CHAPTER 6

WATER RESOURCE INVENTORY

The water resource inventory is the foundation of the Aquatic Data Warehouse. It contains basic information on all of New Brunswick's lakes and streams.

Each lake and stream is assigned a unique identifier or number, plus appropriate drainage system codes. New Brunswick has adopted a five level hierarchal drainage system with the first level representing twelve major drainage basins. Each basin is then divided into composites and 5^{th} order or higher streams, according to Strahler's (1952) stream ordering method. Each drainage unit is then further subdivided until it no longer contains units meeting the minimum order/size criteria: 4^{th} order with a drainage area greater than 100 km^2. Please refer to Chapter 5 **Drainage System** for details.

During the inventory process, stream order, stream permanency, and tidal influence is determined, plus the lake or stream into which each body of water flows is recorded. In the case of coastal streams, the name of the receiving bay or cove is noted. In addition, lake and stream dimensions, such as total length, surface area or maximum depth, is captured if available.

The water resource inventory is based on the Service New Brunswick's (SNB) 1:10,000 scale hydrographic data. The base was developed in the early 1980's through interpretation of spring and late fall aerial photographs. As such, the digital data represents high water conditions.

The water resource inventory exists as a tabular database and as a series of graphic files which can be viewed or plotted with GIS. Three graphics files (points) were created; one places the water body ID's next to the lakes or streams for easy identification, the second places names near the appropriate water bodies, and the third indicates the location of order change along streams (Figure 7).

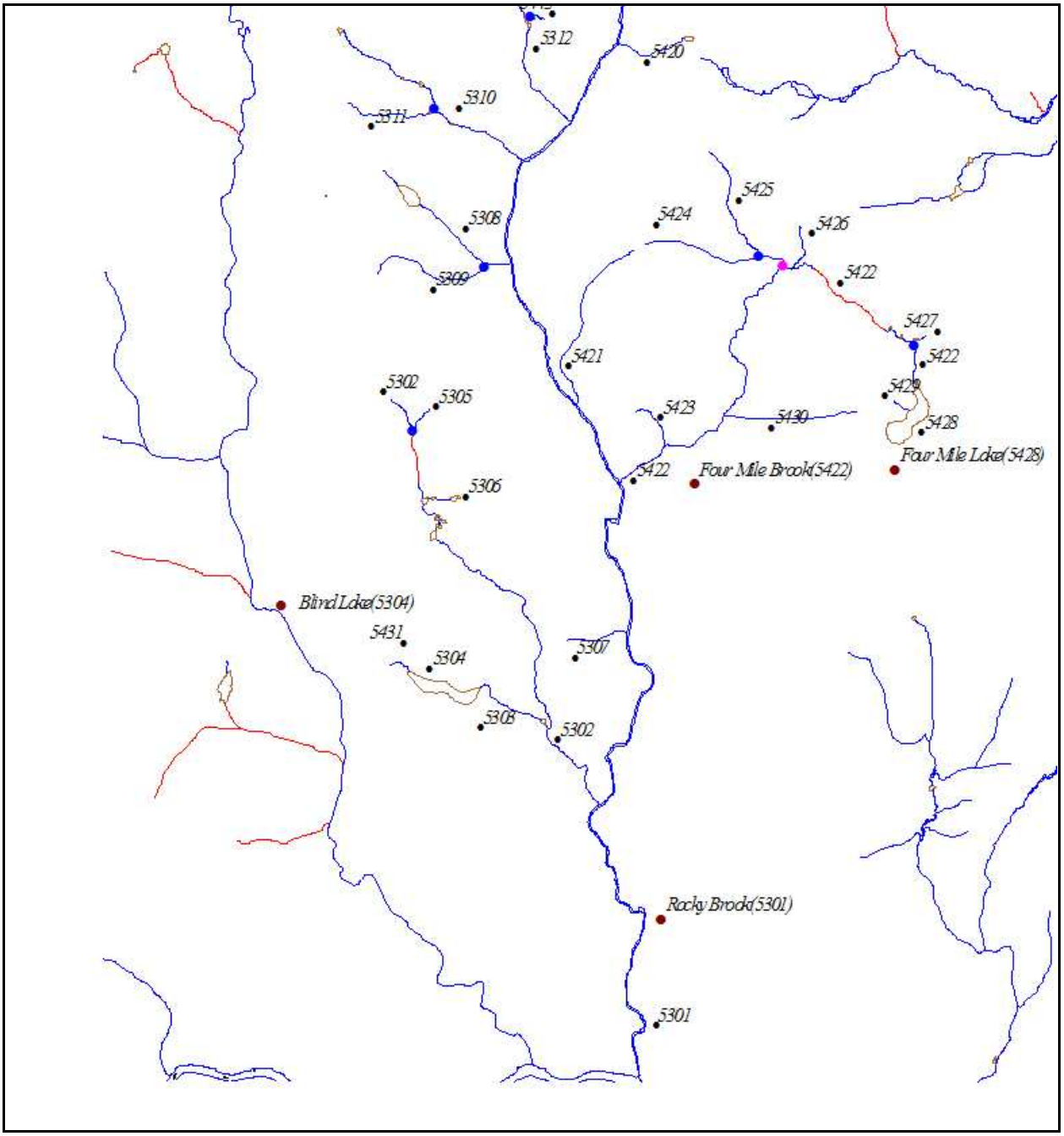
DATA SOURCES

The water resource inventory was developed by the Atlantic Salmon Museum's Aquatic Data Warehouse. While the Service New Brunswick's hydrographic data was the primary base to develop the inventory, National Topographic Series 1:50,000 maps were used as a cross reference.

Additional attributes for some of the primary lakes and streams were acquired through GIS measurements, such as stream length, lake area and perimeter. Planimeter lengths of streams were provided by the New Brunswick Department of Natural Resources & Energy. Lake surveys, performed by the New Brunswick Department of Natural Resources & Energy and Bowater Pulp and Paper Canada Inc. provided other hydrographic parameters, such as mean depth, maximum depth, volume, and productivity indices.

Initially, the water body ID's and stream orders were recorded on paper maps and data entry forms were completed. This information was later transferred to the computer system. Subsequently, a more efficient method of recording information directly on the computer was developed.

Figure 7. Water inventory numbering technique used within the Aquatic Data Warehouse.



METHODOLOGY

Within GIS, a stream is represented by many segments rather than a single line. That is, the line is segmented or broken each time a tributary joins a stream. Ideally, the water body ID should be attached to each stream or lake segment so one could ask the computer system to display a specific body of water. Due to the extended effort of this exercise and limited resources, an alternate method was employed. Graphics files were created to represent water body ID's and locations of stream order change (Figure 7). This approach allows the information to be viewed or plotted with the lakes and streams.

The following lists the rules for developing the water resource inventory.

Numbering Lakes and Streams
All streams and any lake 10 acres or larger, named or unnamed, are given a unique number or water body ID. Lakes less than 10 acres are numbered if they have an official name or have been surveyed. Should a small unnumbered lake require an ID in the future, it can be easily added to the inventory.

Working within a drainage basin, the bodies of water are numbered sequentially in a clockwise direction. As each ID is assigned, the following information is input into a water inventory data file: unique water body ID number, water body name, highest stream order (see *Stream Order* below), intermittent indicator, tidal influence indicator, and the name and number of the stream or lake to which the water body flows. If the stream flows into the ocean, the name of the cove or bay is recorded, but no number is assigned to the receiving water.

A graphics point file was created which places a small point beside each lake and stream. Each point has the appropriate water body ID (Figure 7). Larger streams generally required their number to be repeated several times along their length to clearly indicate their path.

Rules or guidelines used for numbering lakes and streams are summarized below:

- Streams and lakes are numbered as they are encountered while moving clockwise through the stream network. If a stream or lake has tributaries, it is numbered first then its tributaries.

- All named lakes are included in the inventory, regardless of size. All unnamed lakes are measured. If a lake is 10 acres or larger, it is included in the inventory. Each of these lakes is checked on the National Topographic Series (NTS) 1:50,000 maps to see if it is actually a lake or a wetland area (this is not always distinguishable on the SNB map). If it is a lake, it is assigned a unique water body ID number.

- If a lake is numbered, then any inflows are assigned different numbers than the outflow. Otherwise the lake is considered a part of the stream and does not affect the numbering scheme. There are a few exceptions to this rule where named streams flow through named lakes (e.g. South Branch Renous River); this is accepted only when the stream's path is clearly defined on the NTS 1:50,000 topographic maps.

- If a lake is smaller than 10 acres, it is considered an in-stream lake and the inflow and outflow are given the same number. If there is more than one inflow, the stream course has to be determined.

- To determine the source of a stream, the 1:50,000 NTS map is referenced. In the event the stream source is not clearly marked on the NTS map and there are two or more possible sources, the longest stream is selected as the stream source. If there is a lake with the same name as the stream, it is considered to be the source (e.g. Trout Lake is the source of Trout Brook).

- If a named stream forks into two named branches (e.g. North and South Branches

enous River), the forks represent the end (or source) of the main stream. Each of the two branches are assigned unique stream ID numbers different from the main stream ID.

- Bogans and dead waters, even if named, are not included in the inventory as they are considered a part of the main stream. However, any streams flowing into bogans or dead waters are numbered.

- When a main stream flows through a wetland, there are often numerous tiny streams indicated on the SNB hydrographic maps as flowing in and around the main stream (e.g. South Branch Southwest Miramichi River). Only source streams are assigned numbers, i.e. those entering the wetland.

- Only one ID is assigned to streams that split.

- A provincial inventory of lakes currently exists. Due to duplication and errors within the numbering scheme, the files have been updated with the new water body ID's and Gazetteer names. The unnamed lakes within the original inventory do not have new ID's.

Naming Lakes and Streams
Only names found on the NTS 1:50,000 topographic maps are used. These names were later verified within the *Gazetteer of Canada: New Brunswick* published by the Canadian Permanent Committee on Geographical Names, Canada Center for Mapping, Natural Resources Canada. Although the major streams and lakes have names, many of the smaller brooks and ponds do not.

Three names are maintained for each lake and stream - official name, abbreviated name and alternate name. The alternate name may be a local name which is not in the Gazetteer or it can be a name found in the Gazetteer, but has been superceded by a more recent official name.

The abbreviated name should be used on reports and maps or where space is limited. It contains the full official name or an abbreviated version if the name is long and provides a location indicator, such as upper, lower, east or west for lakes within a complex (e.g. Twin Lakes (East)). Only stream names containing "Branch" were shortened. For example, the abbreviated name for "Lower North Branch Little Southwest Miramichi River" is "Lwr N Br LSW Miramichi River". Where no adjustments have been made, the abbreviated name contains the full length official name. The alternate name represents common or local names.

Water Body Complexes
There are instances where the official name refers to more than one body of water. For example, the name "Twin Lakes" refers to two adjacent lakes within the Miramichi drainage. Since it is desirable for the inventory to track every distinct body of water, each lake is assigned a unique number while their official names are the same (Twin Lakes). However, both records reference a water body complex to indicate both lakes belong to the "Twin Lakes" complex. In addition, the abbreviated name notes the relative position of each lake, for instance "Twin Lakes (East)". Each water body complex is assigned a unique number.

Drainage System Codes
Each lake and stream is assigned to a series of drainage system codes to reflect its position within the drainage basin. Please refer to Chapter 5 **Drainage System** for details on how drainage boundaries are defined.

Stream Order
Strahler's ordering system was utilized for identifying stream order. In this system, the number and order of streams that flow together to create a larger stream determine a stream's order. Source streams, which have no tributaries, are considered 1st order. When two 1st order streams join, a 2nd order stream is created. If two 2nd order streams join, a 3rd order stream is created and so on. Larger streams will consist of multiple sections with increasingly higher orders, while small headwater streams will be a single order throughout their entire length.

To incorporate stream order within the GIS system, the points along the stream where the

order changes are recorded. Larger streams that consist of multiple stream orders along its length have stream order change points at the confluence of an equal or higher ordered stream. The following are rules used for applying stream order:

- Stream order does not change within estuarial waters, that is, stream order is used for classifying freshwater streams only.
- If a stream of higher order (a tributary) enters a stream of lower order (the main stream), the main stream increases its order to the order of the tributary.
- If two or more streams of the same order enter a lake, the order of the outlet stream increases by one (e.g. if there are two 1st order inflows, the outflow is 2nd order). If there are two or more inflows to a lake, but only one has a higher order, the order of the outflow remains the same (e.g. if there are two 2nd order and one 3rd order inflows, the outflow is 3rd order).
- If two named streams join to form a third stream which has a different name, the latter does not have a 1st order section. Instead the stream's beginning order will be equal to or higher than the merging branches. The North Branch Renous River joining the South Branch Renous River to form the Renous River is an example.
- When the order changes along a stream, it always occurs at the confluence of another stream.

Stream Permanency
During the development of the Service New Brunswick's hydrographic base, the digitized lines were assigned codes to indicate the type of hydrographic feature. For instance, the codes include lakes, double line (≥ 10 m wide and have right and left banks) and single line (< 10m wide) permanent streams, and single line intermittent streams. Hydrographic maps are generally plotted with different colors to illustrate the various water feature codes. Refer to Table 1 within Chapter 3 **Spatial Data Architecture** for a complete listing of hydrographic feature codes and the colors used.

In many cases, streams begin as intermittent single lines then change to permanent single lines. A stream is only recorded as intermittent if its entire length is coded as intermittent.

Tidal Influence
Within the hydrographic base, portions of streams below the head of tide are coded as coastal. If a stream contains a coastal portion, or flows into the coastal portion of another stream, it is coded as having tidal influence.

POSITIONAL ACCURACY

The positional accuracy of the hydrographic spatial data is ±1.5m to ±2.5m. Refer to the **SNB's Land and Water Standards Manual** for further details.

DATA FILES

Tabular Data
There are four data files within the water resource inventory. One is the master table which maintains the list of all bodies of water. The second maintains the names of water body complexes where a single official name refers to multiple features, such as "Twin Lakes" and "Kennedy Lakes". Two additional tables were created to maintain attributes that are specific to lakes and streams, respectively. The water resource inventory table only includes fields of information that are common to any type of water body.

- **Water Resource Inventory** - Inventory of all lakes and streams. This inventory includes information common to all water bodies, such as unique number, name and drainage system codes. It is the foundation of the Aquatic Data Warehouse. Thus, all tables within the data warehouse reference the water resource inventory table through the water body unique identifier.

- **Water Body Complexes** - Maintains a list of lake complexes.

- **Stream Attributes** - Contains additional information that only pertains to streams, such as length and stream order.

- **Lake Attributes** - Contains additional information that only pertains to lakes, such as maximum depth, volume, and perimeter.

Spatial Data

SNB's hydrographic data exists as in 1893 files which cover the province in a 1:10,000 tiling scheme. The Aquatic Data Warehouse has maintained the same method of organizing spatial data as the New Brunswick Department of Natural Resources and Energy. Within their system each map or tile is referenced by a four digit map number. The map number's first two digits increase as one moves eastward and its last two digits increase in a southerly direction. A directory is created for each tile, which in turn contains SNB's hydrographic and road data. Hydrographic data exists as line features and as polygons (for lakes, wetlands, and double line streams). Within each tile directory, the three layers are consistently named as follows:

- ***waline*** - hydrographic line features
- ***wapoly*** - water polygons
- ***rdline*** - road layer

In addition, route systems were created for primary lakes and streams. All the map tiles associated with a drainage basin are first merged to create a single file. For instance, the Miramichi basin spans 390 map tiles. The merged file only contains hydrographic features used for building routes, i.e. single line streams, stream center lines and lakes. The route system for the basin exists as a layer within this merged coverage.

To facilitate map production, several other layers were created from SNB's hydrographic data, including: lake polygons, river polygons, coastal polygons, and a layer of dams, rapids, and falls. These files cover the entire province.

References:

Strahler, A. N. 1952. Hypsometric (area-altitude) analysis of erosional topography. Bull. Geol. Soc. Am. 63: 1117-1142.

TABULAR DATA FILES

WATER RESOURCE INVENTORY

The ***Water Resource Inventory*** table (waterinv.dbf) maintains a list of lakes and streams. As such, it is the foundation of the Aquatic Data Warehouse. All tables within the data warehouse reference the water resource inventory table through the water body unique identifier. All water bodies are assigned to a drainage unit within the five level provincial hierarchal drainage system. In addition, the water body identifier of the water body into which a lake or stream flows is maintained to create hydrographic network structure.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Drainage Codes	Concatenation of drainage system codes	Drainge_Cd	Character (17)	
Water Body ID	Unique number assigned to each lake or stream	Water_ID	Numeric (8)	Also used as a GIS reference
Water Body Type	Alphabetic code representing the type of water being identified - lake or stream	Water_Type	Character (4)	Code Table 2
Water Body Name	Official name of the stream or lake as determined by the *Gazetteer of Canada - New Brunswick*	Water_Name	Character (55)	
Abbreviated Water Body Name	Abbreviated name or name + location indicator, such as upper, lower, east or west, for lakes within a complex (Intended for use on reports or maps)	Water_Abv	Character (40)	
Alternate Water Body Name	Alternate or local name	Water_Alt	Character (40)	
Water Body Complex ID	Indicates the Complex ID to which the lake belongs	Cmplx_ID	Numeric (4)	
Water Body Complex Name	Name of the water body complex to which the lake belongs	Cmplx_Name	Character (35)	
Survey Indicator	Indicates whether the water body has been previously surveyed	Survey_Ind	Character (1)	Y = Yes Blank = No
Status Code	Code indicating whether the lake or stream has special status, such as watershed designation	Status_Cd	Character (4)	Code Table 3
Owner Code	Code representing ownership of the entire lake or stream if known	Owner_Cd	Character (4)	Code Table 4
Flows Into - Water ID	Water body ID of the lake or stream into which the water body flows	Flow_ID	Numeric (8)	
Flows Into - Water Body Name	Name of the water body into which the water body flows	Flow_Name	Character (40)	
Flows Into - Drainage Codes	The receiving water body's drainage unit codes	Flow_Drnge	Character (17)	Appendix A

WATER BODY COMPLEXES

The ***Water Body Complexes*** table (watercmp.dbf) maintains a list of water body complexes. At this point it only includes lake complexes where multiple lakes have been assigned the same official name. For instance, Twin Lakes refers to two lakes, that are individually recorded within the water inventory.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Body Complex ID	Unique number of the water body complex	Cmplx_ID	Numeric (4)	
Water Body Complex Name	Name of the water body complex	Cmplx_Name	Character (55)	
Water Complex Type	Code representing the type of complex - lake or wetland	Cmplx_Type	Character (4)	Code Table 5
Drainage Codes	Drainage system codes representing the drainage unit in which the complex belongs	Drainge_Cd	Character (17)	Appendix A

LAKE ATTRIBUTES

The ***Lake Attributes*** table (lake-att.dbf) maintains additional hydrological attributes specific to lakes which were acquired during the inventory process or determined through field surveys.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Body ID	Unique number representing a lake	Water_ID	Numeric (8)	
Water Body Name	Name of the lake	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit in which the lake belongs	Drainge_Cd	Character (17)	Appendix A
County	Name of county in which the water body is located	County	Character (20)	
Parish	Name of the parish in which the lake is located	Parish	Character (30)	
Lake Classification	Lake classification - oligotrophic, mesotrophic, eutrophic, or mesotrophic	Lake_Class	Character (15)	
Surface Area (m^2)	Area of the lake as determined by GIS, measured in square meters	Area_m2	Numeric (10.1)	
Surface Area (ha)	Area of the lake as determined by GIS, measured in hectares	Area_ha	Numeric (10.1)	
Surface Area (acres)	Area of the lake as determined by GIS, measured in acres	Area_Acres	Numeric (8.1)	
Lake Perimeter (m)	Perimeter of the lake as determined by GIS, measured in meters	Perimtr_m	Numeric (10.1)	
Lake Perimeter (ft)	Perimeter of the lake as determined by GIS, measured in feet	Perimtr_ft	Numeric (10.1)	
Shoreline - Crown (Plan)	Length of the lake's shoreline(feet) owned by the Crown. Measured with a map wheel using 1:50,000 scale maps and 40 chain Grant Reference Plans	Shore_Crwn	Numeric (7)	
Shoreline - Private (Plan)	Length of the lake's shoreline(feet) which is privately owned. Measured with a map wheel using 1:50,000 scale maps and 40 chain Grant Reference Plans	Shore_Priv	Numeric (7)	
Total Shoreline (Plan)	Total length of the lake's shoreline (feet) measured with a map wheel using 1:50,000 scale maps and 40 chain Grant Reference Plans	Shore_Tot	Numeric (7)	
Depth - Maximum	Maximum depth of lake if known	Depth_Max	Numeric (6.1)	
Depth - Mean	Mean depth of lake if known	Depth_Mean	Numeric (6.1)	
Stratified Indicator	Indicates whether lake is thermally stratified during summer months	Stratified	Character (2)	Y = Yes Blank = No
Percent of Lake <6 m deep	Percent of lake less than 6m (20 ft) deep	Depth_LT20	Numeric (3)	
Percent of Lake <3 m deep	Percent of lake less than 3m (10 ft) deep	Depth_LT10	Numeric (3)	

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Volume	Volume of lake if known. Measured in m^3	Volume_m3	Numeric (12)	
Acre Feet	Surface area multiplied by mean depth	Acre_Feet	Numeric (7)	
Morphoedaphic Index (MEI)	Productivity index derived from total dissolved solids ÷ mean depth	MEI	Numeric (6.2)	
Potential Yield	Annual yield (lbs/acre) derived from $2\sqrt{MEI}$	Pot_Prod	Numeric (6.2)	
Productivity Index	Productivity index developed by DNRE	Wch_Ndx	Numeric (11.1)	
Salmon Index	Productivity index for landlocked salmon	Salmon_Ndx	Numeric (11.1)	
Togue Index	Productivity index for lake trout	Togue_Ndx	Numeric (11.1)	
Total Productivity	Total lake productivity	Tot_Prod	Numeric (11.1)	
Shore Development Index	A quantitative expression describing the configuration of the shoreline and an indicator of lake productivity SDI = Shoreline Length ÷ $2\sqrt{\pi * Area}$	Shore_Dev	Numeric (11.1)	

STREAM ATTRIBUTES

The ***Stream Attributes*** table (strm-att.dbf) maintains additional hydrological attributes, specific to streams, acquired during the inventory process.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Body ID	Unique number representing the stream	Water_ID	Numeric (8)	
Water Body Name	Name of the stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit in which the stream belongs	Drainge_Cd	Character (17)	Appendix A
Stream Length - GIS	Length of the stream determined through GIS, measured in meters	Length_m	Numeric (10.1)	
Highest Stream Order	Indicates the highest stream order within the stream	High_Order	Numeric (2)	
Intermittent Stream Indicator	Indicates whether SNB identified the stream as completely intermittent	Interm_Ind	Character (1)	Y = Yes Blank = No
Tidal Influence Indicator	Indicates whether the stream has tidal influence, i.e. flows directly into salt water or flows into the tidal area of another stream (as identified by SNB)	Tidal_Ind	Character (1)	Y = Yes Blank = No

SPATIAL DATA FILES

SNB'S HYDROGRAPHIC LINEAR DATA

Service New Brunswick's ***Hydrographic Spatial Data*** (waline) includes information on each line segment within the hydrographic data. Features do not exist as individual lakes or streams, but a series of lines. Each line segment has a length, several internal numbers and ID's, hydrographic feature code, and SNB's assigned index key to uniquely identify the segment. The provincial data set exists in 1890 ArcInfo covers.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
From Node No.	Internal ID of the starting node -generated by GIS	FNode#		
To Node No.	Internal ID of the ending node -generated by GIS	TNode#		
Left Polygon No.	Internal ID of the polygon on the left -generated by GIS	LPoly#		
Right Polygon No.	Internal ID of the polygon on the right -generated by GIS	RPoly#		
Arc Length	Length of the segment or arc. Measured in meters	Length		
Arc No.	Internal ID of line segment or arc - generated by GIS	Waline#		
Arc ID	User defined ID or can be generated by GIS	Waline-ID		
Record No.	SNB assigned number	Recno		
User Number	Same as Theme Number (below)	UserNum		
Hydrographic Feature Code	Type of hydrographic feature	FCode		
Data Type	Unknown	DataType		
Description Flags	Unknown	DescFlags		
Theme Number	Identifier for the theme containing the hydrographic data. Hydrographic data is contained in theme 300 and 310	ThemeNum		
SNB's Arc ID	Unique identifier for the line segment. Assigned by SNB	IndexKey		

MERGED HYDROGRAPHIC SPATIAL FILES

The ***Merged Hydrographic Spatial Files*** (basin name, such as miramichi) have the same data structure as single tile files described above. These files exist as ArcInfo covers only.

STREAM ROUTE SYSTEM FILES (Major Rivers)

The ***Stream Route Files*** (basin name.ratstrmroutes, e.g. miramichi.ratstrmroutes) were created for each basin and represent the major lakes and streams within the basin. Each file contains the route identifier, water ID, water body name and drainage codes. Approximately 1800 routes are created for the province. The route file references a route section file (e.g. miramichi.secstrmroutes) which maintains the list of line segments representing each stream route. The fields which link the two files are as follows: Section's RouteLink# links to Route's StrmRoutes#. To facilitate faster rendering of displays, the route systems also exist as ArcView shape files.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Internal GIS Number	Sequence number of the route which links to the route section file. Assigned by the GIS.	StrmRoutes#	Numeric	
Stream Route ID	User assigned ID	StrmRoutes-ID	Numeric	
Water Body ID	Unique number representing the lake or stream - links the tabular data to the spatial data	Water_ID	Numeric (8)	
Water Body Name	Name of the water body	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit in which the body of water belongs	Drainge_Cd	Character (14)	Appendix A
Water Body Type	Type of water body - Lake or Stream	Water_Type	Character (4)	Code Table 2

WATER BODY ID POINT FILES

The ***Water Body ID Point Files*** (id##########) are ArcView shape files which place points adjacent water bodies so their ID's may be viewed or plotted. Longer streams will have several points to illustrate the path of the stream. There is one ID point file for each drainage unit, thus the file name is "id" + the 5 level drainage unit code.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons	Shape		
ID	Internal unique ID for each point. Assigned by ArcView	ID		
Drainage Codes	Drainage system codes representing the drainage unit in which the body of water belongs	Drainge_Cd	Character (14)	Appendix A
Water Body ID	Water body ID of the adjacent hydrographic feature	Water_ID	Numeric (8)	

WATER BODY NAME POINT FILES

The ***Water Body Name Point Files*** (name##########) are ArcView shape files which place points adjacent water bodies so their names may be viewed or plotted. The name includes the water body ID as well. There is one name point file for each drainage unit, thus the file name is "name" + the 5 level drainage unit code.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons	Shape		
ID	Internal unique ID for each point. Assigned by ArcView	ID		
Drainage Codes	Drainage system codes representing the drainage unit in which the body of water belongs	Drainge_Cd	Character (14)	Appendix A
Water Body ID	Water body ID of the adjacent hydrographic feature	Water_ID	Numeric (8)	
Water Body Name	Name of the adjacent water body, followed by the water body ID. The name is abbreviated when space is limited	Water_Name	Character (40)	

STREAM ORDER CHANGE POINT FILES

The ***Stream Order Change Point Files*** (ord##########) are ArcView shape files which place points along streams where stream order changes so this information may be viewed or plotted. There is one order point file for each drainage unit, thus the file name is "ord" + the 5 level drainage unit code.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons..	Shape		
ID	Internal unique ID for each point. Assigned by ArcView.	ID		
Drainage Codes	Drainage system codes representing the drainage unit in which the stream belongs	Drainge_Cd	Character (14)	Appendix A
Water Body ID	Water body ID of the stream whose order is changing	Water_ID	Numeric (8)	
Stream Order	Order of change	Strm_Order	Numeric (2)	

LAKE POLYGONS

The ***Lake Polygon File*** (nb-lakes) is an ArcView shape file containing the polygons of inventoried lakes. . This layer was derived from Service New Brunswick's hydrographic data.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons	Shape		
Area	Area of the lake as determined by the GIS	Area	Numeric (18.5)	
Perimeter	Perimeter of the lake as determined by the GIS	Perimeter	Numeric (18.5)	
Water Body ID	Water body ID of the lake	Water_ID	Numeric (8)	
Water Name	Name of the lake	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit in which the lake belongs	Drainge_Cd	Character (14)	Appendix A
Parish	Name of the parish in which the lake is located	Parish	Character (40)	

RIVER POLYGONS

The ***River Polygon File*** (nb-rivers) is an ArcView shape file containing the polygons of portions of streams coded as double line streams. Water ID's have not been assigned to the polygons. This layer was derived from Service New Brunswick's hydrographic data.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons	Shape		
Area	Area of the double line stream polygon as determined by the GIS	Area	Numeric (18.5)	
Perimeter	Perimeter of the double line stream polygon as determined by the GIS	Perimeter	Numeric (18.5)	
Index Key	Identifier assigned by Service New Brunswick	Key	Character (10)	
Hydrographic Feature Code	Type of hydrographic feature - double line river or island	Fcode	Character (12)	
Internal ID	Another ID assigned by Service New Brunswick	ID	Numeric (11)	

COASTAL POLYGONS

The ***Coastal Polygon File*** (nb-coastline) is an ArcView shape file containing the polygons of portions of streams coded as estuaries, plus ocean waters. This layer was derived from Service New Brunswick's hydrographic data.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Shape	Internal reference used by ArcView to denote the type of shape file - points, lines or polygons	Shape		
Area	Area of the coastal polygon as determined by the GIS	Area	Numeric (18.5)	
Perimeter	Perimeter of the coastal polygon as determined by the GIS	Perimeter	Numeric (18.5)	
Index Key	Identifier assigned by Service New Brunswick	Key	Character (10)	
Hydrographic Feature Code	Type of hydrographic feature - coastal or coastal island	Fcode	Character (12)	
Internal ID	Another ID assigned by Service New Brunswick	ID	Numeric (11)	

DAMS / FALLS / RAPIDS FEATURES

The ***Dams / Falls / Rapids File*** (dams-etc) is an ArcView shape file containing line features representing dams (active and inactive), falls, rapids, fish ladders and flumes. These features were interpreted during the creation of Service New Brunswick's hydrographic layer (early 1980's) and may require ground-truthing.

Element Name	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Internal ID	Internal ID assigned by Service New Brunswick	Recno	Numeric (12)	
Hydrographic Feature	Type of hydrographic feature - dams, inactive dam, rapids, falls, fish ladder, or flume	Fcode	Character (20)	