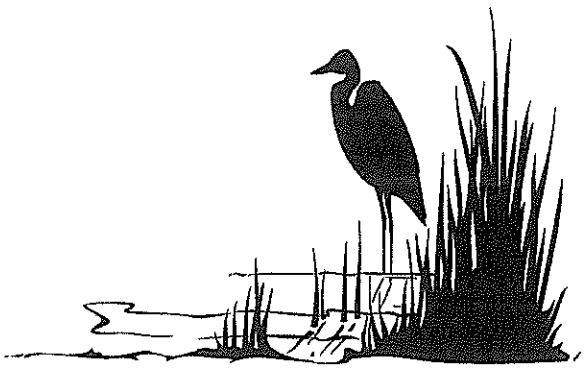
STREAM CROSSING INVENTORY PROJECT - '97



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1.0 INTRODUCTION

The destruction of our environment is often slow and insidious, rasher than rapid and highly visible. Over the years, people using forest access roads throughout the province have carelessly dumped refuse and other waste upon the land and in the water systems. Also, over the years many of these access roads have been exposed to erosion and degradation surrounding the numerous stream crossings. This can eventually cumulate in what may be irreversible damage to long standing ecosystems, and to the balanced cycles of nature. Companies and organizations are awakening to find such examples of neglect and are realizing that the damage be assumed as a starting point to correcting the ever increasing problem. Because of these concerns the ***Stream Crossing Inventory Project*** was established.

2.0 OVERVIEW

The ***Stream Crossing Inventory Project's*** main goal was to identify and document any potential concerns which may affect fish habitat in streams crossing forest access roads. Some potential concerns were:

- ⇒ Fish habitat
- ⇒ Pollution
- ⇒ Road and Stream Bank Erosion/Siltation
- ⇒ Diversion of natural stream beds due to road development
- ⇒ Water Velocity & Slope (Hydraulics)
- ⇒ Debris due to washouts (obstructing water flow and fish migration)

This project was initiated by Corner Brook Pulp and Paper Ltd. and the Centre for Forest and Environmental Studies (CFES) as a tool for road network maintenance. Since then several other partners have realized concerns of their own and have joined the project. These partners include; Western Newfoundland Model Forest Inc.; Department of Fisheries and Oceans; Forest Resources and Agri-Foods; and Abitibi Consolidated. The project commenced June, 1997 and concluded December, 1997, consisting of approximately five months field work, one month data interpretation, and two weeks with a GIS application.

3.0 EQUIPMENT USED IN STREAM CROSSING ASSESSMENT

To complete the assessment and survey of the stream crossings, there were different kinds of equipment used. During the survey of the stream the following were required:

* Metre Stick
* 30M Measuring Tape
* Stopwatch
* Rubber ball
* Slope measurement device
* Camera
* GPS Unit
* Stream Crossing Inventory Data Sheets (**Appendix A**)

4.0 FIELD WORK OVERVIEW

First of all, topographical maps (1:50,000) were obtained from the nearest Forestry Field Stations. On these maps we would trace road networks from overlays. From these road networks we would identify potential stream crossings. Although, in order to conduct an adequate and consistent evaluation of the stream crossings, a stream crossing data sheet (**See Appendix A**) was developed by several of the partners. The stream crossing data sheet was very important in keeping all data collected, organized and consistent.

Once in the field we would locate the access roads and proceed in locating stream crossings. Generally we were mainly concerned with crossings which showed up on the topographical maps. However, any other significant crossing we found would be included in the overall survey.

A general survey of a stream crossing would involve both a physical site inspection and the completion of a data sheet. The structure can either be a **chute, culvert**, an **arch culvert**, a **bridge**, or at worst a **washout**. The following is a general description of what must be completed on every data sheet (**Appendix A**).

- GPS Rover File Ex. (X110413A) (prefix, month, day, hour, file)
- Road Network Code Ex. (AB01) (Abitibi + crossing #)
- Determine water level (Low, Moderate, or High)

- Determine if fish are present at site (Yes or No)
- Determine if there is ditching directly into stream (Yes or No)

Chute/Culvert

Once we discover that the structure is a chute or culvert. We must then determine the following:

- Whether or not the culvert is singular or multiple
- Material (Wooden, Plastic, or Steel)
- Type (Circular, Elliptical, or Box)
- Measure the structure (Diameter (mm)or Dimension (m) & Length (m))
- Total number of culverts present
- Culvert Slope (%)
- Countersinking (mm)
- Determine if there is an upstream\downstream pool (Width & Depth & Length (m))
- Depth of water in culvert (Inlet\Outlet (mm))
- Determine bank stabilization (rip rap, timber, grass, vegetation)
- Stream Substrate (Clay, silt, sands, gravel, boulders, bedrock, etc.)
- Estimated Water velocity Test (m/sec.)
- General comments of the condition of the structure and surrounding area.

Bridge

Once we discover that the structure is a bridge. We must determine the following:

- Abutment type (wooden or concrete)
- Girders (Steel or Wooden)
- Span between abutments (m)
- Determine if footings are within wetted perimeter (Yes or No)
- Estimated Encroachment (m)
- General condition of the bridge

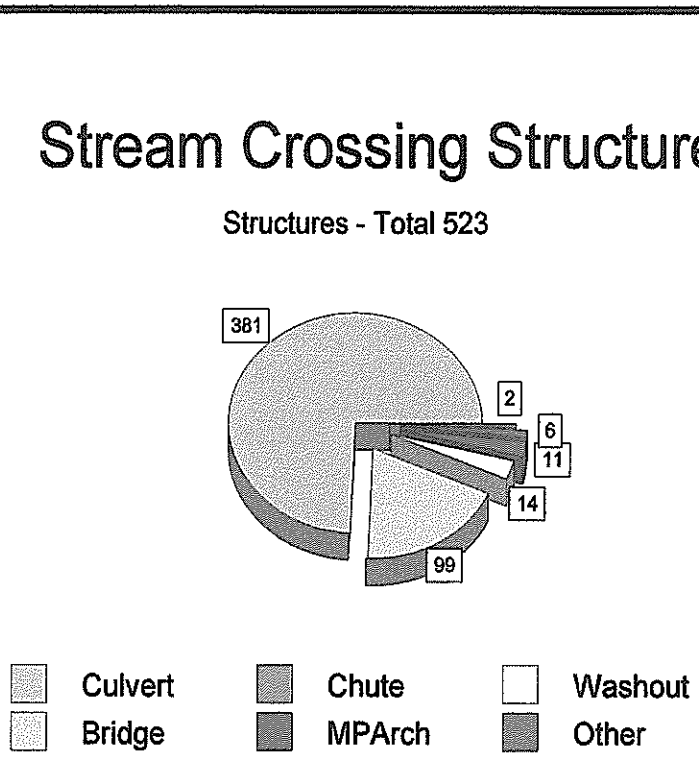
Arch Culvert

Once we discover that the structure is an arch culvert. We must determine the following:

- Span between footings (m)
- Height above footings (m)
- Length (m)
- Footings within wetted perimeter (Yes or No)
- Estimated Encroachment (m)
- Condition of structure and surrounding area.

Over the life of this project, our team, the *Model Forest Team*, conducted 523 stream crossing assessments.

The following chart is a breakdown of the stream crossings encountered:



4.1 Stream Crossing Gallery

Upon conducting the stream survey, one of the field duties was to estimate the magnitude of impairment inflected on the stream and surrounding area. Some stream crossings had multiple impairments that could only be captured with a photograph. The following two photos are a sample of the stream crossings we encountered. More photos can be seen in **Appendix B**.

Photo: Highlands Area

Photo #2: McKenzie's Brook Area

5.0 DATA INTERPRETATION

Once the field work had been completed, the data retrieved in the field had to be entered into a database. Over a period of roughly a month the data was organized and entered into a *Stream-Road Crossing Database*. The last two weeks of the project were spent working on a Geographic Information Systems (GIS) Application.

6.0 AREAS SURVEYED

The areas we surveyed covered a vast area in Western & Central Newfoundland and the Northern Peninsula. The areas we covered included Crown Limits (Districts 14, 15, 16, 17, & 18) and Abitibi Limits(Districts 12 & 13). Although the latter areas were covered, several stream crossings could not be identified due to inaccessible road networks, as identified on Topographical Maps.

6.1 Areas Remaining

The remaining areas not completed during the '97 Project include, Crown Limits east of Baie Verte, remainder of Abitibi Limits for Western and Southern Newfoundland and including portions of Districts 12 & 13 (Unable to complete due to time restrictions).

7.0 COMMENTS ON PROJECT

7.1 Recommendations

In completing this project, it was discovered that many of the road networks were left uncompleted because of access. Therefore, as the project progressed the need for All-Terrain Vehicles (ATV's) became more evident. Our main recommendation to the sponsoring partners, is future crew members have access to ATV's so that every road network with stream crossings can be completed.

7.2 Conclusion

Overall this project was a great initiative towards identifying and indexing environmental concerns pertaining to stream crossings and fish habitat on the island portion of the province. Furthermore we hope that the project will continue in the next year as there are many areas left to be indexed.

Reflecting back on the project we and our contributing partners all believe this has been both educational and worthwhile.

APPENDIX A

Corner Brook Pulp & Paper Ltd
Stream Crossing Identification Form

UTM Coordinates				
Name of Stream		Code		
Type of Structure	Multi-Plate Arch	Culvert	Bridge	Chute
Water Level	low	moderate	high	
Fish present at site	Yes No			
Ditching directly into stream	Y N	Stability	poor fair	good

Culverts

	Singular	Multiple (add extra culverts in comment area)		
Material	Wooden	Plastic	Steel	
Type	Circular	Eliptical	Box	
Circular	Diameter	mm	Lenght	m
Elliptical	Dimension	m	Lenght	m
Box	Dimension	m	Lenght	m
Total # Culverts				
Culvert Slope %				
Countersinking	Yes No	Depth	mm	
Upstream Pool Present	Y N	Width	m Depth	m Lenght m
Downstream Pool Present	Y N	Width	m Depth	m Lenght m
Depth of water in culvert inlet		mm		
Depth of water in culvert outlet		mm		
Bank Stabilization	rip rap	timber	grass	vegetation
	Dimensions	m		
Stream Substrate (clay,silt,sands,gravel,boulders,bedrock)				
	Upstream			
	Downstream			
	In culvert			

Float Test (estimated surface water velocity)

Trial # 1	sec	Trial # 2	sec	Trial # 3	sec
Average of 3 trials		sec			
Water velocity = Lenght of culvert (m)/Average of 3 trials(sec)					
Water Velocity =	(m)/	(sec)=	(m/sec)		

Comments:

Arch Culvert		
	Span between footings	m
	Height above footings	m
	Lenght	m
	Footings within wetted perimeter	Y N
	Estimated Encroachment	m
	Condition:	

Bridge			
	Abutment Type	Concrete	Wooden
	Girders	Steel	Wooden
	Span between abutments	m	
	Footings within wetted perimeter	Y	N
	Estimated Encroachment	m	
	Condition:		

Site Sketch:

Surveyed By:	
Date:	

APPENDIX B

Please note that the following stream crossing photographs are documented due to the severe nature of the impairment, not all crossings were in this condition, the majority had only minor obstructions. Approximately 40% of the stream crossing structures surveyed are in need of immediate maintenance or upgrading.

Codroy Area

Horse Chops Area

Mckenzie's Brook Area

Shefield Lake Area

Codroy Area

McKenzie's Brook Area