CHAPTER 12

WATER QUALITY: TEMPERATURES

A program of continuous monitoring of stream water temperatures was established in 1997 for many streams of the Miramichi drainage by Fisheries and Oceans Canada in cooperation with various private and freehold land owners. Thermistors are instruments used to measure and record water temperatures, generally on an hourly basis for several months at a time. The data is subsequently downloaded from the thermistor after removal, usually in late fall. The data are analyzed to determine if water temperatures for individual streams are reaching lethal or dangerous levels for Atlantic salmon, and to identify vulnerable streams that should be managed accordingly for fisheries.

In addition to this cooperative program, private industries are installing thermistors and/or taking daily temperatures with a simple handheld thermometer to monitor stream temperatures at certain times of the year or at specific locations in a stream.

DATA SOURCES

Water temperature data were obtained from several sources including: NB Department of Natural Resources & Energy, Fisheries and Oceans Canada, the forest industry, and conservation groups.

POSITIONAL ACCURACY

The positional accuracy of the hydrographic spatial data is ±1.5m to ±2.5m. Refer to **NBGIC's Land and Water Standards Manual** for further details. The positional accuracy of temperature monitor sites is based on textual descriptions of locations.

DATA FILES

Tabular Data
There are two data tables within water temperatures. The first maintains general information on the thermistor sites, and the second table contains summaries of the temperature data collected from each site. The original recorder data is available, but not maintained within the data warehouse.

- **Thermistor Sites** - Maintains general information on each site, including the locational data for referencing within GIS.

- **Water Temperatures** - Contains dates and times of temperature measurements, average, maximum and minimum daily temperatures and method of data collection (thermistor or hand held thermometer).

Spatial Data
An ArcView point coverage shape file was created for thermistor sites.

TABULAR DATA FILES

WATER TEMPERATURE MONITORING SITES

The ***Water Temperature Monitoring Sites*** table (thrmsite.dbf) maintains data on the sites where thermistors have been installed or where temperatures have been regularly measured with handheld thermometers. Each site has been assigned a unique ID in addition to the site ID number assigned by the agency.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Temperature Site ID	Unique number representing a water temperature monitoring site. Assigned by the Data Warehouse	ThrmSiteID	Numeric (6)	
Water Body ID	Unique identifier of stream	Water_ID	Numeric (8)	
Water Body Name	Name of stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the drainage unit of stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group measuring water temperatures	Agency_Cd	Character (4)	Code Table 6
Agency's Site No.	Site identifier used by the agency	Ag_Site_ID	Character (10)	
Site Description	Description of where the temperature monitoring site is located	Site_Des	Character (150)	
Habitat Unit No.	Unique number representing an individual habitat unit based on stream habitat survey. Assigned by the Data Warehouse	HabUnit_ID	Numeric (10)	
Stream Type Description	Description of stream type	StrTyp_Des	Character (24)	Code Table 7
Year Started	First year temperature data collected at the site	Start_Yr	Character (4)	
Year Ended	Last year temperature data collected at the site	End_Yr	Character (4)	

WATER TEMPERATURES

The ***Water Temperatures*** table (water-temp.dbf) contains temperature data summarized from thermistor recordings or actual data from handheld thermometer measurements.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Temperature Site ID	Unique number representing a water temperature monitoring site. Assigned by the Data Warehouse	ThrmSiteID	Numeric (6)	
Water Body ID	Unique identifier of stream	Water_ID	Numeric (8)	
Water Body Name	Name of stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the watershed of stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group measuring water temperatures	Agency_Cd	Character (4)	Code Table 6
Agency's Site No.	Site identifier used by the agency	Ag_Site_ID	Character (6)	
Date Surveyed	Date of survey - YYYY.MM.DD	Assmt_Date	Character (10)	
Time of Measurement	Time of day when measurement was taken. Based on 24 hour clock	Assmt_Time	Character (4)	
Weather Conditions	General weather conditions observed when measurement was taken	Weather	Character (50)	
Stream Type Description	Description of stream type	StrTyp_Des	Character (24)	Code Table 7
Method Used	Method used to measure water temperature (e.g. thermistor, handheld thermometer)	Method	Character (30)	
Average Temperature	Average daily water temperature, from thermistor data (ºC)	Ave_Temp_ºC	Numeric (5.1)	
Minimum Temperature	Minimum daily water temperature, from thermistor data (ºC)	Min_Temp_ºC	Numeric (5.1)	
Maximum Temperature	Maximum daily water temperature, from thermistor data (ºC)	Max_Temp_ºC	Numeric (5.1)	
Water Temperature	Actual water temperature, from thermometer data (ºC)	Water_Temp_ºC	Numeric (5.2)	
Air Temperature	Ambient air temperature measured in ºF	Air_Temp_ºF	Numeric (5.1)	
Water Level	Water level measured in centimeters	Water_Lvl_cm	Numeric (6.1)	

SPATIAL DATA FILES

WATER TEMPERATURE MONITORING POINTS

The ***Water Temperature Monitoring Points*** spatial file (thermistor-sites.shp) is a point coverage representing the monitoring sites of water temperature surveys.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Internal ID	Internal ID generated by GIS to uniquely identify each point	ID	Numeric (8)	
Water Temperature Site ID	Unique number representing a water temperature monitoring site. Assigned by the Data Warehouse	ThrmSiteID	Numeric (4)	
Agency Code	Code for agency who collected the data	Agency_Cd	Character (4)	
Agency's Site No.	Site identifier used by the agency	Ag_Site_ID	Character (10)	
Water Body ID	Unique number of the surveyed lake or stream	Water_ID	Numeric (8)	
Water Name	Name of surveyed lake or stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit of the surveyed lake or stream.	Drainge_Cd	Character (17)	Appendix A