Many studies already exist on the fisheries of the Peace, Athabasca, and Slave Rivers, but they are located among different agencies (e.g., government, universities, private sector) and in various formats. Thus, the Northern River Basins Study (NRBS) identified a need to catalogue all existing fish and fish habitat information and compile it into a usable, common-format database. Although some of this information has already been compiled (e.g., Paetz 1984; Wallace and McCart 1984), this step is necessary to update and properly evaluate the status of present knowledge of these river systems and future fishery data requirements before proposed field studies are initiated. Creating a digital database will also improve data tracking and the ability to query the compiled information.



Environmental Management Associates (EMA) was contracted by NRBS carry out the task of establishing this database. The objectives of this study were to:

- compile fish and fish habitat data relevant to the species that inhabit the waters of the Peace, Athabasca and Slave rivers, and their tributaries; and,
- develop a database management system for reporting the compiled data that can also be used for inputting new data collected in subsequent field programs.

The complete terms of reference are presented in Appendix A.



## **2.0 APPROACH**

### **2.1 FISHERIES AND FISH HABITAT DATA COMPILATION**

As established in the Terms of Reference, a major requirement of this study was to acquire fish and fish habitat data for the Peace, Athabasca, and Slave rivers, and their tributaries from government, private industry, research and academic sources. The database includes information collected mostly from:

- provincial and federal government report files;
- university libraries and document centres;
- private consultants;
- published literature and abstract sources; and
- Alberta Fish and Wildlife Division fish collection permit records.

A review of databases of government and the private sector was included in this project. Most of the physical retrieval and compilation of pertinent data was carried out at Alberta Fish and Wildlife Division headquarters office in Edmonton, at their regional offices in Peace River and St. Paul, and at the area offices in Edson and Edmonton. Additional report information was provided by the federal Department of Fisheries and Oceans through contacts in Winnipeg, Yellowknife, and Regina. Private consultants within Alberta were contacted in order to visit their offices to document their pertinent studies. Consultants outside of the province were requested by mail to submit bibliographic lists of the studies they had conducted relative to this project. Appropriate library material (e.g., mostly AOSERP reports) at the Alberta Environment library in Edmonton was reviewed and included in the database. Toward the end of the compilation portion of the project, material on hand at the University of Alberta library was reviewed, although by this time most of the information had already been catalogued from other sources.

The database includes all tributaries of the Peace, Athabasca, and Slave River basins. The Peace River basin includes the Smoky, Little Smoky, Simonette, Wapiti, Wabasca, Loon, and Birch River sub-basins. The Athabasca River basin includes the Berland, McLeod, Pembina, Lesser Slave, La Biche, and Clearwater River sub-basins. The database also includes the riverine portions of Peace - Athabasca Delta, but lakes were not included. A number of unnamed streams were also encountered in the information search and included.

Early in the project it became apparent that much fish and fish habitat information collected had not been formally reported. Therefore, a value judgment was made to decide what would be included in the database and what would not. Virtually all information that was summarized in a report, even informally, was included in the database. This information includes all formal reports as well as stream survey reports and other data summaries, but does not include unsummarized or "raw" data or fish collection permit information.

The fish and fish habitat database is provided on IBM-PC compatible (MS-DOS) diskettes (see next section). The complete bibliography of all reports and unpublished data is provided as a component of the compilation results; this material can be retained and archived for future reference if necessary.

## **2.2 DATABASE MANAGEMENT SYSTEM**

A database management system was developed for storing, retrieving and analyzing all past and future fisheries and fish habitat data compiled by NRBS, including from this project. The software used for the database was dBaseIV; this software is compatible with virtually any Geographic Information System (GIS) software available, should the upgrade to a GIS-format database be considered in future.

The system is also expandable so that additional key words and capabilities can be incorporated later.

All information compiled was assigned key words or codes to be used as search criteria, and for cataloguing and indexing. Fish and fish habitat data were stored in the database according to specific informational fields, including bibliographic data, key words, abstract, availability, fish species and life stage, habitat, collection methods, and geographic information. In many reports, not all of this information was available.

The fields in the database were designed to match those used in the data entry sheets (Appendix B) for ease of data entry. The information entered in each field is as follows:

IDNUM - the unique record identifier for each report

AUTHOR - full author(s) name

YEAR - all four digits

TITLE - in full

PUBLISHER - in full

KEYWORDS - refers to themes of report that are not reported in SPECIES, LIFESTAGE, COLLMETHOD or WATERBODY

ABSTRACT - a brief overview of report - 3 or 4 sentences

STUDY DEPTH

1 - fish collection permit or species listing, generally 1 or 2 pages.

2 - minor report, summary reports - less than 20 pages

3 - major report, journal publications and other scientific reports with an introduction, methods, results and conclusion. Size varies.

LIBRARY - all libraries where the report was found

SPECIES - Four-letter abbreviations, RBTR, BNTR, LKWH, NRPK, etc.  
from Mackay et al. (1990).

LIFESTAGE - Fry, Juvenile, Adult, Spawning, Egg

HABITAT - Physical Habitat, Riffle, Run, Pool, Lifestage Habitat

COLLMETHOD - gill net, electrofishing, primacord, etc.

WATERBODY - name of stream or river

ENVIRCODE - Environment Canada watershed codes

MAXUTM\_X - x-coordinate of the upper right corner of the Study Area

MAXUTM\_Y - y-coordinate of the upper right corner of the Study Area

MAXUTMZONE - UTM zone for the upper right corner of the Study Area

MINUTM\_X - x-coordinate of the lower left corner of the Study Area

MINUTM\_Y - y-coordinate of the lower left corner of the Study Area

MINUTMZONE - UTM zone for the lower left corner of the Study Area

MIN\_X - UTM Zone 11 x-coordinate of lower left corner, Calculated Field

MIN\_Y - UTM Zone 11 y-coordinate of lower left corner, Calculated Field

MAX\_X - UTM Zone 11 x-coordinate of upper right corner, Calculated Field

MAX\_Y - UTM Zone 11 y-coordinate of upper right corner, Calculated Field

Geographic location of data reports was usually described in the traditional section-township-range format. This information was converted to Universal Transverse Mercator (UTM) coordinates for Zones 11 and 12. This will allow database users to search for data based on geographic location. Most studies encompassed areas larger than a single point; therefore, coordinates were used to define a box around the study area. In some reports where the sampling site was unknown, it was necessary to use coordinates that defined the entire river.

The use of geographic locator codes for each entry gives some added functionality to the database. For example, the user can search for fish studies or fish species present within a given distance of a proposed development. Using the legal



description (e.g., section, township, range) to denote location does not allow this type of database search. Geographic location is also denoted by waterbody name to further aid spatial queries.

With dBaseIV, the database is virtually unlimited in the number of records it may contain and can be imported or exported to most other major database systems. The database menu was designed to be "user friendly". The format allows the user to input information using input screens designed to look exactly like the data input forms used in the data compilation. We recommend that all future projects provide information on a similar standardized form so that it can be entered into the existing database.

A manual outlining use of the system is provided as Appendix C. The manual is written to enable users with limited computer experience to use the database productively with a minimum of training. For adding new data, the average time required to complete a single entry is about 20 minutes; this includes about 10 minutes to annotate the report onto the data entry sheet, and another 10 minutes to establish the UTM locator coordinates from a map and enter the information into the computer database file.

A disk containing an electronic copy of the data and the dBase IV application code is provided as Appendix D.

### **3.0 CONCLUSION**

The database developed for this study will be a valuable tool for anyone investigating fish or fish habitat in the area known as the Northern River Basins. We have collected over 1 500 references in this database from a variety of private and government sources. This is the largest fisheries bibliography by far, collected for the NRBS area.



#### 4.0 REFERENCES

Mackay, W.C., G.R. Ash, and H.J. Norris, editors. 1990. Fish ageing methods for Alberta. R.L. & L. Environmental Services Limited *in association with* Alberta Fish and Wildlife Division *and* University of Alberta.

Paetz, M.J. 1984. The fish and fisheries of the Peace River Basin: their status and environmental requirements. *For* Alberta Environment, Planning Division.

Wallace, R.R., and P.J. McCart. 1984. The fish and fisheries of the Athabasca River basin. Their status and environmental requirements. Dominion Ecological Consulting Limited *and* Aquatic Environments Limited. *For* Alberta Environment, Planning Division.





**APPENDIX A**  
**TERMS OF REFERENCE**



**SCHEDULE "A"**

Page 1 of 2

**Description of Services**

1. The Consultant shall perform and deliver the services according to the following description, terms, conditions, standards, requirements and provisions.

**Objectives**

To compile fish and fish habitat data relevant to the fish species found to inhabit the waters of the Peace, Athabasca and Slave Rivers and their tributaries.

**Requirements**

- \* To acquire fish and fish habitat data applicable to the objectives of the NORTHERN RIVERS BASINS STUDY. Scope of work is to entail a review of existing databases. This review is to include an investigation of fish collection permits issued by the Alberta Fish and Wildlife Division-Fisheries Management Branch.
- \* Site specific information being sought:
  - methods of collection, analysis and evaluation,
  - fish composition, distribution and abundance,
  - fish health,
  - habitat associations and descriptions,
  - fish movement (documented and anecdotal),
  - fish life history.
- \* Fish/Fish Habitat data relevant to the fish species found to inhabit the waters of the Peace, Athabasca, and Slave rivers and their tributaries.
- \* To identify inactive and active databases that contain fish/fish habitat information applicable to the NORTHERN RIVER BASINS STUDY and describe the conditions of access, use and data register protocols.
- \* To review and assess the value of private and academic inventory programs and databases for their utility to the NORTHERN RIVER BASINS STUDY - Fish/Fish Habitat-Inventory Project.
- \* If possible, acquire access to private sector inventory programs and databases and include this in the Database Compilation Project.

**The contractor will:**

- \* in a professional manner undertake the work necessary to competently meet the objectives of this project,
- \* present the results of the database review to the Study Office by March 15, 1992, in the formats to be agreed upon with the Study Office.
- \* develop in consultation with the Study Office a data management convention for storing, retrieving and analyzing acquired during the compilation project. This convention is to be suitable for use in reporting data subsequently acquired in field programs.



SCHEDULE "A"

\* catalogue all reports and data filed in support of this review.

\* Report compiled data in the electronic and written protocols agreed to with the Study Office. This includes the supply of 10 copies and the camera-ready original of the final report.

\* a data management handling proposal is to be submitted for discussion by February 1, 1992. The data management handling system will be developed in consultation with the Study Office and their approval.





*Northern River Basins Study*

April 30, 1993

Mr. Bruce Barton  
Environmental Management Associates  
1011 Sixth Avenue S.W.  
Calgary, Alberta  
T2P 0W1

Dear Mr. Barton:

Re: Fisheries and Fish Habitat Database Compilation for the Peace, Athabasca  
and Slave River Basins

---

I appreciate your patience in finalizing the project report. The only significant comments related to the reference manual for using the electronic database. Specifically,

1. The manual could provide more information on all of the menu options available on the screen. It is not always obvious to the user where a particular selection would lead.
2. The initial copy and installation instructions and their implications were not immediately obvious when the DRAFT was reviewed. I understand you were going to resolve this issue in the FINAL manual (Refer June 4th letter).

In addition to the foregoing, I understand:

- a) UTM coding will be complete in the FINAL report,
- b) the fish collection permit information will not be incorporated into the database,
- c) drainage codes would be complete,
- d) the data files would be proofread to correct transcribing errors.

The original Terms of Reference call for 10 copies of a Final Report. In light of our earlier discussions I understood there would be three kinds of product. Them being; electronic disk of the data, a user manual, a hard copy version of the data with a short section detailing how the project was undertaken and what was accomplished. This latter document would have a very abbreviated executive

.../2

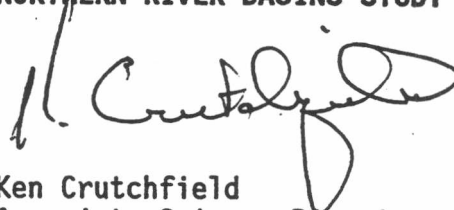
summary as well as the Terms of Reference as an appendix. As a consequence, I would like to revise the original reporting requirements. The new specifications would be: 2 camera ready copies and 5 cerlox copies of the manual, only one camera ready copy and 1 bound copy of the project description inclusive of the appendices i.e., data, TOR.

Please let me know if the foregoing presents any problems or concerns.

Thank you.

Yours sincerely,

NORTHERN RIVER BASINS STUDY

A handwritten signature in dark ink, appearing to read 'K. Crutchfield', written over the typed name.

Ken Crutchfield  
Associate Science Director

**APPENDIX B**  
**DATA ENTRY SHEETS**



# Northern River Basins -- Fisheries Database Input Form

## Reference Information

Identification No: \_\_\_\_\_

Author(s): .....

.....

Year: .....

Title: .....

.....

.....

Publisher: .....

.....

.....

Keywords: .....

.....

.....

Abstract: .....

.....

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.....

Study Depth .....

Library Location: .....

.....



## Biological Data

Species Discussed: .....

.....

.....

Lifestage(s): .....

.....

Habitat(s): .....

.....

.....

.....

Collection Methods: .....

.....

.....

.....

.....

.....

## Geographic Information

Waterbody Name: .....

.....

Drainage Code: .....

### Northeast Corner of Study Area

Easting:..... Northing:..... UTM Zone:.....

### Southwest Corner of Study Area

Easting:..... Northing:..... UTM Zone:.....



**APPENDIX C**  
**DATABASE USERS MANUAL**





## NORTHERN RIVER BASINS DATABASE MANUAL

### Introduction

A database application consisting of a series of dBase IV programs was written to make the Northern River Basins Databases easier to use. Where possible the menus follow dBase IV conventions but there are a number of unique aspects of this database that required a novel approach. This manual explains the use of the various options.

### Installation

To run this database and application, you must have dBase IV Version 1.1 or later correctly installed and working on your computer. See the dBase IV manual for installation instructions.

Installing the database is simply a matter of copying (use the DOS command COPY to copy files) the files on the floppy disk to a directory (use the DOS command MD to create a new directory) where you wish to store the database and software. Once the files are copied, switch to the new directory containing the files and type INSTALL. The database files and the software file executables will then be uncompressed. See your DOS manual for more information on using DOS commands if you are unsure of how to use COPY and MD.

### Using the Data

To use the database, it is necessary to change to the directory where the data and software were installed. If you do not know how to change directories on your hard drive see your DOS manual under the **cd** command. To get into dBase IV you must type **dbase nrbsdata** or **dbase/t nrbsdata** at the DOS prompt. The /t option simply stops dBase from displaying some of the introductory screens allowing you to get into the program more quickly.



If you have successfully installed dBase IV and the NRBS database you will be rewarded with a display of an introductory screen naming the database and some background on the database. Press enter to proceed to the menus.

## The Menus

There are a number of menu choices on the horizontal bar menu from which to select. They will be described from left to right.

**Input** Selection of the input option gives you access to the entire database. This option is used for database corrections and for adding new records to the database. The display of the database corresponds to the layout of the data sheets to aid data entry. It takes three screens to fully display the data for a single record. This option automatically goes to the end of the database to facilitate data entry. You can employ the edit menus by pressing **F10** which gives you the standard dBase edit screen menus. Press **CTRL END** or **Escape** to save any database changes and exit.

**Display** The display option is used to display the database resulting from executing the Query option on the menu. Only the more generally useful fields of the database are displayed to allow each record to fit on one screen. This option is used to quickly check the outcome of a query. You cannot edit the database in Display mode but must exit and go to the Input mode. Press **Escape** to exit.

**Query** The query option displays a form that the user fills out to obtain the records meeting any criteria of interest. It is a powerful tool that has a number of capabilities. The results of the query can be viewed using Display or can be printed using the Print option. The size of the database means that the query can take some time to process.



The user is presented with a number of labelled rows corresponding to fields in the database. These are relatively straightforward and correspond to the fields in the Input, Display and Print options. There are some exceptions however. Both Keywords and Species have been given three lines allowing more options in composing a query. The Distance options (Distance, UTM zone, x and y coordinate) also allow queries to be based on geographic location of the reports in the database. This spatial component is a rather unique feature for a database of this type.

There also three columns labelled **AND** criteria, **OR** criteria and **NOT** criteria. This allows one to perform the three major kinds of database queries. **AND** criteria refers to criteria that must all be true in order for a record to be selected. For example, if you filled out the Author with bishop and the Species1 with nrpk under the **AND** criteria, the only reports selected would be those written by Bishop **and** having NRPK in the species list. Incidentally the query form is not case sensitive - both upper and lower case letters will give the same results.

If BISHOP was the author under the **AND** criteria and NRPK was typed for species1 under the **OR** criteria, the query would select all reports written by Bishop **or** having NRPK in the species list. There is one caution concerning use of the query screen. **At least one of the AND criteria must be filled out for query to run properly.** This is easily accomplished if, for example, you wanted all records with the keywords chemical or inventory you could type chemical in the **AND** Criteria and inventory in the **OR** Criteria.

If BISHOP were typed under author for the **AND** criteria and NRPK were typed under species1 for the **NOT** criteria, the query would select all reports written by Bishop that do not have NRPK in the species list.



## Distance and UTM Coordinates

The part of the query form pertaining to distance and UTM coordinates bears further explanation. The UTM coordinates refer to the Universal Transverse Mercator map projection and locational system which is used on all 1:50 000 and 1:250 000 national topographic series (NTS) maps. In order for this system to work properly the user must learn how to use the UTM coordinate system. To further complicate matters there are at least three variations on the system. The correct one to use for this database references the light blue grid on the NTS maps and uses the corresponding light blue numeric coding system, not the alphanumeric system (letters and numbers). You must use the complete number which is always a six digit x coordinate (easting) and a seven digit y coordinate (northing). The description given in the lower right corner of each NTS map on how to use the UTM system is **incorrect** for our purposes as it uses the alphanumeric system. Some maps have an additional set of UTM codes in brown which are also **incorrect** for our purposes.

Each NTS map has a numeric zone which range from zone 11 to zone 12 in Alberta. You must know how to determine UTM coordinates and the zone for a given point on an NTS map before you will be able to use the spatial component of the database. The zone is always given in the lower right corner of each map. The x and y coordinates must be interpolated from the grid on the NTS map for the area you are interested in.

The Study Area for each record in the database has been designated by a rectangle. The rectangle is defined by the UTM coordinates of the lower left corner and the UTM coordinates of the upper right corner of the Study Area. This allows the user to determine which studies fall into a specific geographic region of interest. For example, if a user of the database wanted all records within 50 km of Ft. McMurray, it is necessary to determine the x coordinate



(easting), y coordinate (northing) and UTM Zone of Ft. McMurray from an NTS map. The coordinates are 475500, 6286000 for zone 12. The distance is 50 km which must be translated to 50 000 m for the database since all UTM coordinates are in meters. The database will select all records with at least part of their study area in the 50 km radius circle drawn around Ft. McMurray.

**Reset**

Reset erases the results of your last query so that all records in the database can be viewed using Display or Printed. The results of your last query are stored even if you turn off your machine. When you use Display or Print you will see your last query. This can be a useful feature as you know you won't lose your query results if you turn off your machine for the day. You must run another query or use reset to change the results of the previous query.

**Print**

Print allows you to make a hardcopy of the results of your query search. A menu pops up that offers three printing selections. You can print to the screen and use CTRL S to pause display, any key to resume scrolling. The ESCAPE key will also stop the display followed by any key (except ESCAPE) to get back to menus. You can print to a file called display.prt for later printing from DOS or import to a word processing program. The program asks if you wish to replace the existing display.prt to remind you that its contents will be lost. Finally, you can print directly to a printer.

**Backup**

Backup allows you to make a copy of your database on your hard drive. This is useful if you are about to make significant changes to your database such as entering new records or correcting typos. If the computer crashes during this process, it is not unusual for the database to be corrupted. You can then **Restore** the database from your backup and overwrite the corrupt version of the database. When using backup or restore, the program will show you the three files being copied. Remember that the current contents of the file will



be replaced by using backup or restore. It should be noted that backup creates a copy of the database on your hard drive. This requires another 4 mgs of hard drive space.

**UTM** As you add new records to the database they will be in one of the UTM zones (11 or 12). In order for the spatial queries to work properly, they must be converted to the same zone (Zone 11 in this case) so they all have the same coordinate system. UTM does this conversion for all new records and skips over old records where the conversion has already been done. This is a rather lengthy calculation so UTM may take some time to run if you have added a large number of new records. Once UTM has been run on a database it need not be run again unless new records are added.

**Quit** Quit allows you to exit to DOS.

**Help** Although there is no help selection on the menu, a number of menu options have a corresponding Help screen to give a quick overview of what the command does. To access help, highlight the option for which you want an explanation and press the F1 key.

## **Software Support**

This software and data are the property of the Northern River Basins Study. There is no warranty expressed or implied for use of the software or the database. Environmental Management Associates, Northern River Basins Study and all individuals that were involved with the development of this product assume no liability for database and software accuracy or use. No software support will be provided for this software.



## **APPENDIX D SYSTEM AND DATA FILES**

The disk comprising this Appendix contains two files:

1. ALL.EXE; being 271,686 bytes in size.
2. INSTALL.BAT; being 27 bytes in size.

Following the instructions in Appendix C for installing the database will result in 25 files requiring 4,228,293 bytes.

**There is no warranty expressed or implied for the use of this database; the Northern River Basins Study does not guarantee the accuracy of the data nor the correctness of the application code. The NRBS does not assume any liability for actions or consequences resulting from the use of the data or the application code; individuals using this database do so entirely at their own risk. The NRBS will not update the data nor modify the application code except as deemed necessary for its own purposes.**

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