

CHAPTER 8

HABITAT ASSESSMENTS: STREAMS

Past stream surveys performed by Fisheries and Oceans Canada and the New Brunswick Department of Natural Resources and Energy used a variety of methodologies. The primary objective was to assess juvenile salmonid (especially Atlantic salmon) habitat.

The New Brunswick Department of Natural Resources recorded stream habitat information within specific lengths or reaches of streams. The stream sections varied in length, ranging from 200 meters to 22 kilometers. Within each section, general characteristics are recorded, such as topography, forest cover type, and shore use, plus the lengths and widths of riffles, pools and dead water. The types of habitat area within each stream section have since been summarized. While this information is used for relative management purposes, a more detailed approach was required for assigning and summarizing site specific habitat variables to exact locations.

A revised stream assessment methodology was developed in 1993 by the New Brunswick Department of Natural Resources and Energy and Fisheries and Oceans Canada. The purpose of the survey is to describe in detail each habitat unit within a stream or stream reach. Rather than describing the habitat within a predefined length as in the older methodology, the descriptions apply to individual variable length habitat units. A habitat unit is determined by the geomorphology of the stream which is expressed as twenty-three stream types. The stream types fall into one of five categories: riffles, runs, pools, rapids, or other (e.g. chutes, falls).

Stream surveys are performed during base summer flows and include a detailed assessment of the stream's fish habitat features. Beginning at

an available access point, each consecutive habitat unit is measured and the following information is recorded:

- , Stream Type
- , Dimensions (length, channel width, & depth)
- , Substrate Composition
- , Undercut Banks
- , Overhanging Vegetation
- , Woody Debris
- , Water Temperatures & Flows
- , Substrate Embeddedness
- , Shore Vegetation
- , Bank Stability
- , Coded Features (e.g. beaver dam, bank erosion, road crossing, etc.)

Where possible, reconnaissance surveys are performed at accessible locations prior to detailed stream surveys. The objective is to obtain an overview of the stream's main stem and tributary variability with respect to channel width, flows, water chemistry (pH, total phosphorous, calcium, total hardness and alkalinity), afternoon (maximum) water temperature, and substrate embeddedness. Embeddedness is measured by observing the percentage of large substrate covered by fines. Sedimentation rates of a stream can also be determined by installing modified Whitlock-Vibert boxes for several months, then measuring the amount and size of fine sediments accumulated. Reconnaissance information can help prioritize stream sections requiring detailed stream habitat assessments or identify sections which should be assessed for major limiting factors, such as high temperatures or excessive substrate embeddedness.

Please refer to New Brunswick Department of Natural Resources and Energy's **Stream Habitat Assessment Methodology Manual** for further details. The Department also developed computer applications which generate seventeen reports summarizing stream habitat data (Fishstream I) and five reports which estimate fish production potential (Fishstream II).

Water chemistry data for an individual stream can be collected by different agencies, but generally the same basic parameters are analysed. To facilitate convenient access to this information, all lab analysed water chemistry data is maintained in one data set. Please refer to the Chapter 10 **Water Quality: Chemistry** for lab chemistry data associated with stream assessments.

Stream survey information has been incorporated within GIS and can be viewed in a variety of ways. Examples include general stream types (riffles, runs, pools and rapids), mean pool depths, and substrate characteristics.

DATA SOURCES

Stream survey data is obtained from the New Brunswick Department of Natural Resources and Energy, Bowater Pulp and Paper Canada Inc., J.D. Irving Limited, and community watershed groups. The majority of the stream assessment data was collected by community groups during the mid-1990's through funding from the Canada/New Brunswick Recreational Fisheries Agreement and with direction from the New Brunswick Department of Natural Resources and Energy.

POSITIONAL ACCURACY

The positional accuracy of the hydrographic spatial data is $\pm 1.5\text{m}$ to $\pm 2.5\text{m}$. Refer to **SNB's Land and Water Standards Manual** for further details.

Reconnaissance and vibert box sites are derived from textual descriptions of the locations. Stream

habitat units are based on the starting point of the stream survey, and the lengths of each subsequent habitat unit. In most cases, the starting point is determined from textual descriptions. Occasionally, the field measurements are significantly longer or shorter ($> 10\%$) than the GIS stream lengths. The individual habitat unit lengths are then calibrated using the following formula:

$$\text{calibrated length} = \frac{\text{unit length}}{\text{surveyed length}} \times \text{route length}$$

DATA FILES

Tabular Data

There are seven data tables within stream habitat assessments, four relating to New Brunswick Department of Natural Resources and Energy's standard stream habitat survey. The primary table contains all the data collected in the field. There are three auxiliary tables which contain data copied from the primary habitat table to facilitate presentation of the data. One table contains water temperatures and/or flows of the survey stream, tributaries or incoming springs. Another auxiliary table contains a record for each comment code used in the comment field since the comment codes represent pertinent information, such as active beaver dams. The last auxiliary table lists the streams that have been surveyed.

There is also a table for stream habitat reconnaissance surveys and another for summary data from an older stream survey methodology (pre-1993). Finally, there is a table containing results of Whitlock-Vibert box sedimentation analyses.

- , **Stream Habitat Units** - Describes each habitat unit within the surveyed stream as collected using the revised survey form.
- , **Stream Habitat Comments** - Auxiliary file of translated comment codes assigned to the various habitat units.

, **Stream Water Temperatures** - Auxiliary file of any water temperature or flow measurements taken during the stream survey.

, **Streams with Habitat Surveys** - Lists the streams with habitat surveys with references to the start and end points for displaying within GIS.

, **Stream Habitat Summary: Old Format** - Provides summary information on each section of surveyed stream. Includes length, area, riffle area and non-riffle area.

, **Stream Habitat Reconnaissance Survey** - Contains data collected during reconnaissance surveys based on survey form.

, **Sedimentation Analysis** - Contains in-field and laboratory measurements of sedimentation (Whitlock-Vibert box) surveys.

Spatial Data

No new spatial files were created in association with the standard stream habitat survey. Stream habitat assessment data collected by the newer revised form are mapped through Route System files and dynamic segmentation

At this time, older format habitat data is linked to the entire stream and not at specific stream sections.

Point coverages (ArcView shapefiles) were created for reconnaissance and sedimentation surveys.

Note

Please refer to the following chapters for additional information on streams:

Water Quality: Chemistry
Fish Population Estimates: Streams

**TABULAR
DATA
FILES**

STREAM HABITAT UNITS

The *Stream Habitat Units* table (habitat.dbf) identifies the habitat units within a stream as determined during a stream survey. Streams may be completely or partially surveyed. The habitat units table consists of the columns of information found on the DNRE/DFO standardized stream survey form with each record representing an individual habitat unit. Several new fields of information have been added, however, to facilitate summarization of the data. In addition, each habitat unit has been assigned a unique ID. The original habitat unit number assigned at the time of the survey is also maintained for referencing the paper form when necessary.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Habitat Unit ID	Unique number representing an individual habitat unit. Assigned by the Data Warehouse	HabUnit_ID	Numeric (10)	
River System ID	A number assigned to a collection of streams within the same drainage unit to be displayed together in the Data Warehouse system	River_Sys	Numeric (4)	See hab-streams.dbf
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the drainage unit of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	Agency_Cd	Character (4)	Code Table 6
Personnel	Initials or names of individuals performing the survey	Personnel	Character (20)	
Start Point	Description of starting point of section being surveyed	StartPoint	Character (50)	
End Point	Description of stream section where survey ends	EndPoint	Character (50)	
From Measure	FOR GIS PURPOSES. Starting point along the stream route where the habitat unit begins. Measurement in meters	From_Meas	Numeric (12.2)	
To Measure	FOR GIS PURPOSES. End location along the stream route where the habitat unit ends. Equals From Measure + Unit Length. Measurement in meters	To_Meas	Numeric (12.2)	
Calibrated Unit Length	A calibrated unit length calculated for plotting when the stream survey data is significantly ($\pm 10\%$ or more) different than the stream route length covering the same stretch	Calib_Len	Numeric (7.2)	
Date Surveyed	Date of survey - YYYY.MM.DD	Assmt_Date	Character (10)	
Order No.	Order of stream where habitat unit occurs	Order_No	Numeric (2)	

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Reach No.	Reach number as indicated on the survey form. Generally refers to a stretch of stream surveyed during a given time period. Has no standard meaning, but maintained for cross referencing data sheets	Reach_No	Numeric (2)	
Habitat Unit No.	Sequential habitat unit number assigned at the time of survey. Useful for cross referencing data sheets	Unit_No	Character (3)	
Stream Type Code	Numeric code representing the geomorphic description of the habitat unit	StrTyp_Cd	Character (2)	Code Table 7
Stream Type Description	Description of stream type	StrTyp_Des	Character (24)	
Stream Type Group	Category of stream type - riffle, run, pool, rapid or other	StrTyp_Grp	Character (10)	
Channel Type Code	Numeric code representing the type of stream channel	Chann_Cd	Character (1)	Code Table 8
Channel Type Description	Description of channel type	Chann_Type	Character (6)	
Channel Position	Position of main or side channel if left, right or middle	Chann_Pos	Character (1)	L = Left R = Right M = Middle
Length (m)	Length of the habitat unit measured in meters	Unit_Len	Numeric (7.2)	
Width - Wet (m)	Average width (meters) of the channel that is currently wet	Wet_Width	Numeric (5.2)	
Width - Channel (m)	Average width (meters) of the channel at high water	Bank_Width	Numeric (5.2)	
Unit Area (m ²)	Area of the habitat unit measured in m ²	Unit_Area	Numeric (10.2)	Calculated field
Substrate - Bedrock	Percent of substrate composed of bedrock	Bedrock	Numeric (3)	0-100%
Substrate - Boulder	Percent of substrate composed of boulder	Boulder	Numeric (3)	0-100%
Substrate - Rock	Percent of substrate composed of rock	Rock	Numeric (3)	0-100%
Substrate - Rubble	Percent of substrate composed of rubble	Rubble	Numeric (3)	0-100%
Substrate - Gravel	Percent of substrate composed of gravel	Gravel	Numeric (3)	0-100%
Substrate - Sand	Percent of substrate composed of sand	Sand	Numeric (3)	0-100%
Substrate - Fines	Percent of substrate composed of fines	Fines	Numeric (3)	0-100%
Large Substrate	Percent of large substrate types - rock + boulder+ bedrock	Lg_Substr	Numeric (3)	0 - 100%
Depth (cm)	Average depth of channel measured in centimeters	Unit_Depth	Numeric (4)	

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Undercut Bank - Left	Percent of left bank length which is undercut	Und_Bank_L	Numeric (3)	0 - 100%
Undercut Bank - Right	Percent of right bank length which is undercut	Und_Bank_R	Numeric (3)	0 - 100%
Total Undercut Banks	Total percent of unit length (left + right) with undercut banks	Tot_Und_Bk	Numeric (3)	0 - 100%
Overhanging Vegetation - Left	Percent of stream width shaded overhanging vegetation on left bank	Over_Veg_L	Numeric (3)	0 - 50%
Overhanging Vegetation - Right	Percent of stream width shaded overhanging vegetation on right bank	Over_Veg_R	Numeric (3)	0 - 50%
Total Overhanging Vegetation	Total percent of stream width shaded by overhanging vegetation from both banks	Tot_Veg	Numeric (3)	0 - 100%
Woody Debris (m)	Total length (meters) of woody debris greater than 10 cm in diameter	Debris_Len	Numeric (6)	
Woody Debris per 100 m ² of Area	Length of woody debris (m) per 100 m ² of habitat area	Debris_100	Numeric (6.2)	
Water Temp - Water Source Code	Numeric code indicating the source of water being measured	Water_Cd	Character (1)	Code Table 10
Water Temp - Water Source Description	Description of water source	Water_Src	Character (14)	
Water Temp - Flow (cms)	Flow of water source measured in cubic meters per second	Water_Flow	Numeric (6.4)	
Water Temp - Time of Day	Time of day when water temperature or flow is measured	Assmt_Time	Character (5)	
Water Temperature	Water temperature measured in °C	Water_Temp	Numeric (5.2)	
Air Temperature	Ambient air temperature measured in °C	Air_Temp	Numeric (5.2)	
Embeddedness Code	Numeric code representing the extent of embeddedness	Embed_Cd	Character (1)	Code Table 11
Embeddedness Description	Description of embeddedness as a percentage range	Embedded	Character (10)	
Comment Codes	String of comment codes as per survey sheet. A comment code represents a feature such as a road crossing, active beaver dam, or cottage present	Comment_Cd	Character (150)	Code Table 12
Percent Shade	Percent shade	Shade	Numeric (3)	0 - 100%
Vegetation - Bare	Percent of stream bank which has no vegetation	Veg_Bare	Numeric (3)	0 - 100%

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Vegetation - Grass`	Percent of stream bank vegetation which is grassy	Veg_Grass	Numeric (3)	0 - 100%
Vegetation - Shrubs`	Percent of stream bank vegetation composed of shrubs	Veg_Shrub	Numeric (3)	0 - 100%
Vegetation - Trees`	Percent of stream bank vegetation composed of trees	Veg_Trees	Numeric (3)	0 - 100%
Left Bank - Stable`	Percent of left bank which is stable	Stable_L	Numeric (3)	0 - 100%
Left Bank - Barely Stable`	Percent of left bank which is barely stable	BareStbl_L	Numeric (3)	0 - 100%
Left Bank - Eroding`	Percent of left bank which is eroding	Eroding_L	Numeric (3)	0 - 100%
Right Bank - Stable`	Percent of right bank which is stable	Stable_R	Numeric (3)	0 - 100%
Right Bank - Barely Stable`	Percent of right bank which is barely stable	BareStbl_R	Numeric (3)	0 - 100%
Right Bank - Eroding`	Percent of right bank which is eroding	Eroding_R	Numeric (3)	0 - 100%
Field Notes	Descriptive free form text or general comments (not comment codes)	FieldNotes	Character (250)	

` This portion of the survey is optional data and not always recorded.

STREAM TEMPERATURES

The *Stream Temperatures* table (hab-temp.dbf) contains water temperature and flow data copied from the Stream Habitat Units table. Multiple temperatures may be recorded within a given habitat unit. For instance, the temperature of the surveyed stream may be recorded along with the temperature of a spring water source. Additional water temperatures are often recorded in the comment field. To facilitate querying and presenting temperature information, this data has been copied into the Stream Temperatures table where each record represents one water temperature and/or water flow measurement taken within a habitat unit. In addition, during the conversion process, any water flow measurements, usually measured in cubic metres per second, are translated into litres/min and gal/min. In many cases there are not measurements for both temperature and flow.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Habitat Unit ID	Habitat Unit ID to which water temperature or flow data is associated	HabUnit_ID	Numeric (10)	
River System ID	A number assigned to a collection of streams within the same drainage unit to be displayed together in the Data Warehouse system	River_Sys	Numeric (4)	See hab-streams.dbf
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the watershed of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	Agency_Cd	Character (4)	Code Table 6
Point Measure	FOR GIS PURPOSES. Water temperature or flow measurement is represented as a point along the stream route. Actually the "From Measure" or starting point of the habitat unit	Point_Meas	Numeric (12.2)	
Date Surveyed	Date of the stream was surveyed (YYYY.MM.DD)	Assmt_Date	Character (10)	
Order No.	Order of stream where habitat unit occurs	Order_No	Numeric (2)	
Reach No.	Reach number as indicated on the survey form. Generally refers to a stretch of stream surveyed during a given time period. Has no standard meaning, but maintained for cross referencing data sheets	Reach_No	Numeric (2)	
Habitat Unit No.	Sequential habitat unit number assigned at the time of survey. Useful for cross referencing data sheets	Unit_No	Character (3)	
Stream Type Code	Numeric code representing the geomorphic description of the habitat unit	StrTyp_Cd	Character (2)	Code Table 7
Stream Type Description	Description of the stream type	StrTyp_Des	Character (24)	
Water Source Code	Numeric code indicating the source of water being measured	Water_Cd	Character (1)	Code Table 10

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Source Description	Description of water source	Water_Src	Character (14)	
Time of Day	Time of day when water temperature or flow is measured	Assmt_Time	Character (5)	
Water Temperature	Water temperature measured in °C	Water_Temp	Numeric (5.2)	
Air Temperature	Ambient air temperature measured in °C	Air_Temp	Numeric (5.2)	
Water Flow (cms)	Flow of water source (measured in cubic meters per second)	Flow_cms	Numeric (6.4)	
Water Flow (gpm)	Flow of water source (measured in gallons per minute)	Flow_gpm	Numeric (10.2)	
Water Flow (lpm)	Flow of water source (measured in litres per minute)	Flow_lpm	Numeric (10.2)	

STREAM HABITAT COMMENTS

The *Stream Habitat Unit Comments* table (hab-cmmt.dbf) contains comment data copied from the Stream Habitat Units table. Comment data is originally recorded as a string of codes making it difficult to query or present this data. Each record in the Stream Habitat Unit Comments table represents a single comment code associated with a particular habitat unit. For a given habitat unit, there may be multiple records representing different comment codes.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Habitat Unit ID	Unique number representing an individual habitat unit. Assigned by the Data Warehouse	HabUnit_ID	Numeric (10)	
River System ID	A number assigned to a collection of streams within the same drainage unit to be displayed together in the Data Warehouse system	River_Sys	Numeric (4)	See hab-streams.dbf
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the watershed of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	Agency_Cd	Character (4)	Code Table 6
Date Surveyed	Date of survey - YYYY.MM.DD	Assmt_Date	Character (10)	
Order No.	Order of stream where habitat unit occurs	Order_No	Numeric (2)	
Reach No.	Reach number as indicated on the survey form. Generally refers to a stretch of stream surveyed during a given time period	Reach_No	Numeric (2)	
Habitat Unit No.	Sequential habitat unit number assigned at the time of survey. Useful for cross referencing data sheets	Unit_No	Character (3)	
From Measure	FOR GIS PURPOSES. Starting point along the stream route where the habitat unit begins. Measurement in meters	From_Meas	Numeric (12.2)	
To Measure	FOR GIS PURPOSES. End location along the stream route where the habitat unit ends. Equals From Measure + Unit Length. Measurement in meters	To_Meas	Numeric (12.2)	
Stream Type Code	Numeric code representing the geomorphic description of the habitat unit	StrTyp_Cd	Character (2)	Code Table 7
Stream Type Description	Description of the stream type	StrTyp_Des	Character (20)	
Comment Code	Numeric comment code	Comment_Cd	Character (3)	Code Table 12

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Comment Description	Description of comment code	Comment	Character (30)	

SURVEYED STREAMS

The *Surveyed Streams* table (stream-w-surveys.dbf) maintains a list of all streams surveyed for habitat using the new (post-1993) methodology. Start and end points of the surveyed stretches are documented for displaying the data within GIS. Each record in the Surveyed Streams table represents one surveyed stream.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
River System ID	A number assigned to a collection of streams within the same drainage unit to be displayed together in the Data Warehouse system	River_Sys	Numeric (4)	
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the watershed of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Start Point	Description of starting point of section being surveyed	StartPoint	Character (50)	
End Point	Description of stream section where survey ends	EndPoint	Character (50)	
From Measure	FOR GIS PURPOSES. Starting point along the stream route where the habitat unit begins. Measurement in metres	From_Meas	Numeric (12.2)	
To Measure	FOR GIS PURPOSES. End location along the stream route where the habitat unit ends. Equals From Measure + Unit Length. Measurement in metres	To_Meas	Numeric (12.2)	

SUMMARIZED STREAM HABITAT: OLD FORMAT

The *Summarized Stream Habitat: Old Format* table (habitat-old.dbf) contains summarized information gathered by the New Brunswick Department of Natural Resources using their older stream survey form. The data is summarized for each stream section, which has variable length ranging from 200 m to 80 kilometers.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the watershed of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	Agency_Cd	Character (4)	Code Table 6
Section No.	Unique identifier assigned to each stream section	Sect_No	Numeric (4)	
Section Description	Textual description of the start and end of the stream section	Sect_Des	Character (50)	
Section Length	Length of the surveyed section measured in meters	Sect_Len	Numeric (8.1)	
Section Width	Average width of the surveyed section measured in meters	Sect_Width	Numeric (5.1)	
Total Area (m ²)	Total area of the surveyed stretch measured in m ²	Sect_Area	Numeric (10.1)	
Productive Area (m ²)	Total area of productive (riffle) habitat within the surveyed stretch measured in m ²	Prod_Area	Numeric (10.1)	
Non-Productive Area (m ²)	Total area of non-productive (non-riffle) types of habitat within the surveyed stretch measured in m ²	NProd_Area	Numeric (10.1)	
Good Riffle Area	Portion of the total productive (riffle) area within the surveyed stretch considered good habitat	Good_Area	Numeric (10.1)	
Fair Riffle Area	Portion of the total productive (riffle) area within the surveyed stretch considered fair habitat	Fair_Area	Numeric (10.1)	
Poor Riffle Area	Portion of the total productive (riffle) area within the surveyed stretch considered poor habitat	Poor_Area	Numeric (10.1)	
Field Notes	Descriptive free form text or general comments	FieldNotes	Character (150)	

STREAM HABITAT RECONNAISSANCE SURVEY

The *Stream Habitat Reconnaissance Survey* table (reconn.dbf) contains results of stream habitat reconnaissance surveys. The survey sites are normally visited only once to obtain an overview of a stream's physical and chemical characteristics before it receives a complete stream habitat survey. Each record in the Reconnaissance Survey table represents a survey at one site. The table consists of the columns of information found on the DNRE standardized stream habitat reconnaissance survey form with the exception of water chemistry data, which is stored in the Water Chemistry table (waterchm.dbf), Chapter 10 **Water Quality: Chemistry**.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Reconnaissance Site ID	Unique number representing a reconnaissance survey site. Assigned by the Data Warehouse	RcnSite_ID	Numeric (6)	
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the drainage unit of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	Agency_Cd	Character (4)	Code Table 6
Personnel	Initials or names of individuals performing the survey	Personnel	Character (20)	
Date Surveyed	Date of survey - format is YYYY.MM.DD	Assmt_Date	Character (10)	
Agency's Site No.	Site identifier used by the agency	Ag_Site_ID	Character (6)	
Site Description	Description of where the sampling site is located	Site_Des	Character (150)	
Reach No.	Reach number as designated by the stream habitat survey. Generally refers to a stretch of stream surveyed during a given time period. Has no standard meaning, but maintained for cross referencing data sheets	Reach_No	Numeric (2)	
Order No.	Order of stream where habitat unit occurs	Order_No	Numeric (2)	
Habitat Unit No.	Unique number representing an individual habitat unit. Assigned by the Data Warehouse	HabUnit_ID	Character (10)	
Stream Type Code	Numeric code representing the geomorphic description of the habitat unit	StrTyp_Cd	Character (2)	Code Table 7
Stream Type Description	Description of stream type	StrTyp_Des	Character (30)	
Width - Wet (m)	Average width (meters) of the channel that is currently wet	Wet_Width	Numeric (5.2)	

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Width - Channel (m)	Average width (meters) of the channel at high water	Bank_Width	Numeric (5.2)	
Substrate - Bedrock	Percent of substrate composed of bedrock	Bedrock	Numeric (3)	0-100%
Substrate - Boulder	Percent of substrate composed of boulder	Boulder	Numeric (3)	0-100%
Substrate - Rock	Percent of substrate composed of rock	Rock	Numeric (3)	0-100%
Substrate - Rubble	Percent of substrate composed of rubble	Rubble	Numeric (3)	0-100%
Substrate - Gravel	Percent of substrate composed of gravel	Gravel	Numeric (3)	0-100%
Substrate - Sand	Percent of substrate composed of sand	Sand	Numeric (3)	0-100%
Substrate - Fines	Percent of substrate composed of fines	Fines	Numeric (3)	0-100%
Embeddedness Code	Numeric code representing the extent of embeddedness	Embed_Cd	Character (1)	Code Table 11
Embeddedness Description	Description of embeddedness as a percentage range	Embedded	Character (10)	
Air Temperature	Ambient air temperature measured in °C	Air_Temp	Numeric (5.2)	
Water Temperature	Water temperature measured in °C	Water_Temp	Numeric (5.2)	
Time of Day	Time of day when water temperature or flow is measured	Assmt_Time	Character (4)	
Flow (cms)	Flow of water measured in cubic meters per second	Water_Flow	Numeric (6.4)	

SEDIMENTATION (WHITLOCK-VIBERT BOX) RESULTS

The *Sedimentation (W-V Box) Results* table (vibert.dbf) contains sedimentation data for various stream sites, usually reconnaissance survey sites or sites specifically chosen for assessing potential sedimentation problems (e.g. to compare sedimentation rates above and below bridges or confluences of tributaries). Each record represents one box and contains data including the weights and percentage compositions of different sizes of sediments captured by vibert boxes.

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Vibert Box Site ID	Unique number representing a vibert box site. Assigned by the Data Warehouse	VibSite_ID	Numeric (6)	
Water Body ID	Unique identifier of the surveyed stream	Water_ID	Numeric (8)	
Water Body Name	Name of the surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes indicating the drainage unit of the surveyed stream	Drainge_Cd	Character (17)	Appendix A
Agency Code	Code for agency or group performing the survey	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 sampling site is located	Site_Des	Character (150)	
Habitat Unit No.	Unique number representing the individual habitat unit determined by stream habitat survey. Assigned by the Data Warehouse	HabUnit_ID	Character (10)	
Stream Type Description	Description of stream type	StrTyp_Des	Character (30)	
Location in Unit	Description of where in the unit box was placed (e.g., tail of pool)	Location	Character (20)	
Placement Date	Date vibert box was placed in stream - YYYY.MM.DD	Place_Date	Character (10)	
Removal Date	Date vibert box was removed from stream - YYYY.MM.DD	Remov_Date	Character (10)	
Depth of Lid (cm)	Depth of box lid when installed in streambed, measured in cm	Lid_Depth	Numeric (5.1)	
Initial Wet Weight (g)	Initial wet weight of box before installation, measured in grams	Ini_Wet_Wt	Numeric (7.1)	
Final Wet Weight (g)	Final wet weight of box upon removal, measured in grams	Fin_Wet_Wt	Numeric (7.1)	
Net Wet Weight (g)	Net wet weight of box (Final - Initial) recorded in grams	Net_Wet_Wt	Numeric (7.1)	
Percent Wet Fines	Percentage of wet weight comprised of fines (material accumulated in the box after installation)	Pc_Wet_Fns	Numeric (5.1)	

Field of Information	Description	Dbase Field Name	Field Type (Length . Decimals)	Comments
Total Dry Weight (g)	Total dry weight of the box upon drying after removal, measured in grams	Tot_Dry_Wt	Numeric (7.1)	
Dry Weight of Box + Rocks (g)	Dry weight of vibert box and rocks (larger than box openings) placed in box before installation, measured in grams	Wt_Box_Rks	Numeric (7.1)	
Percent Dry Weight of Box + Rocks	Percentage of dry weight of vibert box and rocks (larger than box openings) placed in box before installation	Pc_Box_Rks	Numeric (5.1)	
Dry Weight of Fine Gravel (g)	Dry weight of fine gravel (> 2 mm) measured in grams	Wt_FineGrv	Numeric (6.1)	
Percent Dry Weight of Fine Gravel	Percentage of dry weight of fine gravel (> 2 mm) measured in grams	Pc_FineGrv	Numeric (5.1)	
Dry Weight of Sand (g)	Dry weight of sand (< 2 mm, > 0.85 mm) measured in grams	Wt_Sand	Character (6.1)	
Percent Dry Weight of Sand	Percentage of dry weight of sand (< 2 mm, > 0.85 mm)	Pc_Sand	Character (5.1)	
Dry Weight of Fines (g)	Dry weight of fines (< 0.85 mm) measured in grams	Wt_Fines	Numeric (6.1)	
Percent Dry Weight of Fines	Percentage of dry weight of fines (< 0.85 mm)	Pc_Fines	Numeric (5.1)	
Comments	General comments	Comments	Character (150)	

**SPATIAL
DATA
FILES**

STREAM HABITAT RECONNAISSANCE SURVEY POINTS

The *Stream Habitat Reconnaissance Survey Points* spatial file (reconn-sites.shp) is a point coverage representing the sites of reconnaissance 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)	
Reconnaissance Site ID	Unique number representing a reconnaissance survey site. Assigned by the Data Warehouse	RcnSite_ID	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 (6)	
Water Body ID	Unique number of the surveyed stream	Water_ID	Numeric (8)	
Water Name	Name of surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit of the surveyed stream.	Drainage_Cd	Character (17)	Appendix A

SEDIMENTATION (W-V BOX) SAMPLING POINTS

The *Sedimentation (Whitlock-Vibert Box) Sampling Points* spatial file (vibert-sites.shp) is a point coverage representing the sampling sites of sedimentation surveys using Whitlock-Vibert boxes.

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)	
Sedimentation Survey Site ID	Unique number representing a sedimentation survey site. Assigned by the Data Warehouse	VibSite_ID	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 stream	Water_ID	Numeric (8)	
Water Name	Name of surveyed stream	Water_Name	Character (40)	
Drainage Codes	Drainage system codes representing the drainage unit of the surveyed stream.	Drainage_Cd	Character (17)	Appendix A