

APPENDIX A

NOVA SCOTIA REGISTRY OF JOINT STOCKS – SCOZINC LIMITED

Profile

 [Printer Version](#)

[Profile Info](#)
[People Info](#)
[Activites Info](#)
[Related Reg's Info](#)

PROFILE - SCOZINC LIMITED - as of: 2011-07-05 08:14 AM

Business/Organization Name:	SCOZINC LIMITED
Registry ID:	3064626
Type:	N.S. Limited Company
Nature of Business:	
Status:	Active
Jurisdiction:	Nova Scotia
Registered Office:	1300 - 1969 Upper Water Street, Purdy's Wharf Tower II Halifax NS Canada B3J 3R7
Mailing Address:	PO Box 730 Halifax NS Canada B3J 2V1
Previous Name:	PASMINCO RESOURCES CANADA LTD.
Previous Name:	PASMINCO RESOURCES CANADA COMPANY

PEOPLE

Name	Position	Civic Address	Mailing Address
ANNAPOLIS GOLD CORP.	Director	1969 UPPER WATER STREET, SUITE 2001 HALIFAX NS B3J 3R7	
Stacey Stone	Chief Financial Officer	2100-1969 Upper Water Street Halifax NS B3J 3R7	
Grant D. Ewing	President & CEO	1306 Woodgrove Place Oakville ON L6M 1V5	
D. SUZAN FRAZER	CORPORATE SECRETARY	1969 UPPER WATER STREET, STE 1300 HALIFAX NS B3J 3R7	
D. SUZAN FRAZER	Recognized Agent	1300 - 1969 Upper Water Street, Purdy's Wharf Tower II Halifax NS B3J 3R7	PO Box 730 Halifax NS B3J 2V1

ACTIVITIES

Activity	Date
Annual Renewal	2011-02-17
Annual Statement Filed	2011-02-17
Change of Directors	2010-07-02
Annual Renewal	2010-02-23
Annual Statement Filed	2010-02-23
Annual Renewal	2009-04-22
Annual Statement Filed	2009-04-22
Change of Directors	2008-12-17
Change of Directors	2008-12-16
Annual Statement Filed	2008-02-22
Annual Renewal	2008-02-22
Change of Directors	2007-05-31
Annual Statement Filed	2007-04-17
Annual Statement Filed	2007-04-02
Annual Renewal	2007-02-27
Annual Statement Filed	2007-02-27
Annual Statement Filed	2007-02-27
Appoint an Agent	2006-08-10
Address Change	2006-08-10
Change of Directors	2006-08-10
Change of Directors	2006-04-17
Annual Statement Filed	2006-04-03
Annual Renewal	2006-04-03
Change of Directors	2005-10-18
Change of Directors	2005-08-30
Change of Directors	2005-06-01
Annual Renewal	2005-04-18
Change of Directors	2004-07-21
Annual Statement Filed	2004-04-08
Annual Renewal	2004-03-31

Annual Renewal	2003-04-30
Filed Name Change	2002-11-05
Effective Date of Name Change	2002-11-05
Change of Directors	2002-03-04
Appoint an Agent	2002-03-04
Special Res - Change Unlimited to Ltd Liability Corp	2002-03-04
Address Change	2002-03-04
Change of Directors	2002-03-01
Date of Filing Amalgamation	2002-03-01
Appoint an Agent	2002-03-01
Effective Date of Amalgamation	2002-03-01

Show All [Collapse](#)

RELATED REGISTRATIONS

This Company ...	
PASMINCO RESOURCES CANADA COMPANY	Amalgamated From
3063554 NOVA SCOTIA COMPANY	Amalgamated From
SCOTIA MINE	Registered
SCOTIA MINE	Registered

APPENDIX B

PUBLIC CONSULTATION INFORMATION

NOTICE

PUBLIC INFORMATION SESSION **Southwest Expansion Project** **Gays River**

This is to advise that on Wednesday, June 29th, ScoZinc Limited (ScoZinc) will be holding an Open House at the Fire Hall in Cooks Brook, 39 Corbett Road from Noon until 9 PM.

This session is to provide input to the environmental assessment document that is being prepared for the Nova Scotia environmental assessment process.

ScoZinc is proposing to include the mining and processing of additional lead/zinc ore located immediately adjacent to the existing Gays River Mine in their overall mine plan. The currently permitted pit area is proposed to be expanded in a Southwest direction to complete mining and reclamation of this area.

- The project will have 3-5 year lifespan.
- The project will generate 100 full time jobs.
- The SW Extraction Area contains an additional 2.6 million metric tonnes (mmt) of lead/zinc ore that can be mined and milled using similar surface and milling methods as those previously employed at the site.

If you are unable to attend and wish to receive more information, please contact Selwyn Resources:

Community Relations – Michael Cunningham,

mcunningham@selwynchihong.com

Human Resources – careers@selwynresources.com

Investor Communications – info@selwynresources.com

ScoZinc Limited is a wholly-owned subsidiary of Selwyn Resources Ltd.

www.selwynresources.com

OPEN HOUSE

You are cordially invited to attend
an informal open meeting
for local residents to

Introduce the New Owners of the ScoZinc Operations (Gays River)

Selwyn Resources Ltd. has recently completed the
acquisition of the assets of ScoZinc Ltd and wishes to introduce
the company to the local community.

When: Wednesday, June 22, 2011 - 5 pm to 8 pm
A short presentation will be given at 6:30pm

Where: Scotia Mine Administration Building
15601 Highway 224, Cooks Brook, NS



If you are unable to attend and wish to receive more information, please contact Selwyn Resources:

Community Relations	Michael Cunningham mcunningham@selwynchihong.com
Human Resources	careers@selwynresources.com
Investor Communications	info@selwynresources.com

Corporate website www.selwynresources.com

ScoZinc Limited is a wholly-owned subsidiary of Selwyn Resources Ltd.

SCOTIA MINE GATE LOG

VISITOR OR VENDOR AGREEMENT

PERSONS SIGNING LOG ASSUMES ALL RISK OF ACCIDENT AND
DAMAGE TO PERSON OR PROPERTY

DATE	TIME IN	TIME OUT	PRINT NAME	REPRESENTING	COMMENTS
June 22	4:55		Frances Frame	Resident of Gay's River	
June 22	4:55		Donald Frame	" " "	
June 22	5:05		Schv Tiscornia	Cook's Brook	
June 22	5:06		Edna Tiscornia	Cook's Brook	
June 22	5:12 pm	6:20 pm	Edward J. Tiscornia	Shubic East	
June 22	5:20 pm		Bob Jennifer Doucette	Gay's River	
June 22	5:20 pm		Harold Mackinnon	North River	
June 22	5:31 pm		James Woodworth	Coldstream	
June 22	5:31 pm		Michael Tolan	Autina	
June 22	5:31 pm	7:22	Leslie Tolan	Gay's River	
11	5:35		William Tolan	Cook's Brook	
11	5:35		Wayne Hooper	Gay's River	
11	6:00		John Singer	" " Rd	
June 22	5		Bill Newton	Coldstream	
June 22	5:50		Eric McDermott	Cook's Brook	
11	5:50		W. Doucette	Gay's River	
June 22/11	6:00		Mike Crowl	Manesville	
June 22/11	6:00		Kevin Noseworthy	Gay's River	
June 22/11	6:00		Helen Teresa Ellis	Cook's Brook	
11	6:00	6:20	Peter Dujany	Gay's River	

OPEN HOUSE
June 22/11

SCOTIA MINE GATE LOG

VISITOR OR VENDOR AGREEMENT

PERSONS SIGNING LOG ASSUMES ALL RISK OF ACCIDENT AND
DAMAGE TO PERSON OR PROPERTY

DATE	TIME IN	TIME OUT	PRINT NAME	REPRESENTING	COMMENTS
June 22	6:15		Jo-Anne Horne		
"	"		Bonita Delaney		
"	"		David Horne		
			Rod Newman		
			Janice Newman		
		7:30	Diana Ford		
"	"	7:30	Avon O'Connell		
"	6:17	7:30	Dei Jones		
			Tina Dexter		
			Philip Higgins		
			Linda McKenzie		
			Mark Br		
			Reid n p		
			Lynn Smith		
			Amanda Smith		
			Robert W. Malone		
			Cathy Osborne		
			Yvonne Davis		
			Donna C. Gier		
			Tina & Jack Vissers		

VISITOR OR VENDOR AGREEMENT

**PERSONS SIGNING LOG ASSUMES ALL RISK OF ACCIDENT AND
DAMAGE TO PERSON OR PROPERTY**

[illegible]

PUBLIC INFORMATION SESSION

Southwest Expansion Project

Gays River

This brochure provides an overview of the information provided. Please feel free to ask questions or make comments.

This session is to provide input to the environmental assessment document that is being prepared for the Nova Scotia environmental assessment process.

Additional information on the Environmental Assessment process in Nova Scotia can be found at: www.gov.ns.ca/nse/ea/pubs.asp

ScoZinc Limited, recently purchased by Selwyn Resources Ltd., is proposing to include the mining and processing of additional lead/zinc ore located immediately adjacent to the existing Gays River Mine in their overall mine plan. The currently permitted pit area is proposed to be expanded in a Southwest direction to complete mining and reclamation of this area,

- The project will have 3-5 year lifespan.
- The project will generate 100 full time jobs.
- The SW Extraction Area contains an additional 2.6 million metric tonnes (mmt) of lead/zinc ore that can be mined and milled using similar surface and milling methods as those previously employed at the site.

SELWYN RESOURCES /SCOZINC

These panels provide an overview of Selwyn Resources Ltd. and ScoZinc Limited.

THE PROJECT OVERVIEW

ScoZinc is currently permitting an expansion of the Main Pit towards the southwest to increase mine life. The area to be mined is partially covered with waste materials and there are no competing land use values to impede permitting. Permits for expansion are expected in Q4 2011.

Information specific to the Southwest Expansion project is discussed on this panel; for example, the amount of lead/zinc ore available and other components of the project.

PROJECT TIMELINES

This panel gives a broad overview of the planned project timelines.

THE MINING PROCESS

An overview of the mining process is discussed in this panel including:

- Exploration
- Mine Planning
- Overburden Stripping
- Drilling & Blasting
- Transportation of Ore and Concentrate

THE MILLING PROCESS

The diagram on this panel shows conceptually the process by which ore is milled to form Zinc (Zn) and Lead (Pb) concentrates.

BASELINE STUDIES

Many studies are required to assess the projects effect on the environment and the environments effect on the project. This panel provides information on the type and timing of studies conducted, including

- Rare Plant Surveys
- Migratory Bird Surveys
- Wetland Survey
- Archaeological Studies
- Tailings Pond Capacity Study

A brief overview of permitting status is provided.

RECLAMATION

Reclamation is the final phase of the project to return the area to a condition that is consistent with the natural surroundings and community use. Two types of reclamation are done – progressive (during mining operations on stable areas) and final reclamation (after the cessation of mining activity).



If you wish to receive more information on or have other questions about the project, please contact Selwyn Resources:

Community Relations - Michael Cunningham
mcunningham@selwynchihong.com

Human Resources
careers@selwynresources.com

Investor Communications
info@selwynresources.com

Corporate website
www.selwynresources.com

Thank you for attending.



NOTES

NOTES

NOTES

PUBLIC INFORMATION SESSION

Southwest Expansion Project

Gays River

This session is to provide input to the environmental assessment document that is being prepared for the Nova Scotia environmental assessment process.

ScoZinc is proposing to include the mining and processing of additional lead/zinc ore located immediately adjacent to the existing Gays River Mine in their overall mine plan. The currently permitted pit area is proposed to be expanded in a Southwest direction to complete mining and reclamation of this area,

- * The project will have 3-5 year lifespan.
- * The project will generate 100 full time jobs.
- * The SW Extraction Area contains an additional 2.6 million metric tonnes (mmt) of lead/zinc ore that can be mined and milled using similar surface and milling methods as those previously employed at the site.

When: Wednesday, June 29, 2011 - 12 pm to 9 pm
Where: Cooks Brook Fire Hall
39 Corbett Rd, Cooks Brook, NS



If you are unable to attend and wish to receive more information, please contact Selwyn Resources:

Community Relations	Michael Cunningham mcunningham@selwynchihong.com
Human Resources	careers@selwynresources.com
Investor Communications	info@selwynresources.com

Corporate website www.selwynresources.com

ScoZinc Limited is a wholly-owned subsidiary of Selwyn Resources Ltd.

Southwest Expansion Project

THE PROJECT

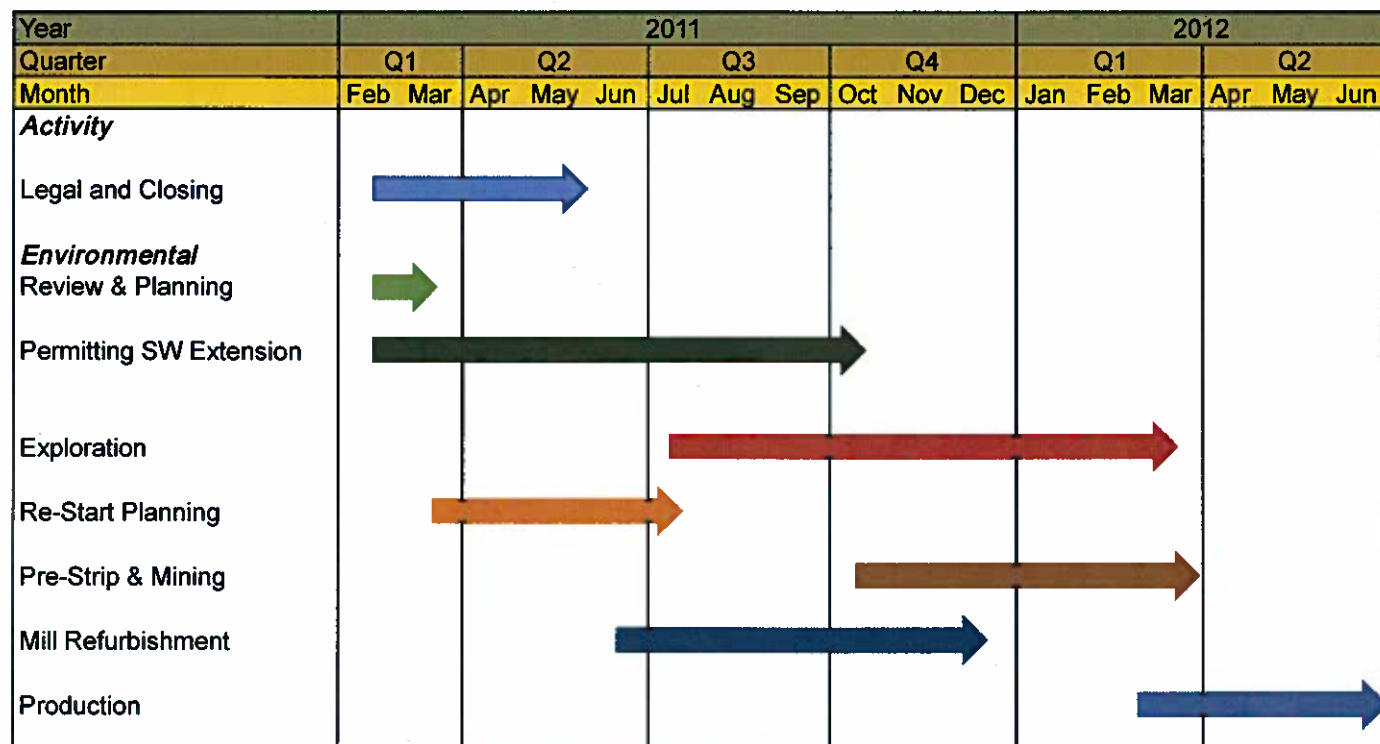
ScoZinc is currently permitting an expansion of the Main Pit towards the southwest to increase mine life. The area to be mined is partially covered with waste materials and there are no competing land use values to impede permitting. Permits for expansion are expected in Q4 2011.

PROJECT OVERVIEW

- Area contains an additional 2.6 million metric tonnes (mmt) of lead/zinc ore that can be mined and milled using similar methods as those previously employed at the mine.
- The current Tailings Management Facility is able to accommodate the tailings generated from this additional ore extraction.
- Approximately 40 mmt of overburden and waste rock will be removed from the SW Expansion Area. Some of this material will be used as backfill in both the existing and proposed pits. An area in the current pit will be left open to provide for potential underground or surface mining development to the northeast. A portion of the SW Expansion Area will be left open to create a small lake and landscaped to mimic local rolling topography.
- Estimates show up to 14.8 mmt of gypsum by-product must be moved in the process. ScoZinc will seek to sell this material to a third party and remove it from site.
- The footprint of the currently permitted project will require changes to the stockpiles to accommodate the SW Expansion pit.
- The currently permitted area is approximately 32.1 ha; the proposed SW Expansion area is 33.9 ha.
- In addition to waste material backfilled into the pit, the existing waste rock storage piles must be reworked to accommodate additional storage.
- The area has been subjected to baseline assessment survey work (archaeology, rare plant surveys, wetland surveys, etc.) with no issues being identified that should prevent the permitting of the SW Expansion Area.

Southwest Expansion Project

PROJECT TIMELINES



Southwest Expansion Project

MINING PROCESS

EXPLORATION

The first stage of the mining process is typically Exploration. This is done to delineate the mineral deposit by core drilling, surveying, rock sampling, quality testing and computer modeling. Drilling has been conducted over the years to quantify the deposit in the SW Expansion Area.

MINE PLANNING

The results of the exploration program are used in Mine Planning - defining the feasible extraction area, stockpile placement, water and tailings management, mine life and future land use. This has been refined over the years through different operators.

STRIPPING

Once the extraction area is defined, removal of the overburden (Stripping) begins. Organic material and soil is removed with dozers and excavators down to the surface of the rock. This material is placed in stockpiles outside of the extraction area and may be used for future reclamation activities. The placement of the material around the perimeter of the mine site also helps to reduce noise levels from the operation, limits view planes into the site and restricts access for employee and public safety.

DRILLING & BLASTING

The exposed rock is drilled and blasted by certified drillers/blasters using Ammonium nitrate/fuel oil (ANFO) and non-electric detonators and caps. Blasting operations are regulated by both federal and provincial governments. In order to maintain ore quality, the ore must be separated from other rock types at Gays River. This makes it necessary to constantly work many different areas of the pit to optimize the deposit.

MILLING

After it is drilled and blasted, the ore is loaded into 100 tonne haul trucks with loaders and hauled to the mill for Processing. Zinc and Lead concentrates are produced via methods outlined on the Milling Panel.

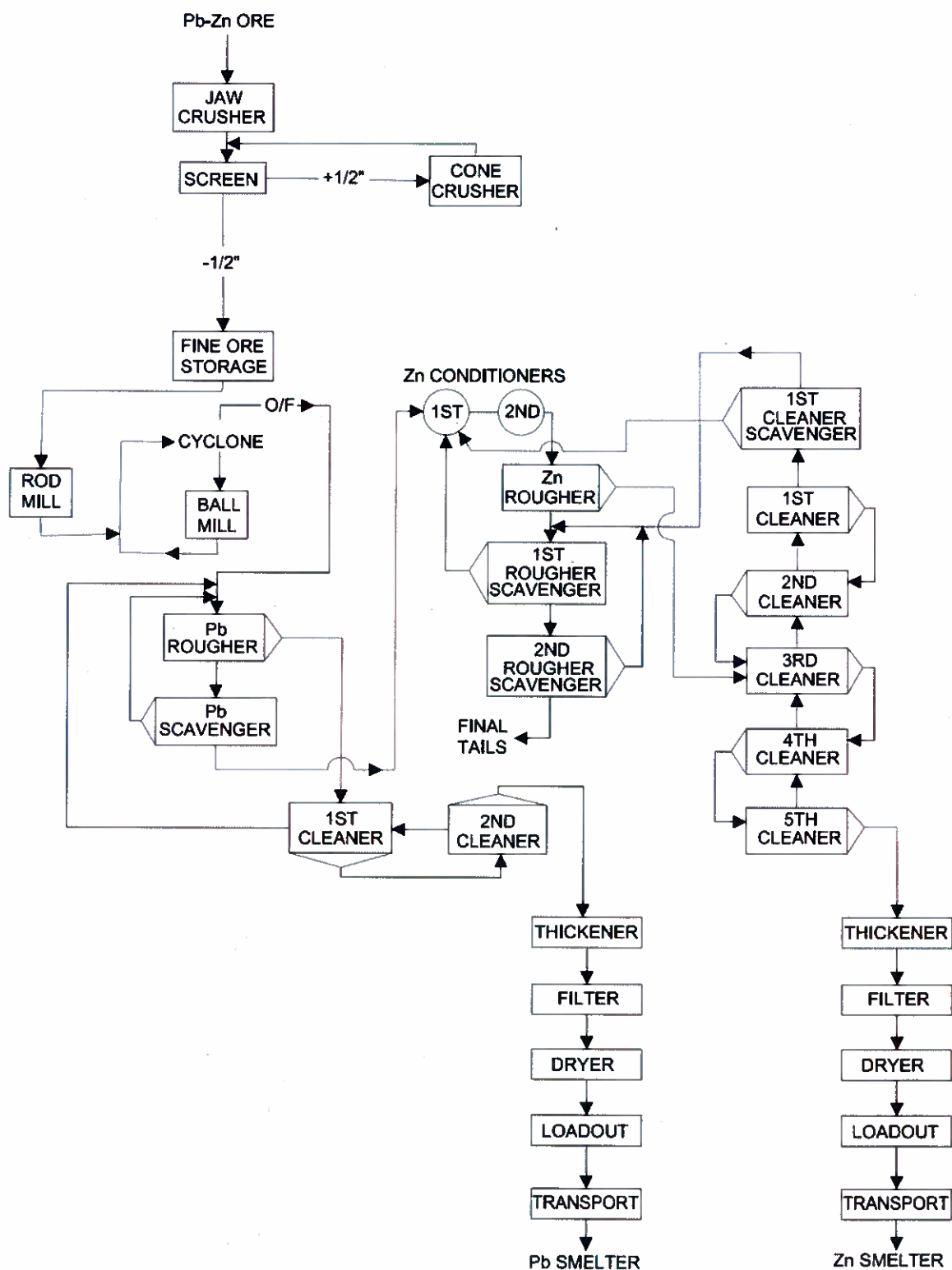
TRANSPORTATION

The Zinc and Lead concentrates are shipped by truck to the Bulk Storage and Handling Facility at Sheet Harbour and then exported to a smelter by container ship.



Southwest Expansion Project

MILLING



Southwest Expansion Project

BASELINE STUDIES

The project area has been the subject of several topographic surveys, soil and rock character assessments and aerial photographic surveys to aid in the mine plan development.

Rare Plant Surveys

- Spring 2008 & 2011.
- No at risk species were identified on the project site.

Migratory Bird Surveys

- Breeding bird and Owl surveys were conducted in 2008 and 2011.
- No at risk species were identified on the project site.

Wetland Survey

- Wetland surveys were conducted in 2011.
- Several small wetlands have been identified.

Archaeological & Cultural Heritage Studies

- The history of the proposed site and the surrounding area has been extensively studied over the years, including reconnaissance surveys, shovel testing and mitigation on known sites between 2006 and 2011.
- The only archaeological feature identified was a domestic site believed to have been established by William Wilson sometime after his purchase of the property in 1872. Being relatively modern and having been heavily impacted by mechanical demolition and site leveling sometime between 1938 and 1992, it was recommended to and accepted by the Heritage Division, that the area be cleared of any future archaeological investigation.

Tailings Pond Capacity Study

- A bathymetry survey of the pit and Tailings facilities and Tailings Pond capacity study were conducted in 2011.

Permitting History

Acadian Mining permitted Scotia Mine as an open pit operation in 2006 & 2007 and commenced mining in Q2 2007.

Current Approvals cover:

- current Main Pit operations;
- mining of the Northeast deposit as an underground mine; and,
- concentrate storage and loading facilities at Sheet Harbour.

Amendments to these approvals may be required to accommodate the SW Expansion.

Southwest Expansion Project

RECLAMATION

The primary goal of ScoZinc's reclamation plan is to return the physical, chemical, and biological quality of disturbed land and water regimes to an acceptable state.

The area will be safe, stable, and compatible with the local areas surrounding landscape and land use (rolling hills, abundant surface water, mixed forest and working or fallowed agricultural lands).

ScoZinc plans to continue mining in three phases over the next 3.5 years. The first phase will be in the southernmost portion of the SW Expansion area, followed by Phase 2 in between the existing pit and Phase 1, and finally Phase 3 which will be in the very northeast area of the existing pit.

With the resumption of mining, progressive reclamation will begin that will include contouring and revegetation of stockpiles.

The North stockpile will be constructed in the Fall 2011 - Winter 2012. Revegetation of the North stockpile will occur in Spring 2012 and will be based on an approved plant species composition.

Once the North stockpile is completed, the South stockpile will be expanded and will be progressively reclaimed.

Once mining has been completed, the pits will be allowed to fill in with precipitation, surface runoff, and groundwater. The pit water elevations will be similar to that of Gays River.

APPENDIX C

PROPOSED MINE EXPANSION BIOLOGICAL FIELD REPORT

June 30, 2011



CONESTOGA-ROVERS &
ASSOCIATES LTD. (CRA)
45 Akerley Boulevard
Dartmouth, Nova Scotia
B3B 1J7

ATTENTION: Mr. Jeff Parks

***Scotia Mine – Proposed Mine Expansion Biological Field Report– Early Summer
Surveys – Draft***

The following provides a summary of early summer biology field studies conducted for CRA related to the proposed Scotia Mine expansion.

Methodology

Initial field work was conducted within the proposed expansion area as provided by CRA. This included a west and east study area. Based on the initial review of Atlantic Conservation Data Centre (ACCDC)/Nova Scotia Museum data provided by CRA, Dillon identified potential priority species and their habitats. Field surveys focused on potential habitat for rare plants (visible during that timeframe), on breeding birds and on wetlands. Breeding bird surveys were undertaken as 10 minute point counts following Canadian Wildlife Service protocols for environmental assessment. An additional pre-dawn bird survey was completed following Bird Studies Canada protocols for Whip-poor-will/Nighthawk. Plant surveys were conducted June 9th and 10th. Bird surveys were conducted June 16th and 17th. Wetland surveys were conducted on June 22nd.

Field Survey Results

Attachment 1 provides a map of the study area, locations of bird survey point counts, priority plant species locations, and wetland or ponded area locations.

Attachment 2 provides the plant list generated during surveys of the proposed expansion area. Two Nova Scotia Department of Natural Resources (DNR) yellow (sensitive) listed plant species were found; Canada lily and wood nettle and one DNR yellow listed lichen (*Sticta fuliginosa*) were found. All three plant species were in close proximity to Gays River.

Generally the study areas are highly disturbed. Forest harvest has occurred in the past and skidder trails and access roads crisscross the property. Streamside low-lying areas and wetlands have been affected by farming practices (grazing and hayfields). As well, drainage features have been rearranged by the presence of the roads and stockpiles for the existing mine site. Key habitats covered are summarized below and pictures provided in **Attachment 3**.

137
Chain Lake Drive
Suite 100
Halifax
Nova Scotia
Canada
B3S 1B3
Telephone
(902) 450-4000
Fax
(902) 450-2008

- Softwood stands - softwood stands included mixed spruce and fir stands with fairly closed canopy and isolated open hemlock stands, both predominately on the slopes approaching the river.
- Mixed wood stands – stands of predominately mixed spruce, fir and maple occur throughout the forested portion of the site.
- Upland hardwoods (poplar) – small upland hardwoods stands dominated by poplar occur in the north central portion of the west study area.
- Clearcuts – extensive historic forestry clearcuts occur in the east study area and in the northeast portion of the west study area. In addition, strip cuts are widespread throughout associated with road development and a pipeline.
- Secondary regeneration – re-growth of spruce, birch, maple and fir is present throughout the site.
- Alder swales – occur in flat or low-lying areas in pockets throughout the Study Areas.
- Riparian and river aquatics – the riparian area next to the river had the highest diversity of plant species and included the yellow listed species. Riparian habitats included bluejoint meadow wetlands and more mature forested habitats. Small intermittent drainage features also occur throughout the property.
- Wetlands – include streamside riparian meadows and partially man-made features associated with drainage changes in the landscape and tight clay soils. Wetlands are summarized in **Table 1** below.

Table 1 Wetland Summary*

No.	Wetland Type	Size (ha)	Comment	In Extraction Area Footprint
1	Shrub swamp /Fen	0.6	Fen within previously disturbed pipeline area and surrounding shrub swamp	Yes
2	Shrub swamp	0.2	Alder shrub swamp surrounding small watercourse and floodplain wetland	Partially
3	Fen/Shrub swamp	3.4	Extensive bluejoint meadow in river floodplain and adjacent alder shrub swamp	No
4	Fen/Shrub swamp	1	Minor bluejoint meadow in river floodplain and adjacent alder shrub swamps	No
5	Marsh/Shrub swamp	0.2	Drainage from historical wetland and stockpile area ponded	Partially
6	Marsh/Shrub swamp	0.4	Drainage from historical wetland and stockpile area ponded	No
7	Fen/Shrub swamp	1.3	Mixed wood and alder shrub swamp adjacent small bluejoint meadow in river floodplain	No
8	Marsh	0.2	Possibly old pit area, limited wetland vegetation	No


No.	Wetland Type	Size (ha)	Comment	In Extraction Area Footprint
9	Fen/Shrub swamp	1.2	Mixed wood and alder shrub swamp adjacent small bluejoint meadow in river floodplain	No
10	Not confirmed	0.2	Small area outside of footprint with some evidence of wetland vegetation	No

* Other small wetland features may be present in areas where drainage is ponded.

Attachment 4 provides the June 2011 breeding bird survey list. A moderate diversity of breeding birds was found at the site reflecting the variety of habitats present. The only Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and yellow listed species identified was the Barn Swallow, which was nesting outside of the project footprint on the other side of the river. No Whip-poor-will or Nighthawk were identified in the pre-dawn surveys, however a Barred Owl and Long-eared Owl were heard on the property, but outside of the Study Areas.

Summary

Priority plant species were identified outside of the proposed extraction area footprint and generally within riparian wetland areas along Gays River. No disturbance will occur within these areas. Although there did not appear to be potential for priority plant species within the extraction area, a late season plant survey will be undertaken to confirm findings. Bird nesting occurs throughout the study area. Site clearance activities will be undertaken outside of the breeding bird season. The majority of the wetland areas are outside of the extraction area footprint and will not be disturbed. For those within the extraction footprint, the Nova Scotia Department of Environment wetland approval process will be followed, including development of appropriate compensation where alteration proceeds. No priority species were identified for the wetland areas.



Page 4
CONESTOGA-ROVERS &
ASSOCIATES LTD. (CRA)
June 30, 2011

Closure

Should you have any questions or comments, please contact the undersigned at your convenience.

Yours truly,

DILLON CONSULTING LIMITED



Karen March, M.Sc.
Associate

KLM:jep
attachments
Our File: 11-5116-1000

Attachment 1 Figure
Attachment 2 Plant List
Attachment 3 Field Photographs
Attachment 4 Bird Survey Results

Attachment 1
Site Figure



Scotia Mine Biological Surveys

Legend

- ◆ Avian Survey Points
- ▲ Plants June 10/11
- Watercourse
- Intermittant Stream
- ☘ Hemlock stand
- ☘ Mature mixed stand
- Wetlands Delineated June 10/11
- Pit Optimization Outline
- Study Area
- Open Water



Attachment 2
June 2011 Plant List

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
Secondary Regen				
<i>Picea glauca</i>	White Spruce	S5	Green	No
<i>Salix discolor</i>	Pussy Willow	S5	Green	No
<i>Betula populifolia</i>	Gray Birch	S5	Green	No
<i>Prunus serotina</i>	Wild Black Cherry	S5	Green	No
<i>Cornus sericea</i>	Silky Dogwood	S5	Green	No
River Edge				
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5	Green	No
<i>Typha latifolia</i>	Broad-Leaf Cattail	S5	Green	No
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	Green	No
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	Green	No
<i>Galium palustre</i>	Marsh Bedstraw	S5	Green	No
<i>Thalictrum pubescens</i>	Tall Meadow-Rue	S5	Green	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Carex intumescens</i>	Bladder Sedge	S5	Green	No
<i>Symphyotrichum puniceum</i>	Swamp Aster	S5	Green	No
<i>Viola cucullata</i>	Marsh Blue Violet	S5	Green	No
<i>Ludwigia palustris</i>	Marsh Seedbox	S5	Green	No
<i>Calamagrostis canadensis</i>	Blue-Joint Reedgrass	S5	Green	No
<i>Galium asprellum</i>	Rough Bedstraw	S5	Green	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	S5	Green	No
<i>Viburnum nudum</i>	Possum-Haw Viburnum	S5	Green	No
<i>Solanum dulcamara</i>	Climbing Nightshade	SE	Green	No
<i>Rubus idaeus</i>	Red Raspberry	S5	Green	No
<i>Carex pallescens</i>	Pale Sedge	S5	Green	No
<i>Carex arctata</i>	Black Sedge	S5	Green	No
<i>Lycopus americanus</i>	American Bugleweed	S5	Green	No
<i>Proserpinaca pectinata</i>	Comb-Leaved Mermaid-Weed	S3	Green	No
<i>Clematis virginiana</i>	Virginia Virgin-Bower	S5	Green	No
<i>Rubus pubescens</i>	Dwarf Red Raspberry	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Osmunda regalis</i>	Royal Fern	S5	Green	No
<i>Thelypteris palustris</i>	Marsh Fern	S5	Green	No
Mixed Woods Secondary Regen				
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Cornus canadensis</i>	Dwarf Dogwood	S5	Green	No
<i>Trientalis borealis</i>	Northern Starflower	S5	Green	No
<i>Osmunda claytoniana</i>	Interrupted Fern	S5	Green	No
<i>Osmunda regalis</i>	Royal Fern	S5	Green	No
<i>Alnus incana</i>	Speckled Alder	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Maianthemum canadense</i>	Wild Lily-of-The-Valley	S5	Green	No
Alder Swale				
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	Green	No
<i>Carex arctata</i>	Black Sedge	S5	Green	No
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	Green	No
<i>Galium palustre</i>	Marsh Bedstraw	S5	Green	No
<i>Aster umbellatus</i>	Flat-topped White Aster	S5	Green	No
<i>Clematis virginiana</i>	Virginia Virgin-Bower	S5	Green	No
<i>Dryopteris cristata</i>	Crested Shield-Fern	S5	Green	No
<i>Impatiens capensis</i>	Spotted Jewel-Weed	S5	Green	No
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Rubus pubescens</i>	Dwarf Red Raspberry	S5	Green	No
<i>Ranunculus acris</i>	Tall Butter-Cup	SE	Exotic	No
<i>Thelypteris noveboracensis</i>	New York Fern	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Carex echinata</i>	little prickly sedge	S5	Green	No
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	Green	No
<i>Athyrium filix-femina</i>	Lady-Fern	S5	Green	No
<i>Carex stipata</i>	Stalk-Grain Sedge	S5	Green	No
<i>Geum aleppicum</i>	Yellow Avens	S5	Green	No
<i>Polygonatum pubescens</i>	Downy Solomon's-Seal	S4S5	Green	No
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5	Green	No
Clearcut				
<i>Betula populifolia</i>	Gray Birch	S5	Green	No
<i>Rubus idaeus</i>	Red Raspberry	S5	Green	No
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No
<i>Carex arctata</i>	Black Sedge	S5	Green	No
<i>Picea rubens</i>	Red Spruce	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	Green	No
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	Green	No
<i>Carex pallescens</i>	Pale Sedge	S5	Green	No
<i>Maianthemum canadense</i>	Wild Lily-of-The-Valley	S5	Green	No
<i>Ranunculus acris</i>	Tall Butter-Cup	SE	Green	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5	Green	No
Secondary Regen				
<i>Betula populifolia</i>	Gray Birch	S5	Green	No
<i>Rubus idaeus</i>	Red Raspberry	S5	Green	No
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Carex arctata</i>	Black Sedge	S5	Green	No
<i>Picea rubens</i>	Red Spruce	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	Green	No
<i>Scirpus cyperinus</i>	Cottongrass Bulrush	S5	Green	No
<i>Carex pallescens</i>	Pale Sedge	S5	Green	No
<i>Maianthemum canadense</i>	Wild Lily-of-The-Valley	S5	Green	No
<i>Ranunculus acris</i>	Tall Butter-Cup	SE	Exotic	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5	Green	No
Secondary Regen				
<i>Tsuga canadensis</i>	Eastern Hemlock	S4S5	Green	No
<i>Betula populifolia</i>	Gray Birch	S5	Green	No
<i>Fraxinus americana</i>	White Ash	S5	Green	No
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	Green	No
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5	Green	No
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No
<i>Athyrium filix-femina</i>	Lady-Fern	S5	Green	No
<i>Osmunda claytoniana</i>	Interrupted Fern	S5	Green	No
<i>Thelypteris noveboracensis</i>	New York Fern	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Polystichum acrostichoides</i>	Christmas Fern	S5	Green	No
<i>Phegopteris connectilis</i>	Northern Beech Fern	S5	Green	No
<i>Daphne mezereum</i>	February Daphne	SE	Exotic	No
<i>Veronica officinalis</i>	Gypsy-Weed	S5SE	Exotic	No
<i>Carex intumescens</i>	Bladder Sedge	S5	Green	No
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	SE	Exotic	No
<i>Oryzopsis asperifolia</i>	White-Grained Mountain-Ricegrass	S5	Green	No
<i>Carex leptoneura</i>	Finely-Nerved Sedge	S5	Green	No
<i>Populus tremuloides</i>	Quaking Aspen	S5	Green	No
<i>Hamamelis virginiana</i>	American Witch-Hazel	S5	Green	No
<i>Aralia nudicaulis</i>	Wild Sarsaparilla	S5	Green	No
<i>viola sp</i>	Violet sp.	Not at risk sp.		No
<i>Aster acuminatus</i>	Wood Aster	S5	Green	No
<i>Cornus canadensis</i>	Dwarf Dogwood	S5	Green	No
<i>Trientalis borealis</i>	Northern Starflower	S5	Green	No
<i>Luzula multiflora</i>	Common Woodrush	S5	Green	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Circaea alpina</i>	Small Enchanter's Nightshade	S5	Green	No
<i>Dryopteris carthusiana</i>	Spinulose Shield Fern	S5	Green	No
Alder Swale				
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Picea glauca</i>	White Spruce	S5	Green	No
<i>Tussilago farfara</i>	Colt's Foot	SE	Exotic	No
<i>Daphne mezereum</i>	February Daphne	SE	Exotic	No
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	Green	No
<i>Cornus alternifolia</i>	Alternate-Leaf Dogwood	S5	Green	No
<i>Equisetum arvense</i>	Field Horsetail	S5	Green	No
<i>Sium suave</i>	Hemlock Water-Parsnip	S5	Green	No
<i>Prunus serotina</i>	Wild Black Cherry	S5	Green	No
<i>Carex intumescens</i>	Bladder Sedge	S5	Green	No
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	Green	No
<i>Iris versicolor</i>	Blueflag	S5	Green	No
<i>Osmunda claytoniana</i>	Interrupted Fern	S5	Green	No
<i>Thelypteris noveboracensis</i>	New York Fern	S5	Green	No
<i>Clematis virginiana</i>	Virginia Virgin-Bower	S5	Green	No
<i>Arisaema triphyllum</i>	Swamp Jack-In-The-Pulpit	S4S5	Green	No
<i>Senecio robbinsiae</i>	Senecio	-	-	No
<i>Galium palustre</i>	Marsh Bedstraw	S5	Green	No
<i>Osmunda regalis</i>	Royal Fern	S5	Green	No
<i>Calamagrostis canadensis</i>	Blue-Joint Reedgrass	S5	Green	No
<i>Epilobium angustifolium</i>	Fireweed	S5	Green	No
<i>Thelypteris palustris</i>	Marsh Fern	S5	Green	No
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	S5	Green	No
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5	Green	No
<i>Comarum palustre</i>	Marsh Cinquefoil	S5	Green	No
<i>Proserpinaca pectinata</i>	Comb-Leaved Mermaid-Weed	S3	Green	No
<i>Asclepias incarnata</i>	Swamp Milkweed	S3	Green	No
River Aquatics				
<i>Juncus militaris</i>	Bayonet Rush	S5	Green	No
<i>Sium suave</i>	Hemlock Water-Parsnip	S5	Green	No
<i>Pontederia cordata</i>	Pickereel Weed	S5	Green	No
<i>Ludwigia palustris</i>	Marsh Seedbox	S5	Green	No
<i>Utricularia sp</i>	Bladderwort sp.	Not at risk sp.		
Wetland 20T 0472331 4985880				
<i>Typha latifolia</i>	Broad-Leaf Cattail	S5	Green	No
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	Green	No
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No
<i>Osmunda cinnamomea</i>	Cinnamon Fern	S5	Green	No
<i>Populus tremuloides</i>	Quaking Aspen	S5	Green	No
<i>Carex stipata</i>	Stalk-Grain Sedge	S5	Green	No
<i>Carex gynandra</i>	A Sedge	S5	Green	No
<i>Carex intumescens</i>	Bladder Sedge	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Betula alleghaniensis</i>	Yellow Birch	S5	Green	No
Secondary Regen				
<i>Betula papyrifera</i>	Paper Birch	S5	Green	No
<i>Betula alleghaniensis</i>	Yellow Birch	S5	Green	No
<i>Fraxinus americana</i>	White Ash	S5	Green	No
<i>Picea rubens</i>	Red Spruce	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Lilium canadense</i>	Canada Lily	S2S3	Yellow	No
<i>Laportea canadensis</i>	Wood Nettle	S3	Yellow	No
River Edge				
<i>Fraxinus americana</i>	White Ash	S5	Green	No
<i>Abies balsamea</i>	Balsam Fir	S5	Green	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Picea glauca</i>	White Spruce	S5	Green	No
<i>Pinus strobus</i>	Eastern White Pine	S5	Green	No
<i>Betula populifolia</i>	Gray Birch	S5	Green	No
<i>Betula papyrifera</i>	Paper Birch	S5	Green	No
<i>Salix discolor</i>	Pussy Willow	S5	Green	No
<i>Cornus alternifolia</i>	Alternate-Leaf Dogwood	S5	Green	No
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5	Green	No
<i>Carex gynandra</i>	A Sedge	S5	Green	No
<i>Clematis virginiana</i>	Virginia Virgin-Bower	S5	Green	No
<i>Thalictrum pubescens</i>	Tall Meadow-Rue	S5	Green	No
<i>Asclepias incarnata</i>	Swamp Milkweed	S3	Green	No
<i>Carex intumescens</i>	Bladder Sedge	S5	Green	No
<i>Carex arctata</i>	Black Sedge	S5	Green	No
<i>Polygonatum pubescens</i>	Downy Solomon's-Seal	S4S5	Green	No
<i>Viola cucullata</i>	Marsh Blue Violet	S5	Green	No
<i>Geum aleppicum</i>	Yellow Avens	S5	Green	No
<i>Galium asprellum</i>	Rough Bedstraw	S5	Green	No
<i>Senecio robbinsiae</i>	Senecio	-	-	No
<i>Athyrium filix-femina</i>	Lady-Fern	S5	Green	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	Green	No
<i>Cornus sericea</i>	Silky Dogwood	S5	Green	No
<i>Arisaema triphyllum</i>	Swamp Jack-In-The-Pulpit	S4S5	Green	No
<i>Sanguinaria canadensis</i>	Bloodroot	S3S4	Green	No
<i>Carex novae-angliae</i>	New England Sedge	S5	Green	No
<i>Aquilegia vulgaris</i>	European Columbine	SE	Exotic	No
<i>Prenanthes trifoliolata</i>	Three-Leaved Rattlesnake-root	S5	Green	No
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	S5	Green	No
<i>Sium suave</i>	Hemlock Water-Parsnip	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Chelone glabra</i>	White Turtlehead	S5	Green	No
<i>Scutellaria galericulata</i>	Hooded Skullcap	S5	Green	No
<i>Equisetum fluviatile</i>	Water Horsetail	S5	Green	No
<i>Ludwigia palustris</i>	Marsh Seedbox	S5	Green	No
<i>Proserpinaca pectinata</i>	Comb-Leaved Mermaid-Weed	S3	Green	No
<i>Triadenum fraseri</i>	Marsh St. John's-Wort	S5	Green	No
<i>Thelypteris palustris</i>	Marsh Fern	S5	Green	No
<i>Asclepias incarnata</i>	Swamp Milkweed	S3	Green	No
<i>Iris versicolor</i>	Blueflag	S5	Green	No
<i>Carex stipata</i>	Stalk-Grain Sedge	S5	Green	No
<i>Corylus cornuta</i>	Beaked Hazelnut	S5	Green	No
<i>Viburnum opulus</i>	Guelder-Rose Viburnum	S5	Green	No
<i>Lonicera canadensis</i>	American Fly-Honeysuckle	S5	Green	No
<i>Iris versicolor</i>	Blueflag	S5	Green	No
<i>Sticta fuliginosa</i>	lichen	-	Yellow	No
<i>Dendrocopaulon intricatum</i>	lichen	-	-	No
<i>Carex vesicaria</i>	Inflated Sedge	S4S5	Green	No
<i>Diervilla lonicera</i>	Northern Bush-Honeysuckle	S5	Green	No
Upland Poplars				
<i>Populus tremuloides</i>	Quaking Aspen	S5	Green	No
<i>Betula papyrifera</i>	Paper Birch	S5	Green	No
<i>Pteridium aquilinum</i>	Bracken Fern	S5	Green	No
<i>Anthoxanthum odoratum</i>	Sweet Vernal Grass	SE	Exotic	No
<i>Prunus virginiana</i>	Choke Cherry	S5	Green	No
<i>Potentilla simplex</i>	Old-Field Cinquefoil	S5	Green	No
<i>Fraxinus americana</i>	White Ash	S5	Green	No
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	S5	Green	No
<i>Acer rubrum</i>	Red Maple	S5	Green	No
<i>Crataegus sp</i>	Hawthorn sp.	Not at risk sp.		
<i>Fragaria virginiana</i>	Virginia Strawberry	S5	Green	No
<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S5	Green	No
<i>Moneses uniflora</i>	One-Flower Wintergreen	S5	Green	No
<i>Polystichum acrostichoides</i>	Christmas Fern	S5	Green	No
<i>Dennstaedtia punctilobula</i>	Eastern Hay-Scented Fern	S5	Green	No
<i>Thelypteris noveboracensis</i>	New York Fern	S5	Green	No
<i>Osmunda claytoniana</i>	Interrupted Fern	S5	Green	No
<i>Luzula acuminata</i>	Hairy Woodrush	S5	Green	No
<i>Oxalis montana</i>	White Wood-Sorrel	S5	Green	No
<i>Drosera rotundifolia</i>	Roundleaf Sundew	S5	Green	No
Wetland				
<i>Typha latifolia</i>	Broad-Leaf Cattail	S5	Green	No
<i>Galium palustre</i>	Marsh Bedstraw	S5	Green	No
<i>Lysimachia terrestris</i>	Swamp Loosestrife	S5	Green	No
<i>Juncus canadensis</i>	Canada Rush	S5	Green	No

ScoMine Expansion Areas - Plant Survey June 9, 10 2011

Surveyor: T. Neily

Species	Common Name	S-Rank	DNR Status	COSEWIC / NSESA /SARA
<i>Juncus effusus</i>	Soft Rush	S5	Green	No
<i>Viola sp</i>	Violet sp.	Not at risk sp.		
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	Green	No
<i>Ranunculus acris</i>	Tall Butter-Cup	SE	Exotic	No
<i>Alnus incana</i>	Speckled Alder	S5	Green	No
<i>Carex flava</i>	Yellow Sedge	S5	Green	No
<i>Carex stipata</i>	Stalk-Grain Sedge	S5	Green	No
<i>Eupatorium perfoliatum</i>	Common Boneset	S5	Green	No
<i>Lycopus americanus</i>	American Bugleweed	S5	Green	No

Attachment 3
June 2011 Field Photographs

Softwood stands



Mixed wood stands



Upland hardwoods (poplar)



Clearcuts



Secondary regeneration



Alder swales



River aquatics & Bluejoint Meadow Wetland



Riparian Edge



Shrub, Fen Wetland



Recent flooded area



Attachment 4
June 2011 Bird Survey Results

ScoMine Peak Breeding Survey June 16, 17 2011

Surveyor: F. Lavender

PC#:	1	6	11	16
UTM:	0472325, 4985852	0472529, 4986691	0472711, 4986054	0473358, 4986672
Date:	16-Jun-11	16-Jun-11	17-Jun-11	17-Jun-11
Sunrise:	5:27	5:27	5:27	5:27
Start Time:	5:47	8:04	5:18	7:15
Sky:	Overcast	Overcast	Overcast	Overcast
Precip/ Noise	No/light road noise	No/light road noise and moving water	No	No
W Speed:	15 km/h	15	<5 km/h	<5 km/h
Temp:	9	9	8	9
Habitat:	Mixed forest and wetland area at edge of pit material deposit	Large former clearcut to south and west, mixed to east and north	Cleared, rock piled area, mixed forest	Mixed forest - mature
PC#:	2	7	12	17
UTM:	0472686, 4986006	0472862, 4986853	0473483, 4986419	0473243, 4985432
Date:	16-Jun-11	16-Jun-11	17-Jun-11	17-Jun-11
Sunrise:	5:27	5:27	5:27	5:27
Start Time:	6:22	8:35	5:42	7:49
Sky:	Overcast	Overcast	Overcast	Sun/Clouds (clearing)
Precip/ Noise	No/light road/plane noise	No	No	No
W Speed:	15 km/h	15 km/h	<5 km/h	<5 km/h
Temp:	9	9	8	8
Habitat:	Open, cleared gravel area bordering mixed forest - hardwood dominant	Gravel pit to south, river, swamp, and softwood-dominant forest to N, E, and	Mixed forest at edge of clear area (rock/gravel/crushed)	Softwood forest to west/north, open area, burn area and tailings area near
PC#:	3	8	13	18
UTM:	0472712, 4986131	0473058, 4986759	0473563, 4986598	0472104, 4986484
Date:	16-Jun-11	16-Jun-11	17-Jun-11	17-Jun-11
Sunrise:	5:27	5:27	5:27	5:27
Start Time:	6:49	8:59	6:09	8:28
Sky:	Overcast, fog	Overcast (clearing)	Overcast	Sun/clear
Precip/ Noise	Yes (light)/light road noise	No	No	No
W Speed:	10 km/h	10	<5 km/h	5 km/h
Temp:	9	9	8	8
Habitat:	Former clearcut, immature softwood dominant	Softwood dominant to west, river to north, mixed forest to east.	Edge of former clear cut, mixed forest	Large hemlock/hardwood stand to north, swamp and sand/gravel pit to south
PC#:	4	9	14	19
UTM:	0472439, 4986241	0473114, 4985844	0473641, 4986807	0472395, 4986610
Date:	16-Jun-11	16-Jun-11	17-Jun-11	17-Jun-11
Sunrise:	5:27	5:27	5:27	5:27
Start Time:	7:14	9:33	6:29	8:55
Sky:	Overcast	Overcast	Overcast	Sun/clear
Precip/ Noise	No	No	No	No
W Speed:	10 km/h	20 km/h (increasing)	<5 km/h	10 km/h
Temp:	9	9	8	9
Habitat:	Softwood dominant, near secondary access roads and overhead power lines	Mixed forest to north, south, west, and young clearcut to east	Mixed forest - softwood dominant, at power line and some open gravel area	Recent clearcut, hardwood-dominant mixed forest to south
PC#:	5	10	15	20
UTM:	0472519, 4986403	0474128, 4986546	0473582, 4986918	17-Jun-11
Date:	16-Jun-11	17-Jun-11	17-Jun-11	0473992, 4986553
Sunrise:	5:27	5:27	5:27	5:27
Start Time:	7:40	4:51	6:50	9:40
Sky:	Overcast	Light overcast	Overcast	Sun/clear
Precip/ Noise	No	No	No/Light road noise	No
W Speed:	15 km/h	<5 km/h	<5 km/h	<5 km/h
Temp:	9	8	8	10
Habitat:	Mixed forest, 150m from recent clearcut, near access roads	Wetland area at Gays River, mixed conifer-dominant	large wetland and alder swamp area, between river and clear cut area	Edge of clearcut - hardwood regen; edge of wetland bordering Gays River

**Draft - Potential Priority Plant / Lichen Species for ScoZinc Study Area based on Previous Studies;
2011 ACCDC (100 km) and NSM data and 2011 SARA/NSESA/COSEWIC Listings and Potential
Habitat Present**

Species	Name	SARA (or COSEWIC*) Status and Sched. and NSESA Status or General DNR Status ¹	Habitat ² (nearby reference locations)	Flowers ²
<i>Anemone quinquefolia</i>	Wood Anemone	NSDNR yellow	Wooded river banks and shaded intervalles	late May-early June
<i>Betula michauxii</i>	Dwarf Birch	NSDNR yellow	Peat and sphagnum bogs	Jun-Jul.
<i>Bidens (Megalondonata) beckii</i>	Beck water- marigold	NSDNR yellow	Shallow, quiet water, slow stream/pond	Aug-Sept.
<i>Carex hirtifolia</i>	Pubescent sedge	NSDNR Red	Calcareous soil, slope	May-Jun.
<i>Caulophyllum thalictroides</i>	Blue cohosh	NSDNR Red	Deciduous/interval forest	Apr.-early Jun
<i>Cypripedium reginae</i>	Showy lady's- slipper	NSDNR Red	Alkaline swamp, bog	Jun.-Aug.
<i>Dirca palustris</i>	Eastern leatherwood	NSDNR Red	Gypsum, rich woods	late May- visible year round
<i>Erioderma pedicellatum</i>	Boreal Felt Lichen	SARA Endangered Sched. 1 NSESA Endangered	Moist balsam fir forests	Na - visible year round
<i>Euthamia caroliniana</i>	Goldenrod sp.	NSDNR Yellow	Dry sandy soil, beach	Aug.-Sept.
<i>Fraxinus nigra</i>	Black Ash	NSDNR Yellow	Damp wood, swamp	May-Jun. - visible year round
<i>Goodyera pubescens</i>	Downy rattlesnake- plantain	NSDNR Red	Woodlands and thickets	Jul.-Aug.
<i>Hepatica nobilis</i>	Round-leaved liverleaf	NSDNR Red	Dry woods	early May
<i>Laportea canadensis</i>	Wood nettle	NSDNR Yellow	Alluvial	Jul.-Sept.
<i>Lilium canadense</i>	Yellow Canada lily	NSDNR Yellow	Alluvial	July
<i>Listera australis</i>	Southern Twayblade	NSDNR Red	Red maple swale, wetland	Late Jun.-Jul.
<i>Myriophyllum farwellii</i>	Water-milfoil	NSDNR Yellow	Ponds and slow moving stream	June-Sept.
<i>Potamogeton zosteriformis</i>	Flatstem pondweed	NSDNR Yellow	Shallow lake, river	Jul.-Sept.
<i>Ranunculus flammula</i> var. <i>flammula</i>	Greater creeping snowwort	NSDNR Yellow	Gravelly lake shore, cold brook, swale, grassy bog	summer
<i>Rhamnus alnifolia</i>	Alderleaf Buckthorn	NSDNR Yellow	Swampy woods, meadows, alkaline	May-June
<i>Salix sericea</i>	Silky willow	NSDNR Yellow	Wet thicket, stream edge, marsh	Early summer
<i>Scirpus pedicellatus</i>	Bulrush sp.	NSDNR Undetr.	Wet areas	July
<i>Spiranthes lucida</i>	Shining Ladies- tresses	NSDNR Red	Alluvial soils	Early July
<i>Spiranthes ochroleuca</i>	Yellow Nodding Ladies'-Tresses	NSDNR Yellow	Acid sandy soils in dry, open habitat	Sept.-Oct.
<i>Tiarella cordifolia</i>	Heart-leaved foam flower	NSDNR Yellow	Deciduous forest, intervalle	Mid May - mid June
<i>Vallisneria americana</i>	Eel-grass	NSDNR Red	Quiet waters	Jul.-Oct.

1. NSDNR Status of Nova Scotia Wildlife - Red at risk, Yellow sensitive, Green stable

2. Zinck 1998

**Draft - Potential Priority Animal Species for ScoZinc Study Area based on Previous Studies; 2011
ACDC (100 km) and NSM data and 2011 SARA/NSEA/COSEWIC Listings and Potential Habitat
Present**

Common Name	SARA (or COSEWIC*) Status and Sched. and NSEA Status	NSDNR Status	Habitat Preference	Timing for Investigation
INVERTEBRATES				
Brook Floater (<i>Alasmidonta varicose</i>)	na	Yellow	Riffles, rocky, gravel, sand bottom	Summer
Eastern Lampkill (<i>Lampsilis radiata</i>)	na	Yellow	Streams; sand to mud	Summer
Little Bluet (<i>Enallagma minusculum</i>)	na	Yellow	Pond, lake shore	Spring - Fall
Rusty Snaketail (<i>Ophiogomphus rupinulensis</i>)	na	Red	Rapid large streams and rivers	Spring - Fall
Skillet Clubtail (<i>Gomphus ventricosus</i>)	na	Red	Turbid rivers, mud bottom, good water quality, clean lake sand or marl bottom	Spring - Fall
Zebra Clubtail (<i>Stylurus scudder</i>)	na	Red	Forest streams	Summer
BIRDS				
Bobolink (<i>Dolichonyx oryzivorus</i>)	Threatened	Yellow	Nest in openings, lush grass	nest Jun. - Jul.
Baltimore Oriole (<i>Icterus galbula</i>)	na	Green	Open woods, forest edge, farmland	nest May-Jun.
Bank Swallow (<i>Ripara ripara</i>)	Threatened	Green	Banks, cliffs	nest May-July
Boreal Chickadee (<i>Parus hudsonicus</i>)	na	Yellow	Nest cavities in rotted tree stumps	nest Mid May – mid Aug.
Canada Warbler (<i>Wilsonia canadensis</i>)	Threatened	Yellow	Dense understory mature to mid age forest	Nest June
Common Tern (<i>Sterna hirundo</i>)	na	Yellow	Nest offshore but may feed inland along lake shores	nest Summer
Least Sandpiper (<i>Calidris minutilla</i>)	na	Green	Sedge meadow and bog	Nest May-Jun.
Northern Goshawk (<i>Accipiter gentilis</i>)	na	Yellow	Woodland species	nest Apr.-May
Rusty Blackbird (<i>Euphagus carolinus</i>)	Special Concern	Yellow	Nests in swamps and bogs along sluggish streams.	nest May-July
Whip-poor-will (<i>Caprimulgus vociferus</i>)	Threatened	Green	Nest in mixed forest near clearings.	Nest May – Jun.
FISH				
Atlantic salmon – Inner Bay of Fundy (<i>Salmo salar</i>)	Endangered Sched. 1	Red	Gravel bottomed streams, rivers	Late summer/fall
American eel (<i>Anguilla rostrata</i>)	Special Concern	Green	Fresh water streams for adults. Migrate to sea to spawn.	Non-winter
Brook trout (<i>Salvelinus fontinalis</i>)	na	Yellow	Streams, brooks	Late summer/fall
Gaspereau (<i>Alosa pseudoharengus</i>)	na	Yellow	Spawn above head of tide in rivers, stillwater, lake	Spring-summer
Striped bass (<i>Morone saxatilis</i>)	Threatened	Red	Spawn at head of tide.	Spring-summer
Herptiles				
Snapping turtle (<i>Chelydra serpentina</i>)	Special Concern	Green	Vegetated lakes and streams, nest on sand / gravel	Non-winter
Wood turtle (<i>Glyptemys insculpta</i>)	Threatened, Vulnerable	Yellow	Nest on gravel bank near river, overwinter in pools, clear streams	Late spring
MAMMALS				
Eastern Pipistrelle (<i>Pipistrellus subflavus</i>)	na	Yellow	Hibernate in caves, may feed in area	Summer - fall
Little Brown Bat (<i>Myotis lucifugus</i>)	na	Yellow	Hibernate in caves, may feed in area	Summer - fall
Northern Myotis (<i>Myotis septentrionalis</i>)	na	Yellow	Hibernate dense forest and caves, may feed in area	Summer - fall

APPENDIX D

SCOZINC OPERATIONS ARCHAEOLOGICAL SCREENING & RECONNAISSANCE

SELWYN RESOURCES LIMITED

**GAYS RIVER MINE
ARCHAEOLOGICAL
SCREENING & RECONNAISSANCE**

**ARCHAEOLOGICAL
SCREENING & RECONNAISSANCE
REPORT**

Submitted to:
Conestoga-Rovers and Associates
and the
Heritage Division

Prepared by:
Cultural Resource Management Group Limited
6040 Almon Street
Halifax, Nova Scotia
B3K 1T8

Consulting Archaeologist: Sara Beanlands
Report Preparation: Sara Beanlands

Heritage Research Permit Number: A2011NS43

CRM Group Project Number: 2011-0013-01

JUNE 2011



TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
2.0 STUDY AREA	2
3.0 METHODOLOGY	5
3.1 Background Study.....	5
3.2 Field Reconnaissance.....	5
4.0 RESULTS OF SCREENING AND RECONNAISSANCE	6
4.1 Background Study.....	6
4.1.1 Environmental Setting	6
4.1.2 Previous Archaeological Research	8
4.2 2011 Field Reconnaissance.....	14
5.0 CONCLUSION AND RECOMMENDATIONS.....	23
6.0 REFERENCES CITED.....	14

LIST OF FIGURES

Figure 1:	Approximate Study Areas	3
Figure 2:	2011 Archaeological Study Areas.....	4
Figure 3:	Site Location and Archaeological Sites in the Vicinity.....	9
Figure 4:	Archaeological Study Areas.....	10
Figure 5:	High Potential Areas	17

LIST OF PLATES

Plate 1:	Existing facilities at Gays River Mine, formerly the Scotia Mine property; facing north. May 27, 2011	2
Plate 2:	Gays River; facing southwest. May 27, 2011	7
Plate 3:	Sinkhole indicating karst topography; facing northeast. May 27, 2011	7
Plate 4:	Impact of previous quarry expansion on eastern study area; facing northwest. May 27, 2011	15
Plate 5:	Typical hummocky woodland and undulating terrain; facing north. May 27, 2011.....	15
Plate 6:	Sand quarry situated in western study area; facing southwest. May 27, 2011	16
Plate 7:	High Potential Area 1; facing southwest. May 27, 2011.....	16
Plate 8:	High Potential Area 2; facing northwest. May 27, 2011	19
Plate 9:	High Potential Area 2; facing southeast. May 27, 2011	19
Plate 10:	Rectangular depression in High Potential Area 2; facing south. May 27, 2011	20
Plate 11:	Small circular depression in High Potential Area 2; facing north. May 27, 2011	20
Plate 12:	High Potential Area 3; facing south. May 27, 2011	21
Plate 13:	Possible remains of historic bridge; facing northwest. May 27, 2011.....	21
Plate 14:	High Potential Area 4, showing terraces; facing south. May 27, 2011	22
Plate 15:	Level terrace in High Potential Area 4; facing northeast. May 27, 2011	22

**GAYS RIVER MINE
ARCHAEOLOGICAL SCREENING & RECONNAISSANCE
HALIFAX REGIONAL MUNICIPALITY
NOVA SCOTIA**

1.0 INTRODUCTION

Selwyn Resources Limited is in the process of acquiring mining operations at Scotia Mine, located within the community of Gays River, from Acadian Mining. In order to address the potential for encountering archaeological resources during any subsequent development of the facility, Conestoga-Rovers and Associates (CRA), on behalf of Selwyn Resources, retained Cultural Resource Management (CRM) Group Limited in April 2011 to undertake archaeological screening and reconnaissance of previously un-assessed areas inside the Scotia Mine property.

The archaeological screening and reconnaissance was directed by CRM Group Staff Archaeologist Sara Beanlands. Technical support was provided by CRM Group President and Senior Consultant W. Bruce Stewart and Archaeological Technician Kathryn Stewart. Reconnaissance was carried out on May 27, 2011.

The archaeological investigation was conducted according to the terms of Heritage Research Permit A2011NS43 (Category 'C'), issued to Beanlands by the Nova Scotia Heritage Division. This report describes the archaeological screening and reconnaissance of the Gays River Mine 2011 archaeological study areas, presents the results of these efforts and offers cultural resource management recommendations.

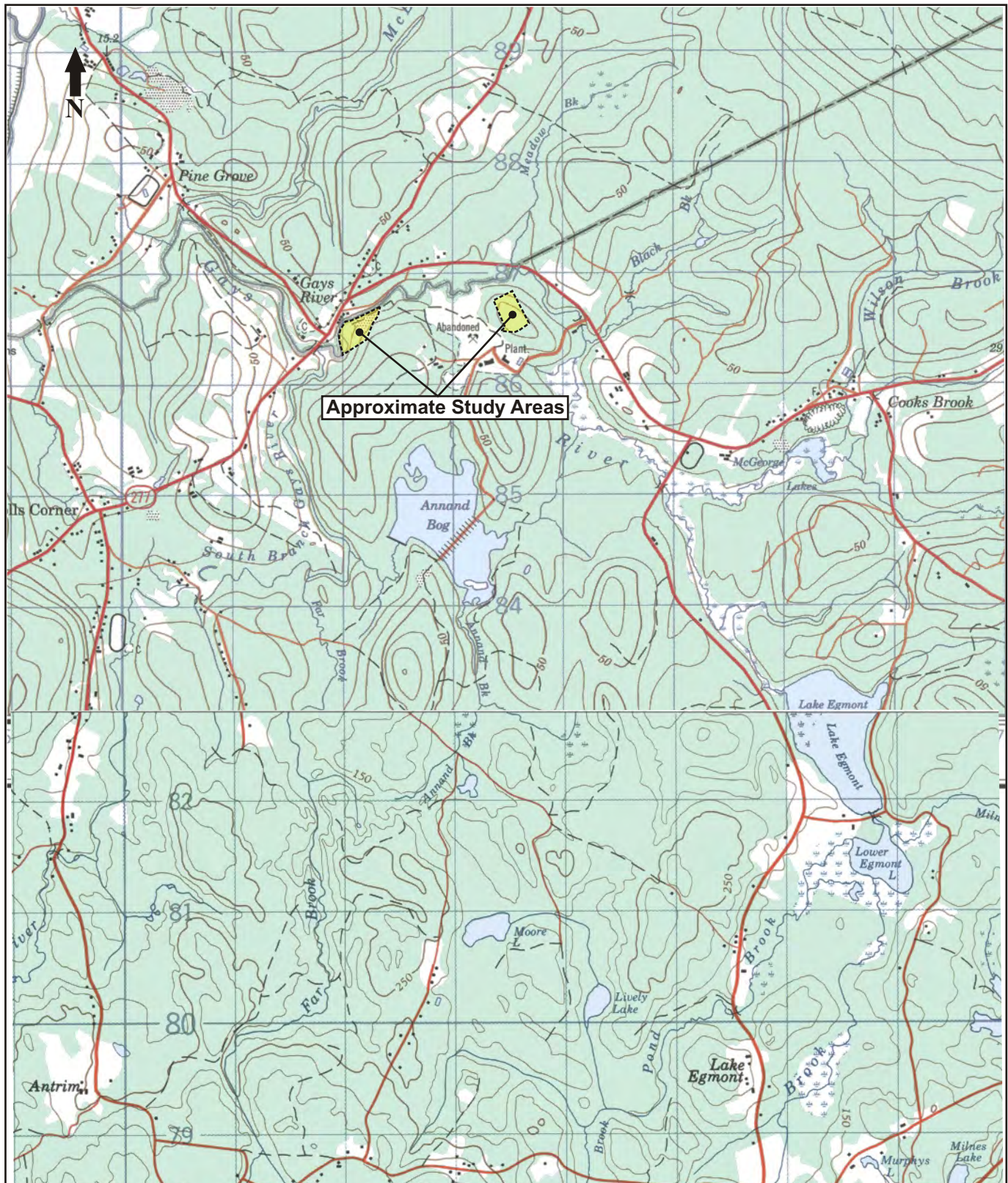
2.0 STUDY AREA


The Gays River Mine, formerly the Scotia Mine property, is generally located within the community of Gays River, situated at the southern limit of the Municipality of the County of Colchester (**Plate 1**). However, the Gays River Mine property and the 2011 archaeological study areas, located on the southern side of Gays River, fall within the Halifax Regional Municipality (**Figure 1**). Access to the property can be gained along Highway 224.

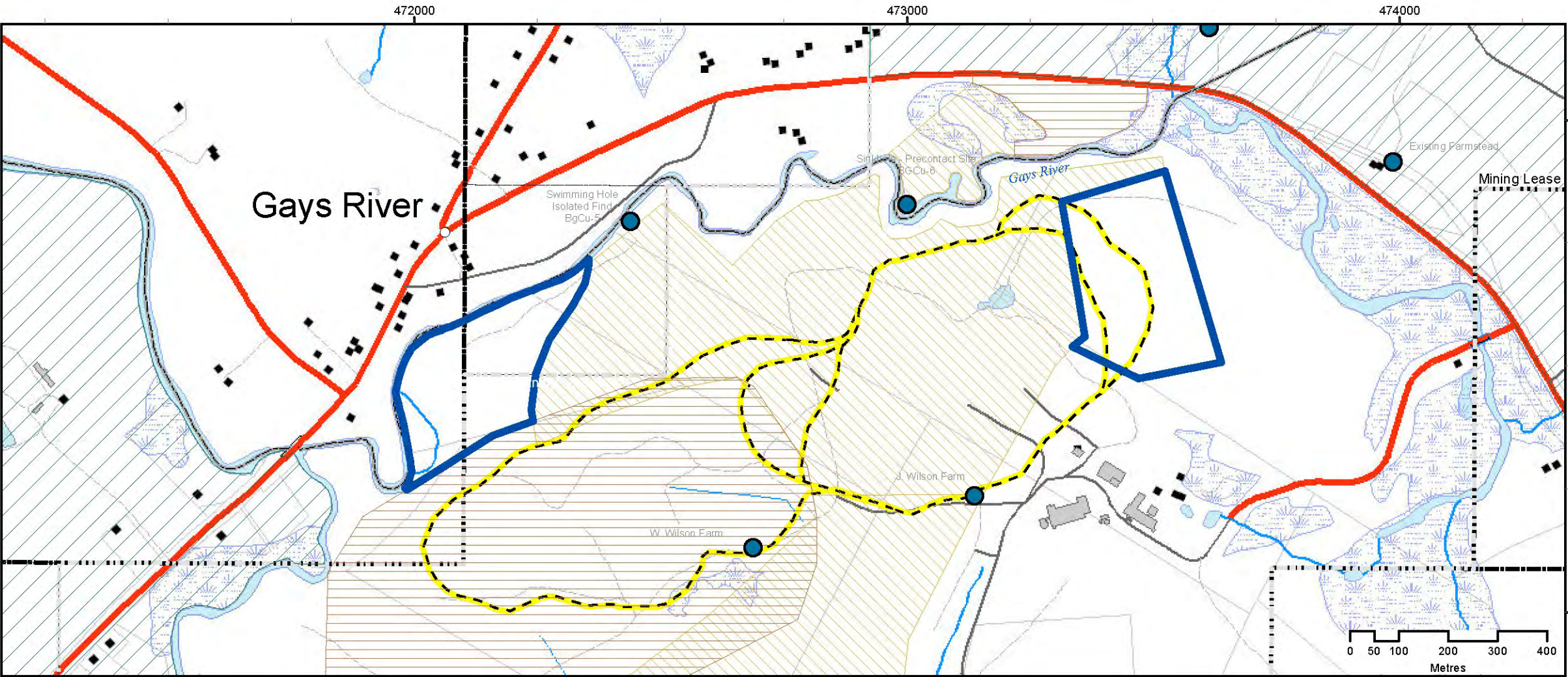
The 2011 archaeological study areas consist of two separate parcels of land (**Figure 2**). The western parcel, which extends approximately 300 metres east/west at its widest point, by approximately 600 metres north/south, is situated adjacent to the southern bank of Gays River. The eastern parcel, which extends approximately 250 metres east/west by approximately 500 metres north/south, is situated approximately 100 to 500 metres south of the river.



PLATE 1: Existing facilities at Gays River Mine, formerly the Scotia Mine property; facing north. May 27, 2011.



	<p>Approximate Study Areas</p>	<p>Figure 1</p>
	<p>GAYS RIVER MINE ARCHAEOLOGICAL SCREENING & RECONNAISSANCE 2011 ARCHAEOLOGICAL STUDY AREAS HALIFAX REGIONAL MUNICIPALITY</p>	<p>June 2011</p>
		<p>Scale 1:50 000</p>



LEGEND:

Archaeological Study Areas

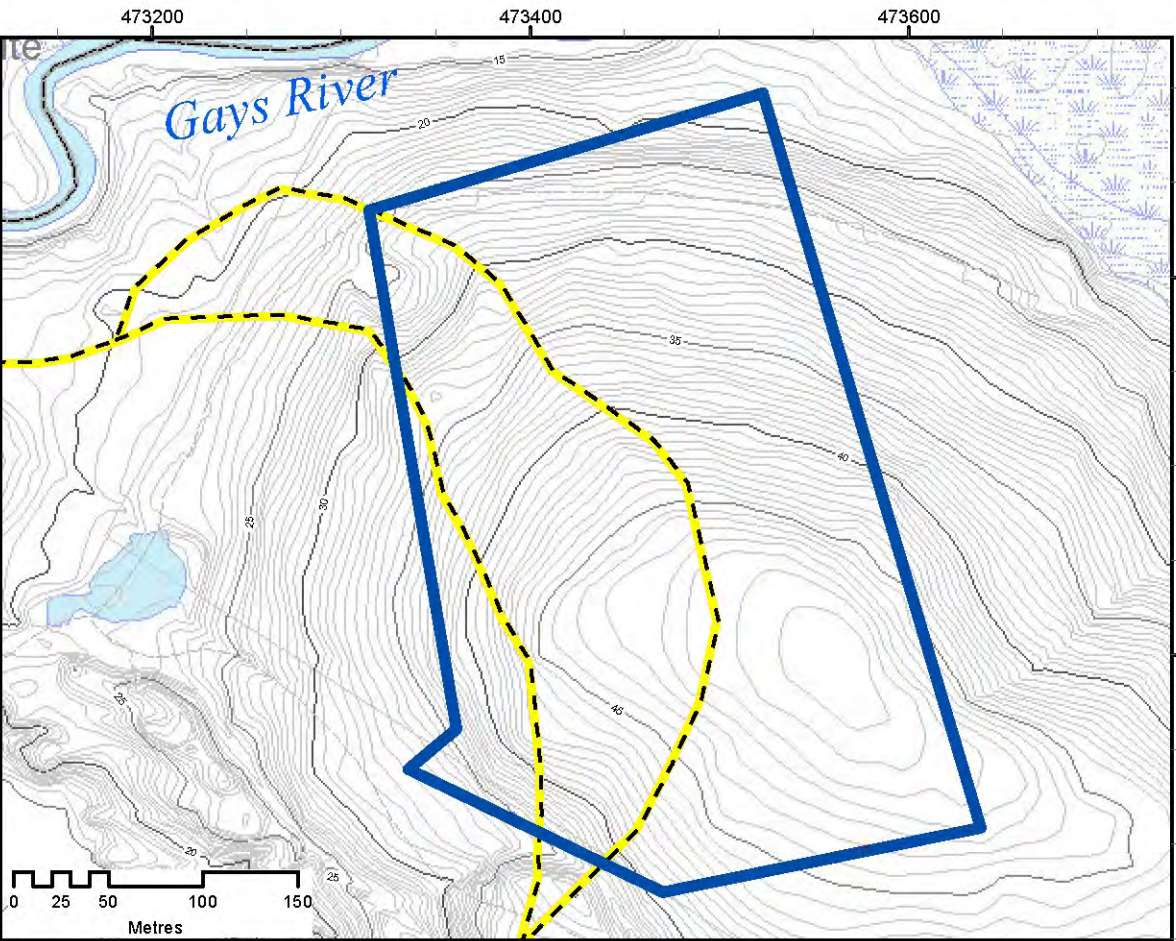
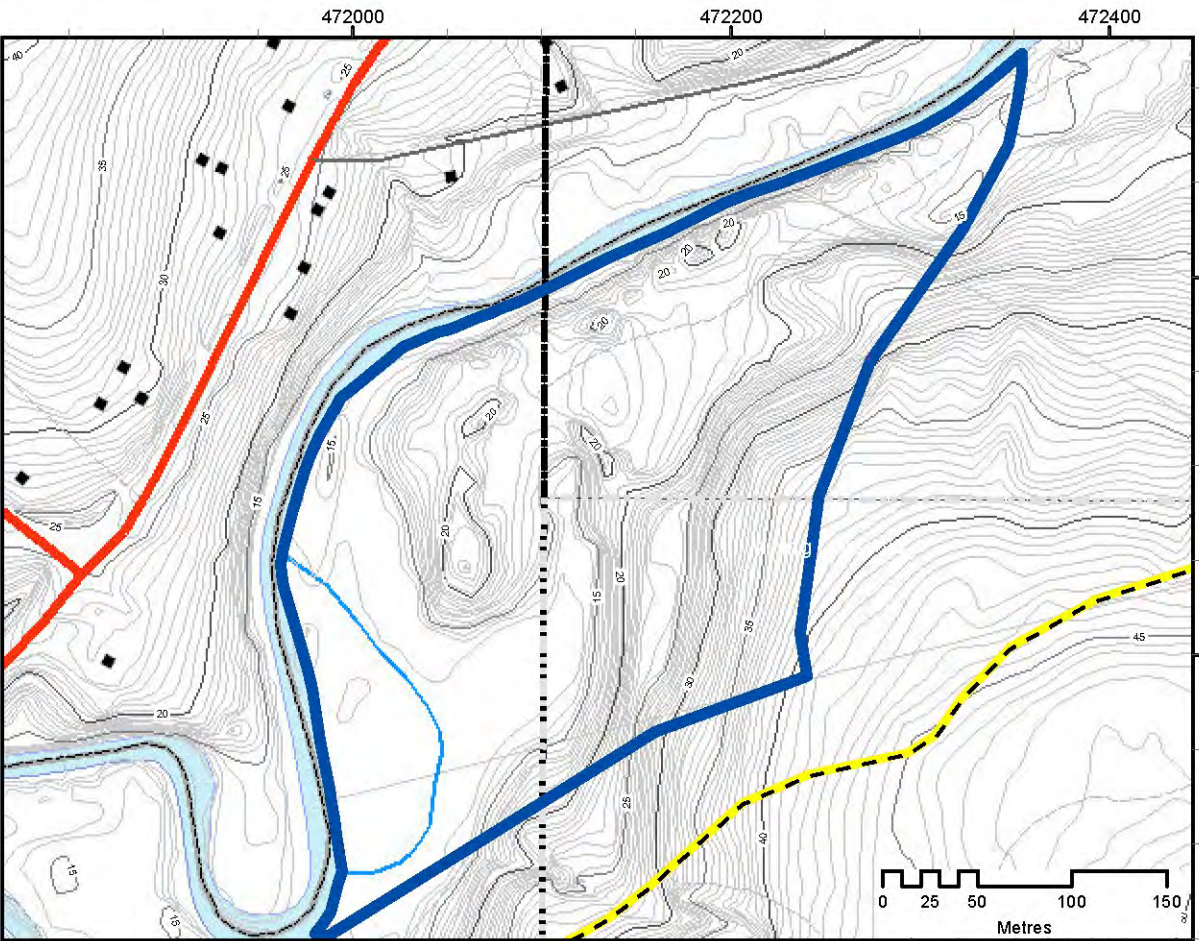
- 2011 Study Areas

Completed Studies

- 1998 (Cleared)
- 2006 (Cleared)
- 2008 (Assessment only)

Archaeological Sites/Features

- Extraction Areas



SOURCE:

Base Map : SNS&MR
Property : SNS&MR
Arch. Studies: CRM Group

CRM Group
Cultural Resources Management Group Ltd.

PROJECTION:
UTM z20 NAD83

DRAWN / CHECKED BY:
JJP /

MAP ANGLE:
0° North

SCALE:
1:10,000 / 1:4,000

DATE:
June 2011

PROJECT NO:
074320

074320 GIS-DA001_Arch 2011.mxd

Detailed Study Area

Figure 2

**GAYS RIVER MINE
ARCHAEOLOGICAL SCREENING & RECONNAISSANCE
2011 ARCHAEOLOGICAL STUDY AREAS
HALIFAX REGIONAL MUNICIPALITY**

**CONESTOGA-ROVERS
& ASSOCIATES**

3.0 METHODOLOGY

CRA, on behalf of Selwyn Resources Ltd., retained CRM Group to undertake archaeological screening and reconnaissance of two previously un-assessed areas inside the former Scotia Mine property. The objective of the archaeological assessment was to evaluate archaeological potential within the two un-assessed areas of the property that may be disturbed by subsequent activities associated with the development of the mining facility. To address this objective, CRM Group developed a work plan consisting of the following components: a review of relevant site documentation to develop an archaeological potential model (screening); archaeological reconnaissance of the areas that may be impacted by development activities; and, a report summarizing the results of the background research and field survey, as well as providing cultural resource management recommendations.

3.1 Background Study

The background study included a review of documentation that had been compiled for previous projects within the former Scotia Mine property. Topographic maps and aerial photographs, both current and historic, were also used to evaluate the study area. This data facilitated the identification of environmental and topographic features that would have influenced human settlement and resource exploitation patterns. The historical and cultural information was integrated with the environmental and topographic data to identify potential areas of archaeological sensitivity.

3.2 Field Reconnaissance

The goals of the archaeological field reconnaissance were to conduct a visual inspection of the study areas, document any areas of archaeological sensitivity or archaeological sites identified during the course of visual inspection, and design a strategy for testing any areas of archaeological potential, as well as any archaeological resources identified within the study area. Although the ground search did not involve sub-surface testing, the researchers were watchful for topographic or vegetative anomalies that might indicate the presence of buried archaeological resources. The process and results of the field reconnaissance were documented in field notes and photographs.

A hand-held Global Positioning System (GPS) unit was used to record UTM coordinates for all survey areas, as well as any identified diagnostic artifacts, formal tools, isolated finds and site locations. All coordinates use NAD 83 as datum.

4.0 RESULTS OF SCREENING AND RECONNAISSANCE

4.1 Background Study

The following discussion details the environmental and cultural setting of the study area, as well as previous archaeological research conducted on the former Scotia Mine property. This background study provides a framework for the evaluation of archaeological potential and the initial interpretation of any resources encountered during the field component of the assessment.

4.1.1 Environmental Setting

A number of environmental factors such as water sources, physiographic features, soil types and vegetation have influenced settlement patterns and contribute to the archaeological potential of the area.

Water Sources

Proximity to water, for both drinking and transportation, is a key factor in identifying Precontact and historic Native, as well as early Euro-Canadian, archaeological potential. The archaeological study areas are located south of Gays River, a slow-moving tributary of the Shubenacadie River, which would have been an important transportation corridor facilitating travel between the Minas Basin and the Atlantic Coast at Musquodoboit (*Plate 2*).

Topography

The Gays River Mine study areas are located within the greater terrestrial region known as the Windsor Lowlands Unit – Shubenacadie River (Davis & Browne 1996: 100). As such, it is underlain by Early Carboniferous (Windsor Group) strata, predominately composed of gypsum, limestone, sandstone and siltstone. Indeed, a portion of the western study area displays obvious features of karst topography (*Plate 3*). The greater landscape can be described as an area of lowland plains with limited relief. However, the general topography of the Gays River region varies from rolling to hilly, and elevation within the study areas ranges from approximately 15 metres to approximately 40 metres above sea level.

The eastern study area is covered primarily by *Queens* series soils – imperfectly drained, sandy clay loam developed on clay loam till derived principally from shale and sandstone (Davis & Browne 1996: 101). The mantle of glacial till attains a thickness of approximately 75 metres in this region and deep soils have developed resulting in excellent agricultural areas (MacDougall et al. 1963: 25-26). In general, “the fine texture and poor structure in the lower part of the soil profile impedes the internal drainage and, on the more level areas, the soils are poorly drained” (MacDougall et al. 1963: 25). There are problems with drainage in the area as a result, and adequate slope must be present to carry away excess water. Under these conditions the soils are best suited for grain, hay or pasture (MacDougall et al. 1963: 25).

The western study area is covered primarily by *Hebert* series soils – brown sandy loam over strong-brown to brown sandy loam derived from gravel, sand and finer sediments of mixed origin (MacDougall et al. 1963: 35). *Hebert* series soils occur chiefly along larger rivers, such as the Musquodoboit and Gays rivers. The topography varies from gently undulating to irregularly



PLATE 2: Gays River; facing southwest. May 27, 2011.



PLATE 3: Sinkhole indicating karst topography; facing northeast. May 27, 2011.

shaped hills or mounds composed of sand, gravel and till that accumulate on hills and river terraces. The soils can be used for a wide range of crops, but must be well supplied with organic matter and nutrients for good yields (MacDougall et al. 1963: 35).

Vegetation

Forest growth within this ecological region is characterized largely by coniferous species including red spruce, black spruce, balsam fir and eastern hemlock (Davis & Browne 1996: 102). The forest growth in the area is relatively open and has been subjected to some tree harvesting activity.

4.1.2 Previous Archaeological Research

1998 Study Areas

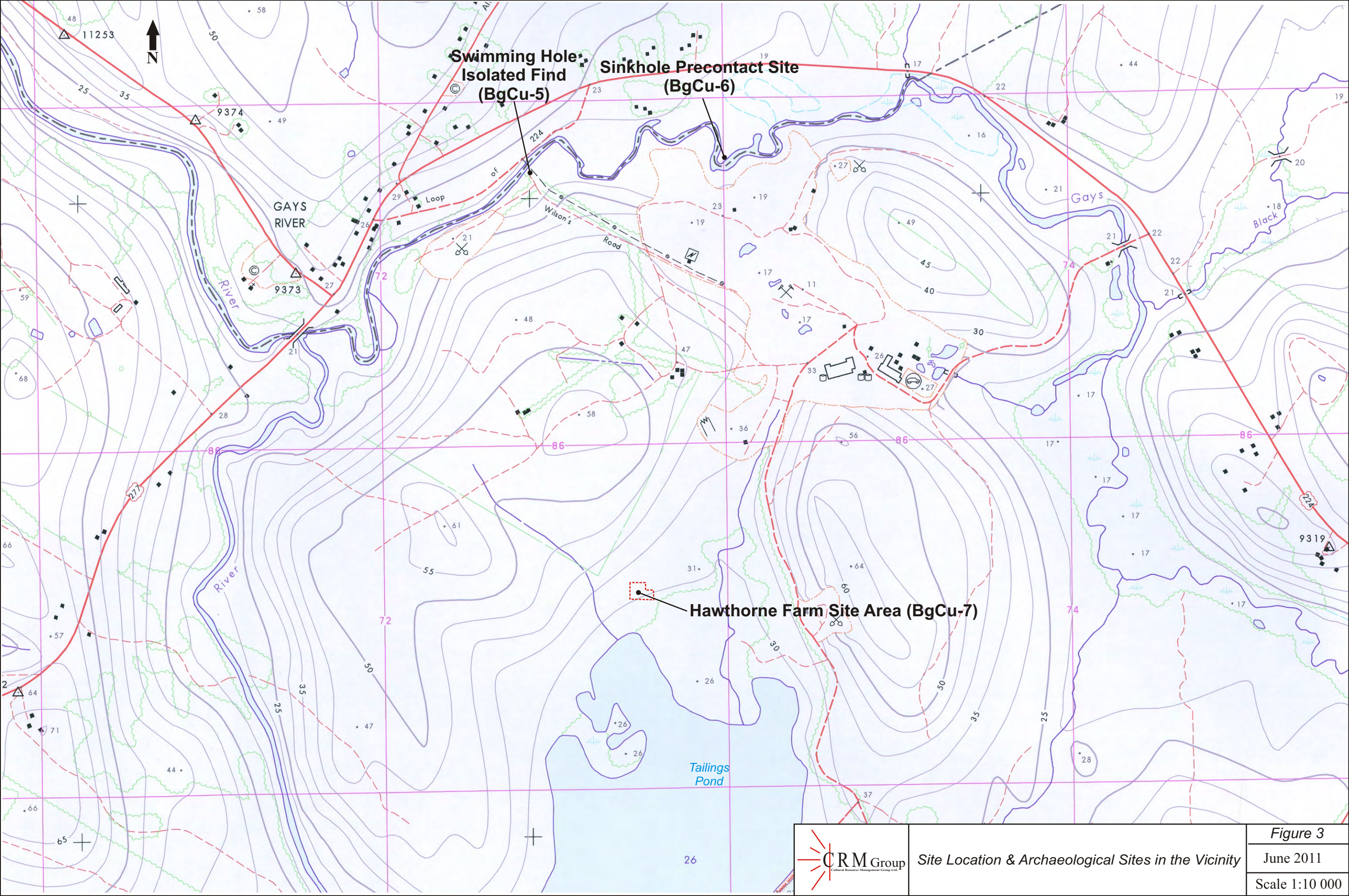
Prior to 1998, no portion of the Scotia Mine site had been addressed by archaeological assessment. In 1998, MGI Limited, now CRA, retained In Situ - Cultural Heritage Research Group, on behalf of Savage Resources Canada Company, to investigate archaeological potential within five proposed on-site development areas (Sanders 1998). The 1998 study areas, each named for its proposed future function, were identified as the River Relocation, Pit Expansion, North Stockpile, South Stockpile and East Stockpile areas. As a result of the 1998 archaeological assessment, three archaeological resource areas were identified (**Figures 3 & 4**). They are described separately below.

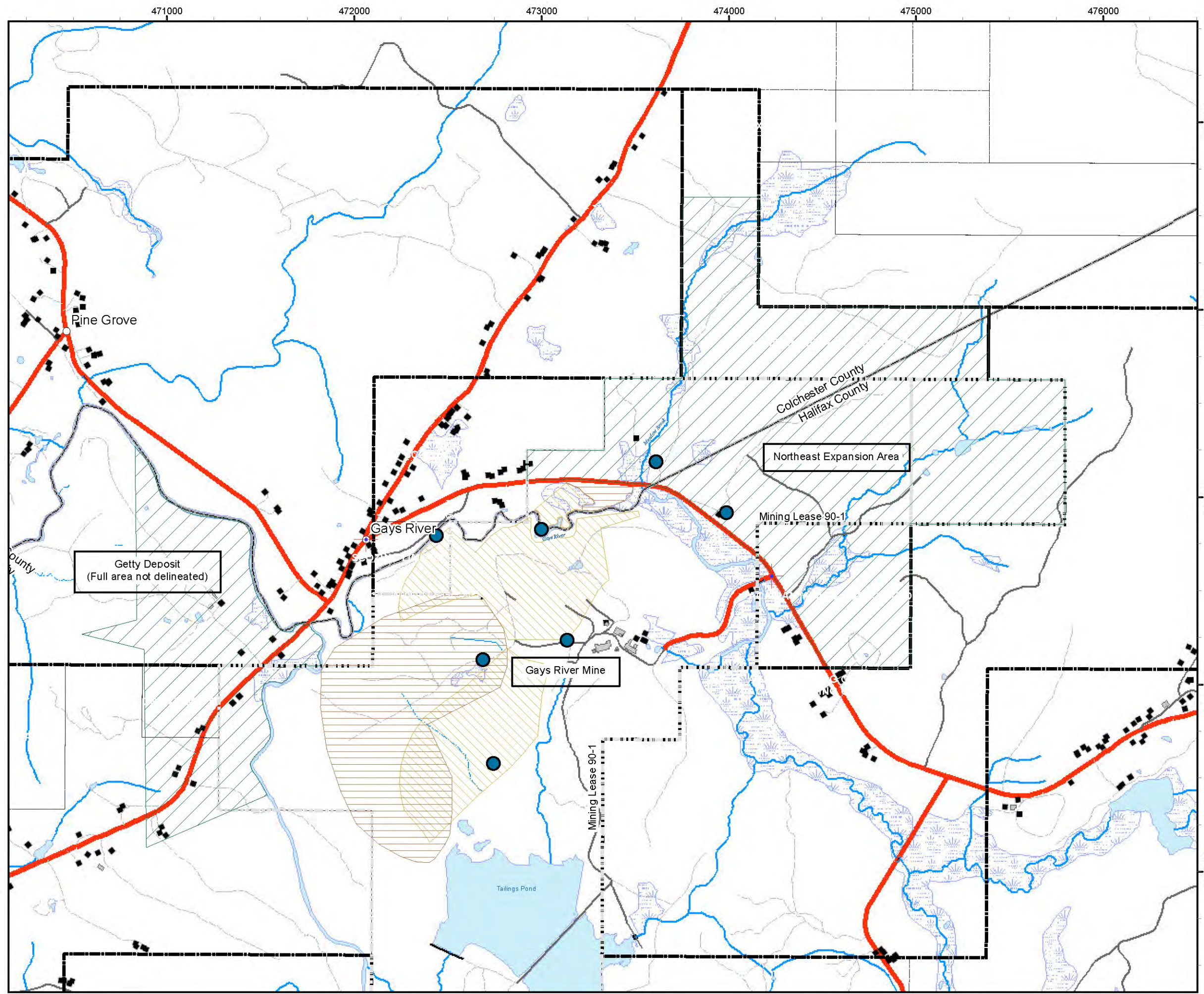
Swimming Hole Isolated Find (BgCu-5)

The Swimming Hole isolated find constitutes a single quartz flake (a by-product of the manufacture or modification of a stone tool) recovered from a shovel test on the southern side of Gays River, 7.5 metres southeast of the river's edge and 38 metres northeast of Wilson's Road (**Figure 3**). Although additional shovel tests were dug outward from the findspot in each cardinal direction, no other artifacts or stratigraphic indications of archaeological resources were encountered, suggesting that the flake may have been an isolated artifact. The Swimming Hole isolated find is a registered archaeological site (BgCu-5).

Sinkhole Site (BgCu-6)

The Sinkhole site, a small Precontact habitation site, is situated on the northern bank of the Gays River, where a natural sinkhole creates a flooded notch in the riverbank on the south-eastern side of a prominent point (**Figure 3**). Estimated to cover an area approximately 14 metres long (east/west) by 8 metres wide (north/south), the site occupies a narrow ridge between the north bank of Gays River and a relict river channel. Limited testing of this site in 1998 yielded 23 flakes recovered from two shovel tests in a series of shovel test pits excavated at five-metre intervals across the site area. Five one metre-square test units were also excavated. The Sinkhole Site is a registered archaeological site (BgCu-6).





LEGEND:

Archaeological Study Areas

Year

- 1998 (Cleared)
- 2006 (Cleared)
- 2008 (Assessment only)
- Archaeological Sites/Features

SOURCE:

0 100 200 400 600 800 1,000
Metres

PROJECTION: UTM, zone 20, NAD83
DRAWN / CHECKED BY: JJP /
MAP ANGLE: 0° North

SCALE: 1:20,000
DATE: April 20, 2011
PROJECT NO: 074320

074320(01) GIS-DA002_Arch Studies.mxd

figure 4
ARCHAEOLOGICAL STUDIES
Gays River Mine
SELWYN RESOURCES LTD
Cooks Brook, Nova Scotia

CONESTOGA-ROVERS & ASSOCIATES

Hawthorne Farm Site (BgCu-7)

The Hawthorne Farm Site, including an historic cellar depression and a culturally modified landscape, was located north of the tailings pond floodplain, at the eastern edge of the South Stockpile area as proposed in 1998 (**Figure 3**). A single one-metre square test unit excavated near the cellar in 1998 yielded 36 artifacts, representing architectural material (nails and window glass) and domestic waste (ceramics, glass, metal and leather) dating to the mid-1800s.

2006 Study Areas

In 2006, Acadian Gold Corporation requested that additional areas not previously assessed in 1998 be subjected to archaeological assessment. CRM Group was retained by CRA, on behalf of Acadian Gold, to address the new areas of interest at the Scotia Mine site (**Figure 4**). The 2006 CRM Group assessment, designed to build upon the 1998 survey, focussed on areas not previously assessed, but was also designed to identify and help delineate known archaeological resources in the vicinity of Scotia Mine (Sanders & Stewart 2007). The 2006 study areas are described below.

Northern Area

The Northern Area, measuring approximately 3.5 hectares in area, was located on the northern side of Gays River, roughly 300 metres northeast of the Sinkhole Site (BgCu-6) (**Figure 4**). Identified in conjunction with plans for a river diversion, this area of interest was situated between the river and Route 224, and between 0.9 and 1.2 kilometres west of the Scotia Mine access road.

Western Area

The largest of the 2006 study areas was a nearly 90 hectare “L”-shaped area located west of the processing mill and northwest of the tailings pond (**Figure 4**). The area consisted of upland terrain with varying degrees of forest cover.

Hawthorne Farm Site Area

CRM Group’s 2006 work included a program of shovel testing designed to identify the northern and western boundaries of the Hawthorne Farm site’s zone of archaeological sensitivity. The ultimate goal was to include site avoidance strategies into the process of mine site development planning. Ultimately, the shovel testing program was restricted to the area within 20 metres north and west of the site’s identified cellar.

Eastern Area

This area consisted of an historic field, located approximately 240 metres northeast of the Hawthorne Farm Site cellar, immediately north of the existing tailings pond floodplain and slightly east of the South Stockpile boundaries as delineated in 1998. Although this field was outside of the 1998 archaeological assessment area, its existence northeast of the main features at the Hawthorne Farm site was noted in the 1998 archaeological assessment report.

The 2006 Archaeological assessment conducted in four areas of the Scotia Mine property in 2006 involved background research, reconnaissance, shovel testing and strategic test excavation.

With the exception of the Western Area, shovel testing was performed within each of the 2006 study areas. In the Northern and Eastern areas, the testing was designed to check for the presence of archaeological resources. Within the Hawthorne Farm Site Area, where archaeological resources were already known to exist, testing was conducted to identify boundaries for the northern and western limits of the site's zone of archaeological sensitivity.

Within the Western Area, the only "archaeological" feature identified was the site of a residence believed to have been established by William Wilson sometime after his purchase of the property in 1872. Being relatively modern and having been heavily impacted by mechanical demolition and site levelling sometime between 1938 and 1992, the site did not warrant registration as an archaeological site and required no further archaeological investigation. No evidence of significant archaeological resources was identified in either the Northern or Eastern study areas.

Reconnaissance and shovel testing undertaken at the Hawthorne Farm Site (BgCu-7) identified the site's northern archaeological limits to be 20 metres north of the cellar and its western limit to be 20 metres west of the cellar. Based on these conclusions, CRM Group recommended the Northern, Western and Eastern study areas be cleared of any further archaeological investigation prior to initiating mine development, and that if impacts in the vicinity of the Hawthorne Farm could not be avoided (within 20 metres north and west or within 50 metres south or east of the cellar), advance archaeological testing and/or mitigation will be required (Sanders & Stewart 2007).

2007 Archaeological Mitigation of the Sinkhole Site (BgCu-6)

In 2007, plans for northward expansion of the existing mine pit called for diversion of a 300 meter segment of Gays River (Sanders et al. 2008). It was anticipated that the proposed diversion would involve ground disturbance in the area of the Sinkhole Site (BgCu-6). Consequently, CRM Group was retained in the summer of 2007 by CRA, on behalf of Acadian Mining Corporation, to undertake the excavation of the Sinkhole Site (BgCu-6). Mitigation of the site involved the manual excavation of 62 square metres, beginning at known resource areas and expanding outward to the limit of artifact concentrations.

CRM Group's mitigative archaeological excavation of the Sinkhole Site (BgCu-6) in 2007 determined that it was a relatively small habitation site occupied intermittently over a short period of time during the late Early Ceramic Period (*ca.* 2350 BP). Based on the fact that the site was excavated to the outer limit of its artifact concentrations, CRM Group recommended that the Sinkhole Site (BgCu-6) site be considered fully mitigated and cleared of requirement for further archaeological investigation (Sanders et al. 2008). This recommendation was accepted by Heritage Division on March 5, 2009 (Ogilvie 2009).

2007 Testing of the Hawthorne Farm Site (BgCu-7)

Subsequent plans for development at Scotia Mine included southward expansion of the existing South Stockpile – a large mound of overburden situated between the active pit and the tailings pond. The footprint of the proposed expansion included the Hawthorne Farm Site (BgCu-7). Due to its archaeological resources, the Hawthorne Farm Site warranted mitigative archaeological excavation and documentation prior to being overlapped by the stockpile (Sanders et al. 2008).

In order to assess the scope of mitigation required at the Hawthorne Farm Site, CRM Group was retained by CRA, on behalf of Acadian Mining Corporation, to conduct archaeological testing at the site. Undertaken in October, 2007, this work was designed to expand upon the results of strategic archaeological testing conducted at the site in 1998 (Sanders 1998) and in 2006 (Sanders & Stewart 2007). Its goals were to delineate the eastern and southern boundaries of the site and to test any archaeological features found in the process (Sanders et al. 2008).

Results of the 2007 archaeological testing at the Hawthorne Farm Site (BgCu-7) indicated that the site's zone of archaeological sensitivity extended roughly 20 metres outward from the cellar in all directions. It extended significantly further to the southeast, where it included a possible well or privy pit depression located 44 metres from the cellar. Testing of this depression suggested that it was infilled sometime after the mid-nineteenth century.

Based on these conclusions, CRM Group recommended archaeological mitigation of the Hawthorne Farm Site (Sanders et al. 2008).

2008 Archaeological Mitigation of the Hawthorne Farm Site (BgCu-7)

In 2008, CRM Group was retained by CRA, on behalf of Acadian Mining Corporation, to undertake archaeological mitigation of the Hawthorne Farm site (BgCu-7) (Kelman et al. 2010). Excavation of the site addressed the cellar, an associated drain, a shallow natural depression that had been infilled, artifact scatters, a single posthole and various stone piles associated with field clearing activities

On basis of the archaeological mitigation and the historic research, it was determined that the site was occupied as early as 1835 and abandoned sometime before the 1860s. Based on the extent of archaeological mitigation undertaken in the spring of 2008, CRM Group recommended that the Hawthorne Farm Site (BgCu-7) site be considered fully mitigated and cleared of requirement for further archaeological investigation (Kelman et al. 2010). This recommendation was accepted by Heritage Division on April 9, 2010 (Powell 2010).

4.2 2011 Field Reconnaissance

Archaeological reconnaissance of previously un-assessed areas of the Gays River Mine Site was conducted on May 27, 2011 under clear, warm conditions. The primary purpose of the visit was to assess the archaeological potential of the study areas and to investigate any topographical and cultural features that had been identified as areas of elevated potential during the background research. A number of transects were made through both the eastern and western properties, resulting in extensive coverage of the archaeological study areas.

Eastern Study Area

Visual inspection of the eastern parcel revealed that previous quarry expansion had already impacted a large portion of the study area (**Plate 4**). A significant amount of disturbance associated with previous mining and logging activities was also noted. The remainder of the eastern study area constituted rough and undulating terrain that would have been unsuitable for Precontact occupation (**Plate 5**). Soils in tree-falls were examined and found to be shallow and devoid of artifacts. No evidence of archaeological resources or areas of significant archaeological potential was encountered.

Based on the uneven and sloped nature of the terrain, the existence of a more suitable occupation area closer to Gays River and the amount of observable disturbance, the eastern study area is considered to exhibit low potential for encountering either Precontact and early historic Native or historic Euro-Canadian archaeological resources.

Western Study Area

Visual inspection of the western parcel revealed the presence of a large sand quarry situated within the eastern portion of the study area (**Plate 6**). Given its proximity to Gays River, careful attention was paid to the areas located along the river bank and along an associated meander. Four areas considered to exhibit high potential for encountering both Precontact and/or early historic Native and historic Euro-Canadian archaeological resources were identified (**Figure 5**). All four areas are located along the river bank or along the meander. Each high potential area is described separately below.

High Potential Area 1:

This area, located along the eastern side of a small meander, constitutes a high, dry and level area that would have been suitable for both Precontact and/or early historic Native and historic Euro-Canadian utilization (**Figure 5; Plate 7**). Extending approximately 20 metres by approximately 10 metres, the centre point of the high potential area is located at UTM: 20T 0472 063E; 4 986 362N (NAD 83). Given the high, dry and level nature of the locale and its proximity to Gays River, this area is considered to exhibit high potential for encountering both Precontact and historic archaeological resources.



PLATE 4: Impact of previous quarry expansion on eastern study area; facing northwest.
May 27, 2011.



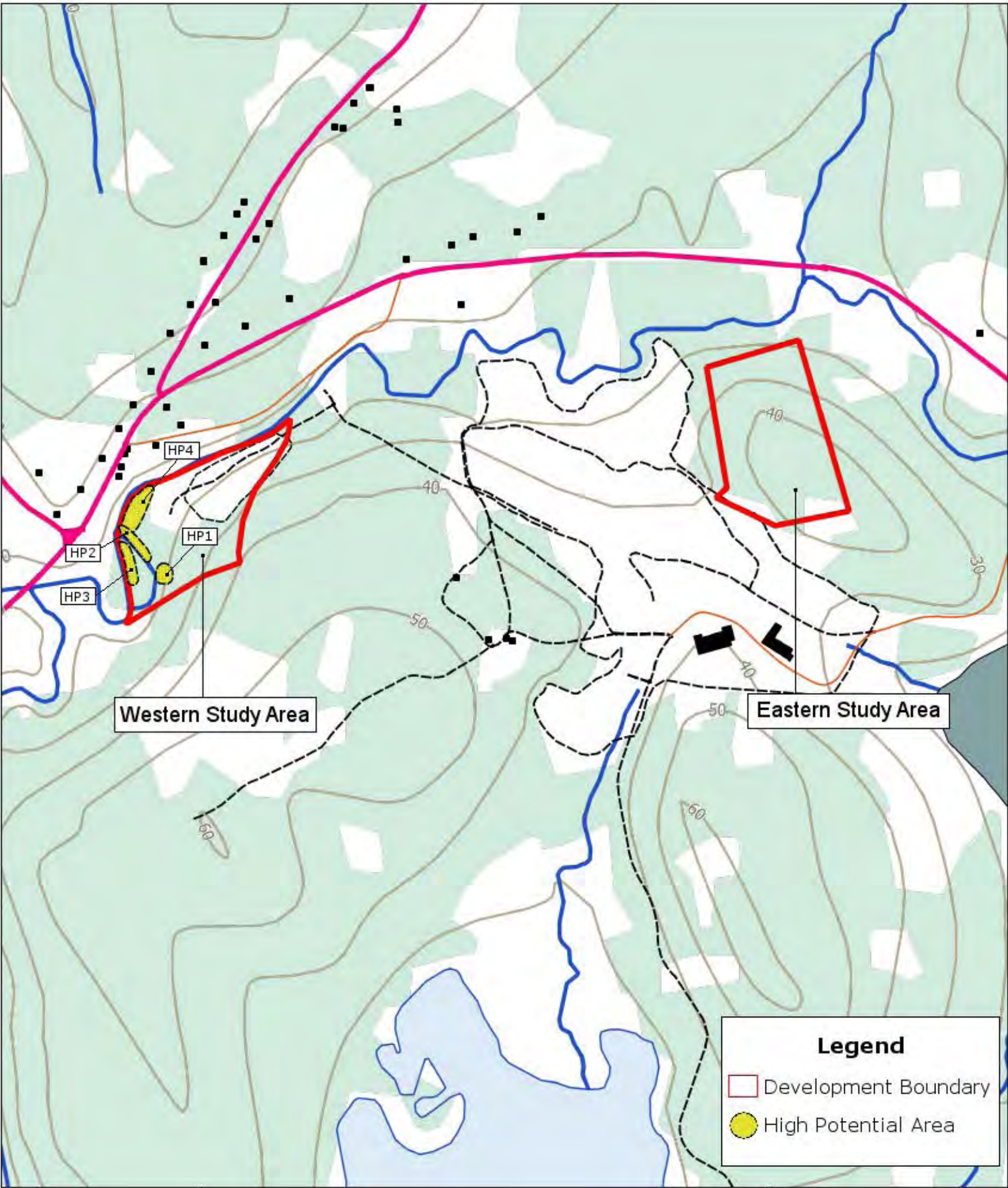
PLATE 5: Typical hummocky woodland and undulating terrain; facing north. May 27, 2011.



PLATE 6: Sand quarry situated in western study area; facing southwest. May 27, 2011.



PLATE 7: High Potential Area 1; facing southwest. May 27, 2011.



High Potential Area 2:

This area, located along the eastern side of the meander northwest of High Potential Area 1 constitutes a high, dry and level plateau that would have been suitable for both Precontact and/or early historic Native and historic Euro-Canadian utilization (**Figure 5; Plates 8 & 9**). Extending approximately 100 metres by approximately 10 metres, the southern limit of the high potential area is located at UTM: 20T 0472 026E; 4 986 405N (NAD 83); the northern limit is located at UTM: 20T 0472 025E; 4 986 398N (NAD 83).

Visual inspection of the plateau revealed the presence of two potential historic features. A rectangular depression, measuring approximately 3 metres by approximately 4 metres, was identified and may represent the remains of a cabin or other historic structure (**Plate 10**). A small circular depression, situated approximately 2 metres north of the first feature, was also encountered and may be the remains of an associated privy (**Plate 11**). Given the high, dry and level nature of the locale, its proximity to Gays River and the presence of potential historic features, this area is considered to exhibit high potential for encountering both Precontact and historic archaeological resources.

High Potential Area 3:

This area, located along the eastern bank of Gays River and south of High Potential Area 2, constitutes a high, dry and level terrace that would have been suitable for both Precontact and early historic Native or historic Euro-Canadian utilization (**Figure 5; Plate 12**). Extending approximately 100 metres by approximately 20 metres, the southern limit of the high potential area is located at UTM: 20T 0471 999E; 4 986 353N (NAD 83); the northern limit is located at UTM: 20T 0471 971E; 4 986 463N (NAD 83).

Visual inspection of the area revealed the presence of a concentration of stone, located adjacent to the river at UTM: 20T 0471 981E; 4 986 365N (NAD 83). The presence of another concentration directly across the river suggests that these features may represent the remains of an historic bridge (**Plate 13**). Indeed, portions of an historic road alignment were visible running north/south along the terrace. Given the high, dry and level nature of the locale, its proximity to Gays River and the presence of potential historic features, this area is considered to exhibit high potential for encountering both Precontact and historic archaeological resources.

High Potential Area 4:

This area, located along the eastern bank of Gays River and north of High Potential Area 3, constitutes a pair of high, dry and level terraces that run parallel to the river and would have been suitable for both Precontact and early historic Native or historic Euro-Canadian utilization (**Figure 5; Plates 14 & 15**). Extending approximately 100 metres, the southern limit of the high potential area is located at UTM: 20T 0471 995E; 4 986 3469N (NAD 83); the northern limit is located at UTM: 20T 0472 037E; 4 986 562N (NAD 83). The western terrace is approximately 11 metres wide; the eastern terrace is approximately 21 metres wide. Given the high, dry and level nature of the locale and its proximity to Gays River, this area is considered to exhibit high potential for encountering both Precontact and historic archaeological resources.



PLATE 8: High Potential Area 2; facing northwest. May 27, 2011.



PLATE 9: High Potential Area 2; facing southeast. May 27, 2011.



PLATE 10: Rectangular depression in High Potential Area 2; facing south. May 27, 2011.



PLATE 11: Small circular depression in High Potential Area 2; facing north. May 27, 2011.



PLATE 12: High Potential Area 3; facing south. May 27, 2011.



PLATE 13: Possible remains of historic bridge; facing northwest. May 27, 2011



PLATE 14: High Potential Area 4 showing terraces; facing south. May 27, 2011.



PLATE 15: Level terrace in High Potential Area 4; facing northeast. May 27, 2011.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2011 archaeological screening and reconnaissance of the Gays River Mine study areas property consisted of a review of documentation that had been compiled for previous projects within the former Scotia Mine property and a visual inspection of the study area. It did not involve sub-surface testing. Field reconnaissance conducted by CRM Group archaeologists determined the eastern study area to exhibit low potential for encountering both Precontact and/or early historic Native archaeological resources, and historic Euro-Canadian archaeological resources. Four high potential areas for encountering both Precontact and/or early historic Native archaeological resources, and historic Euro-Canadian archaeological resources were identified within the western study area.

Based on these results, CRM Group offers the following management recommendations for the study area:

1. It is recommended that the eastern study area be cleared of any requirement for further archaeological investigation.
2. It is recommended that if any of the areas of potential archaeological significance located within the western study area, as identified in this report (High Potential Areas 1 - 4), are to be impacted in any future development of the Gays River Mine Site, they be subjected to a program of shovel testing to determine whether or not buried archaeological resources are present and/or to determine the age, function and significance of identified features.
3. It is recommended that in the event that archaeological deposits or human remains are encountered during development activities associated with the Gays River Mine, all work in the associated area(s) should be halted and immediate contact made with the Heritage Division (Laura Bennett: 424-6475).

6.0 REFERENCES CITED

Davis, Derek & Sue Browne, eds.

1996 *The Natural History of Nova Scotia*. Vol. 2. *Theme Regions*. Halifax: Nimbus, Nova Scotia Museum.

MacDougall, J.I., D. B. Cann, and J.D. Hilchey

1963 *Soil Survey of Halifax County, Nova Scotia*. Report No. 13, Nova Scotia Soil Survey. Canada Department of Agriculture.

Kelman, Darryl, Sara Beanlands, Mike Sanders, & W. Bruce Stewart

2010 *Hawthorne Farm Site (BgCu-7) Archaeological Mitigation, Gays River, Nova Scotia*. Heritage Research Permit report (A2008NS78) on file with the Nova Scotia Heritage Division.

Sanders, Mike

1997 *Scotia Mines Property Archaeological Assessment*. Heritage Research Permit report (A1998NS29) on file with the Nova Scotia Heritage Division.

Sanders, Mike, Sara Beanlands, Darryl Kelman & W. Bruce Stewart

2007 *Hawthorne Farm Site 2007 Archaeological Testing, Gays River, Nova Scotia*. Heritage Research Permit report (A2007NS79) on file with the Nova Scotia Heritage Division.

Sanders, Mike, W. Bruce Stewart, Darryl Kelman & Sara Beanlands

2008 *Sinkhole Site (BgCu-6) Archaeological Excavation, Gays River, Nova Scotia*. Heritage Research Permit report (A2007NS57) on file with the Nova Scotia Heritage Division.

Sanders, Mike & W. Bruce Stewart

2007 *Scotia Mine 2006 Archaeological Assessment, Gays River, Nova Scotia*. Heritage Research Permit report (A2006NS78) on file with the Nova Scotia Heritage Division.

APPENDIX E

WATER BUDGET AND TAILINGS MANAGEMENT TECHNICAL MEMOS



MEMORANDUM

TO: Selwyn Resources Ltd. REF. NO.: 074320

FROM: Andrew Betts, Conestoga-Rovers & Associates, Waterloo DATE: July 7, 2011

CC:

RE: Water Budget and Calculation of Losses to Gays River from Mining Activities

1.0 INTRODUCTION

As part of the Environmental Assessment for the mine expansion, CRA has been tasked with demonstrating that the Selwyn Resources mining activities located at 15601 Highway 224 in Halifax Regional Municipality, Nova Scotia (Site) will not cause any adverse impact to the flows in the Gays River. The Site is located solely within the Gays River watershed. The objective of this assessment is to quantify the loss of flow in the Gays River due to mining activities at the Site; as well as demonstrate that there will be no adverse impacts to the Gays River as a result of the mining activity.

2.0 SITE DESCRIPTION

The total subwatershed area of Gays River at the site is 8380 ha. The total area of the existing mine and tailing pond are 51.5 and 74 ha, respectively. The total area of proposed mine expansion (including extended pit, 33.9 ha, and proposed stockpile, 96.0 ha) is 130.0 ha. Figure 1 presents the size of the existing and proposed Site relative to the Gays River subwatershed at the Site. Therefore, the proposed mine and stockpile only consists of 1.54 percent of the total watershed. This means that if the existing and proposed mine, proposed stockpile and the tailing pond were to store all of the precipitation which falls on the Site and not release any back to the Gays River there would only be a 3.03 percent drop in the flows in the Gays River.

However, this is not the case. Precipitation which falls on the Site follows one of three pathways: 1) surface runoff; 2) evaporation; and 3) infiltration. Since the soils on Site consist mostly of clay till this will result in very minimal amounts of infiltration and this pathway is deemed negligible and omitted from this study. This results in the precipitation travelling as either runoff to Gays River or evaporation back into the atmosphere. The precipitation which is converted to runoff is diverted to a tailing pond on Site, for water quality purposes, and then eventually flows into the Gays River.

3.0 QUANTIFICATION OF LOSSES TO GAYS RIVER

Of all the precipitation which falls on the Site the only water which does not make its way to the Gays River is that lost to evaporation. In order to quantify the evaporation loss, average evaporation rates were obtained from Environment Canada Weather Office for Station 8205990 which is located in Truro, Nova Scotia. Environment Canada has developed daily average evaporation rates per month based on daily rates from 1971 to 2000. These values were converted to monthly average evaporation rates and are presented in Table 1 below.

Table 1 Monthly average evaporation rates (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
0.0	0.0	0.0	0.0	89.9	102.0	111.6	99.2	69.0	40.3	0.0	0.0	512.0

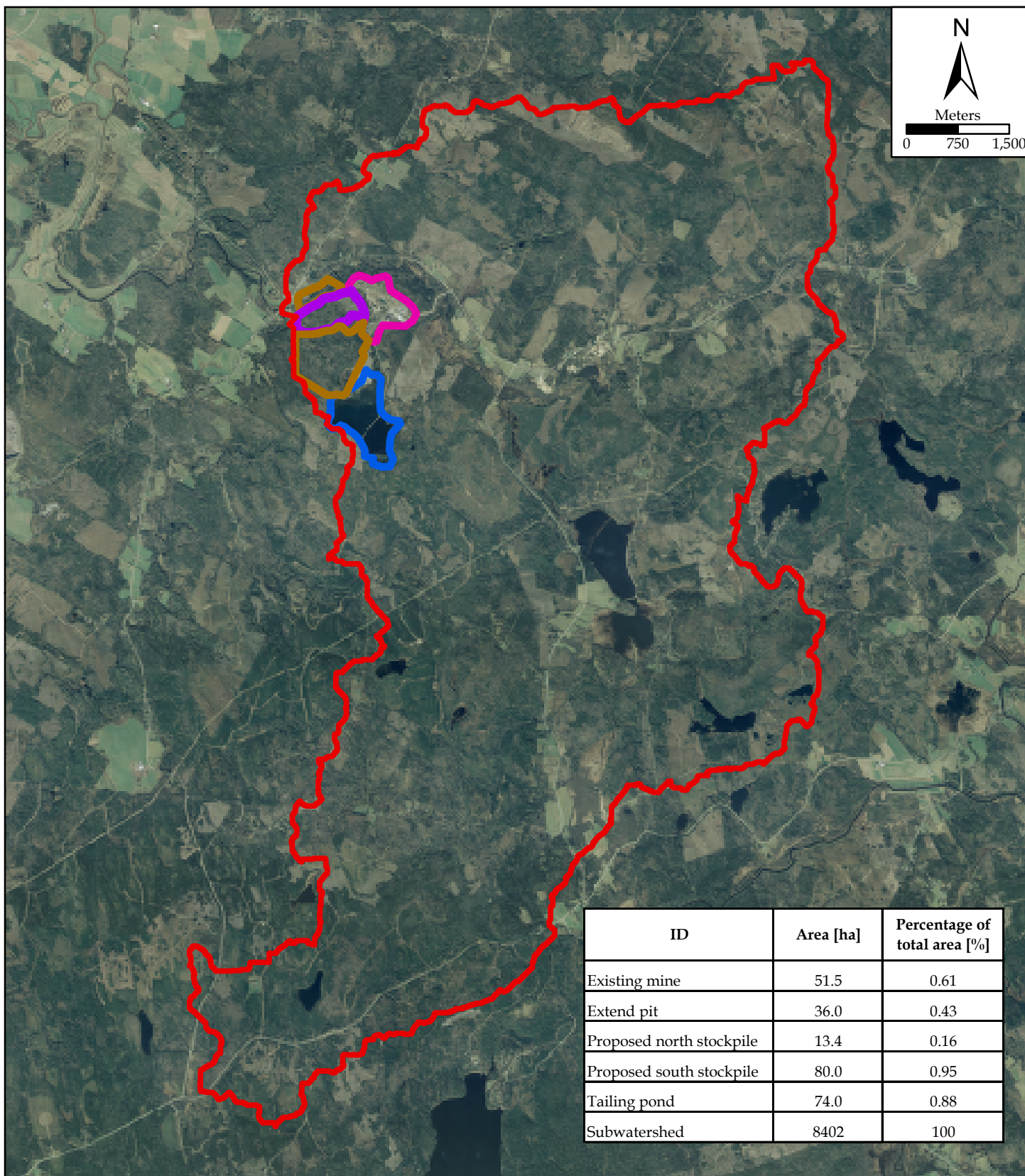
Precipitation which is available for evaporation on Site is largely located in the tailing pond with little amounts available on the mine floor. Due to the topographic nature of the mine only a small portion of the mine floor will allow for evaporation. This is due to the rapid response of surface runoff due to the steep slopes found on Site. However, a conservative calculation was performed for this analysis to quantify the amount of precipitation lost to evaporation and the entire mine area was included in the calculations. Table 2 below presents the results from the calculation which quantifies the precipitation lost to evaporation for both the mine and tailing pond on an annual basis.

Table 2 Average annual volume loss to evaporation

Average Annual Volume (m3)				
Location	Mine	Tailing Pond	Proposed Mine	Proposed Stockpile
Precipitation	682000	980000	47700	1237000
Evaporation	263700	378900	184300	478200
Evaporation loss	38.7%	38.7%	38.7%	38.7%

4.0 CONCLUSION

The remaining amount of precipitation that is not lost to evaporation will eventually make its way back into the Gays River. The Site only comprises of 3.03 percent of the total subwatershed area and of all the precipitation that falls on the Site only 38.7 percent is lost to evaporation. Making a very conservative assumption that there would have been no evaporation losses if the Mine did not exist; the mining activities on Site will result in a loss of 1.2% of the flow in Gays River. It can therefore be concluded that the mining activities at the Site will not cause any adverse impact to the flows in Gays River.



Aerial Imagery Courtesy of Government of Nova Scotia. <http://www.gov.ns.ca/natr/forestry/GIS/juanning.asp>

- Subwatershed boundary
- Extend pit
- Existing Mine
- Proposed stockpiles
- Tailing pond



figure 1

MINE AREAS AS A PERCENTAGE OF SUBWATERSHED AREA
SCOZINC OPERATIONS
SCOZINC LIMITED
Cooks Brook, Nova Scotia



TECHNICAL MEMORANDUM

TO: Peter Oram (CRA) REF. NO.: 074320
FROM: Earl Shannon, Haley Piagno/jdh/1 DATE: August 10, 2011
RE: Gays River Mine - Volume of Tailings and Polishing Ponds

Tailings from the Gays River Mine are discharged to the tailings pond, where sediment settles and is effectively separated from the water. Clarified water flows into the polishing pond for removal of remaining suspended solids before discharge to the receiving water. Settled solids accumulate in the ponds, gradually decreasing available volume. The continued use of the ponds following completion of the Southwest (SW) Expansion Project is desired, but is dependent on the remaining capacity of the ponds.

CRA reviewed bathymetry data from December 2006 and June 2011 to determine the approximate volume of both the tailings pond and the polishing pond at those times. For 2006, a surface representing the bottom of the ponds was created in AutoCAD Civil 3D using contours generated from the bathymetric data. Using the water surface elevation measured at the time of the survey, Civil 3D was used to calculate the volume of each pond. Another surface was created using data points from a recent (2011) bathymetric survey, and the volume of each pond was again calculated, assuming a water surface elevation of 23.5 m was assumed. At this level, a 1.0 m freeboard is available.

Table 1 summarizes the results of calculations to determine the volumes of the tailing pond and polishing pond.

TABLE 1

Year	Available Tailings Pond Volume (m ³)	Available Polishing Pond Volume (m ³)
2006	1,159,864	551,370
2011	845,068	497,347

CRA was not able to obtain information describing the original volumes for the tailings and polishing ponds, or the original design criteria for the ponds. Based on the calculation method described herein, approximately 73 percent and 90 percent of the available 2006 volumes remain in the tailings and polishing ponds respectively.

APPENDIX F

ACCDC and NS MUSEUM SCREENING REPORTS



DATA REPORT 4450: Gays River, NS

Prepared 29 April, 2011
by S.H. Gerriets



CONTENTS OF REPORT

1.0 Preface

- 1.1 Restrictions
- 1.2 Additional Information

2.0 Rare and Endangered Taxa

- 2.1 Flora
- 2.2 Fauna
- Map 1: Flora and Fauna

3.0 Special Areas

- 3.1 Managed Areas
- 3.2 Significant Areas
- Map 2: Special Areas

4.0 Taxa Lists

- 4.1 Fauna
- 4.2 Flora
- 4.3 Range Maps

5.0 Source Bibliography

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (ACCDC) is part of a network of circa 85 NatureServe data centres and heritage programs in 50 states, 10 provinces and 1 territory, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The ACCDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador. Although a non-governmental agency, the ACCDC is supported by 6 federal agencies, plus 4 provincial governments, outside grants and data processing fees. URL: www.ACCDC.com.

Upon request and for a fee, the ACCDC reports known observations of rare and endangered flora and fauna, in and near a specified study area. As a supplement to that data, the ACCDC includes locations of managed areas with some level of protection, and also known sites of ecological interest. Data summarised in each report is attached as DBF files which may be opened from within data software (Excel, Access) or mapped in GIS (ArcView, MapInfo, AutoCAD).

1.1 RESTRICTIONS

The ACCDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By receiving ACCDC data, recipients assent to the following limits of use:

- a.) Data is restricted to use by trained personnel who are sensitive to its potential threat to rare and endangered taxa.
- b.) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
- c.) The ACCDC requires Data Users to cease using and delete data 12 months after receipt.
- d.) ACCDC data responses are restricted to that data in our Data System at the time of the data request.
- e.) Data is qualified as to location (Precision) and time (SurveyDate); cf Data Dictionary for details.
- f.) ACCDC data reports are not to be construed as exhaustive inventories of taxa in an area.
- g.) The non-occurrence of a taxon cannot be inferred by its absence in an ACCDC data report.

1.2 ADDITIONAL INFORMATION

Please direct biological questions about ACCDC data to: Sean Blaney, ACCDC: (506) 364-2658, and technical data queries to: Stefen Gerriets, ACCDC: (506) 364-2657.

For provincial information on rare taxa and protected areas, or information on game animals, deer yards, old growth forest, archeological sites, fish habitat etc, please contact Sherman Boates, NSDNR: (902) 679-6146.

2.0 RARE AND ENDANGERED TAXA

A 100km buffer around the study area contains 2984 records of 397 taxa from 87 sources, a relatively low-to-moderate density of records (quintile 2): 0.09 rec/km².

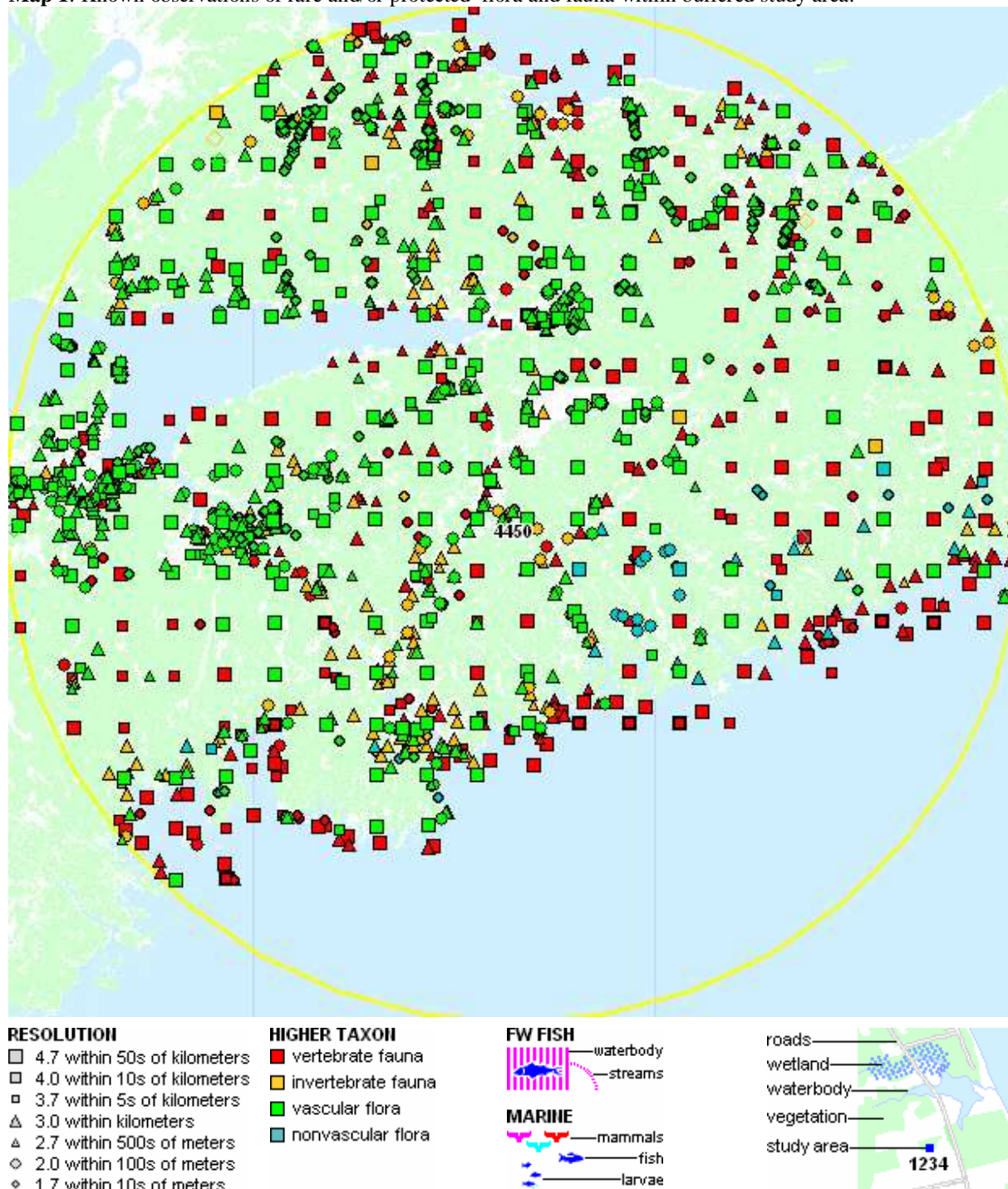
2.1 FLORA

A 100km buffer around the study area contains 1349 records of 259 vascular, 49 records of 5 nonvascular flora (see attached *ob.dbf).

2.2 FAUNA

A 100km buffer around the study area contains 1229 records of 70 vertebrate, 357 records of 63 invertebrate fauna (cf attached *ob.dbf). Sensitive data: Wood Turtles are PRESENT in the study area (cf attached WOTU.rtf).

Map 1: Known observations of rare and/or protected flora and fauna within buffered study area.



3.0 SPECIAL AREAS

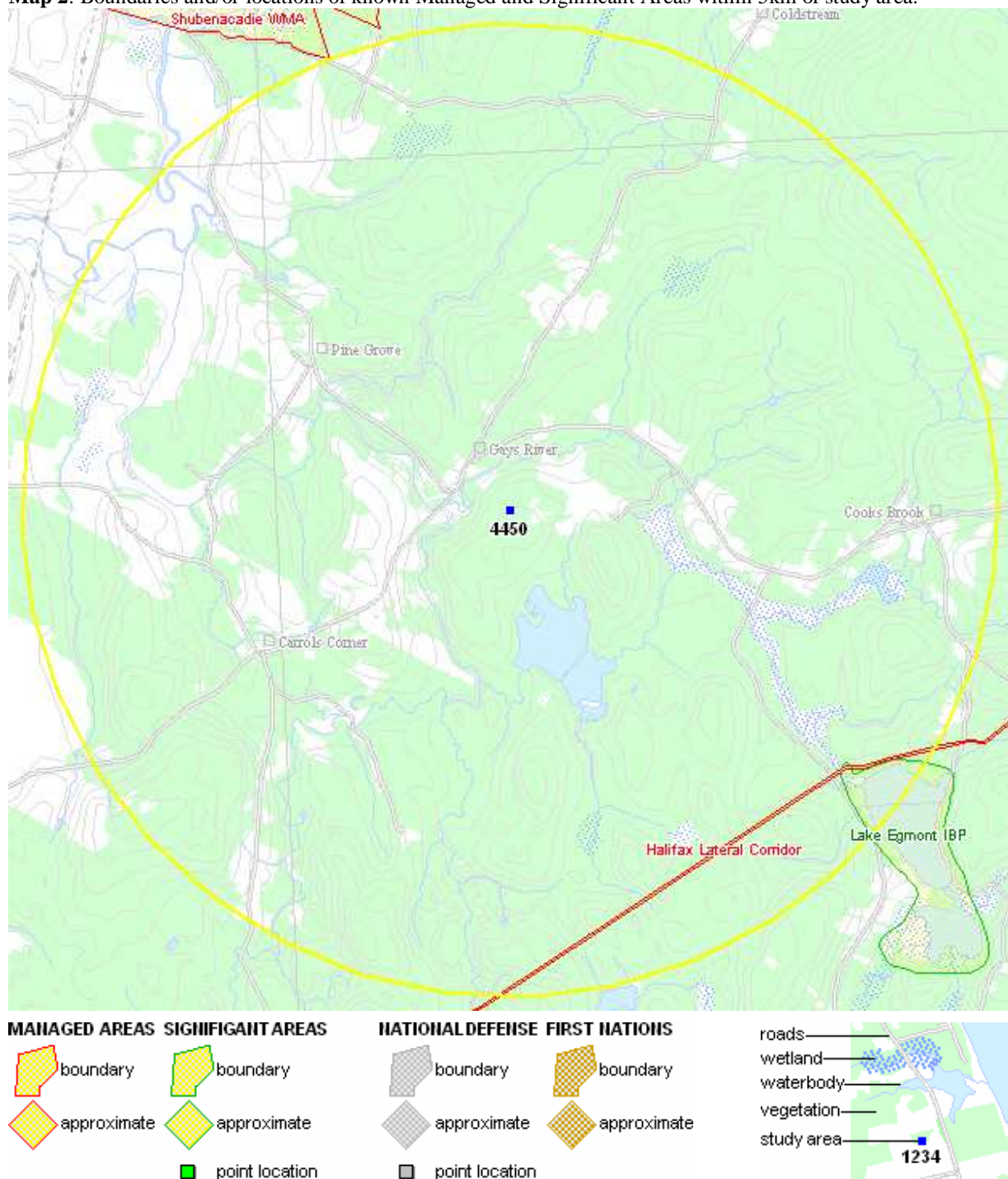
3.1 MANAGED AREAS

The GIS scan identified 2 Managed Areas with some degree of protected status, in the vicinity of the study area (see attached *ma.dbf).

3.2 SIGNIFICANT AREAS

The GIS scan also identified 1 biologically significant site in the vicinity of the study area; such sites are known for exceptional biotic richness but may or may not have legal status (see attached *sa.dbf).

Map 2: Boundaries and/or locations of known Managed and Significant Areas within 5km of study area.



4.0 TAXON LISTS

Rare and/or endangered taxa within the buffered area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation. [p] = vascular plant, [n] = nonvascular plant, [a] = vertebrate animal, [i] = invertebrate animal, [c] = community.

4.1 FLORA

scientific name	common name	prov. rarity	prov. status	COSEWIC	obs	dist.km
n Erioderma pedicellatum (Atlantic pop.)	Boreal Felt Lichen (Atlantic pop.)	S1S2	Endangered	E	40	17 ±1
p Clethra alnifolia	Coastal Sweet Pepperbush	S1	Vulnerable	SC	1	48 ±0.1
p Isoetes prototypus	Prototype Quillwort	S2	Vulnerable	SC	3	61 ±0.1
p Lilaeopsis chinensis	Eastern Lilaeopsis	S2	Vulnerable	SC	1	90 ±0
n Pseudevernia cladonia	Ghost Antler Lichen	S2S3		SC	6	35 ±0
p Floerkea proserpinacoides	False Mermaidweed	S2		NAR	4	41 ±10
p Cypripedium arietinum	Ram's-Head Lady's-Slipper	S1	Endangered		12	52 ±0.5
p Helianthemum canadense	Long-branched Frostweed	S1	Endangered		1	54 ±1
p Thuja occidentalis	Eastern White Cedar	S1S2	Vulnerable		14	33 ±1
p Botrychium lunaria	Common Moonwort	S1			1	43 ±5
p Equisetum palustre	Marsh Horsetail	S1			1	91 ±5
p Cryptogramma stelleri	Steller's Rockbrake	S1			2	57 ±10
p Adiantum pedatum	Northern Maidenhair Fern	S1			8	39 ±1
p Puccinellia fasciculata	Saltmarsh Alkali Grass	S1			3	76 ±5
p Festuca subverticillata	Nodding Fescue	S1			7	30 ±5
p Elymus hystrix var. bigeloviana	Spreading Wild Rye	S1			5	9 ±10
p Elymus wiegandii	Wiegand's Wild Rye	S1			9	45 ±10
p Bromus latiglumis	Broad-Flumed Brome	S1			2	88 ±0
p Spirantes casei var. casei	Case's Ladies'-Tresses	S1			1	86 ±0.1
p Malaxis brachypoda	White Adder's-Mouth	S1			4	69 ±10
p Trillium grandiflorum	White Trillium	S1			1	94 ±1
p Allium tricoccum	Wild Leek	S1			8	54 ±0.1
p Juncus vaseyi	Vasey's Rush	S1			1	95 ±10
p Iris prismatica	Slender Blue Flag	S1			1	98 ±100
p Scirpus pedicellatus	Stalked Bulrush	S1			1	6 ±1
p Cyperus lupulinus ssp. macilentus	Hop Flatsedge	S1			1	87 ±10
p Carex tuckermanii	Tuckerman's Sedge	S1			6	48 ±0
p Carex prairea	Prairie Sedge	S1			1	94 ±1
p Carex plantaginea	Plantain-Leaved Sedge	S1			3	41 ±0.1
p Carex livida var. radicaulis	Livid Sedge	S1			1	62 ±10
p Carex laxiflora var. laxiflora	Loose-Flowered Sedge	S1			1	84 ±1
p Carex pellita	Woolly Sedge	S1			4	34 ±10
p Carex haydenii	Hayden's Sedge	S1			3	39 ±1
p Carex garberi	Garber's Sedge	S1			1	49 ±0
p Viola canadensis	Canada Violet	S1			2	41 ±10
p Pilea pumila	Dwarf Clearweed	S1			3	28 ±0
p Dirca palustris	Eastern Leatherwood	S1			13	8 ±10
p Amelanchier nantucketensis	Nantucket Serviceberry	S1			1	87 ±1
p Ranunculus pensylvanicus	Pennsylvania Buttercup	S1			3	73 ±0
p Montia fontana	Water Blinks	S1			1	49 ±1
p Polygala polygama	Racemed Milkwort	S1			1	47 ±1
p Fraxinus pennsylvanica	Red Ash	S1			3	42 ±0.5
p Ribes americanum	Wild Black Currant	S1			3	28 ±1
p Desmodium glutinosum	Large Tick-Trefoil	S1			7	48 ±0
p Desmodium canadense	Canada Tick-trefoil	S1			5	38 ±5
p Cuscuta pentagona	Five-angled Dodder	S1			1	80 ±1
p Cuscuta cephalanthi	Buttonbush Dodder	S1			2	69 ±0.1
p Hypericum majus	Large St. John's-wort	S1			4	45 ±10
p Hudsonia tomentosa	Woolly Beach-heath	S1			1	93 ±10
p Lobelia spicata	Pale-Spiked Lobelia	S1			7	42 ±10
p Draba glabella	Rock Whitlow-Grass	S1			2	82 ±0.1
p Cochlearia tridactylites	Limestone Scurvy-grass	S1			4	93 ±10
p Cardamine maxima	Large Toothwort	S1			1	93 ±0
p Cynoglossum virginianum var. boreale	Wild Comfrey	S1			2	55 ±1
p Bidens hyperborea	Estuary Beggarticks	S1			1	90 ±0
p Antennaria parlinii	Parlin's Pussytoes	S1			8	29 ±10
p Zizia aurea	Golden Alexanders	S1			5	34 ±1
p Sanicula odorata	Clustered Sanicle	S1			6	27 ±10
p Osmorhiza depauperata	Blunt Sweet Cicely	S1			1	80 ±5
p Dichanthelium acuminatum var. lindheimeri	Woolly Panic Grass	S1?			1	84 ±0.1
p Schoenoplectus robustus	Sturdy Bulrush	S1?			2	89 ±10
p Crataegus submollis	Quebec Hawthorn	S1?			6	17 ±10
p Crataegus robinsonii	Robinson's Hawthorn	S1?			3	38 ±5
p Suaeda rolandii	Roland's Sea-Blite	S1?			1	68 ±10
p Chenopodium rubrum	Red Pigweed	S1?			1	87 ±10
p Atriplex acadiensis	Maritime Saltbush	S1?			1	61 ±10
p Solidago hispida	Hairy Goldenrod	S1?			2	45 ±10
p Hieracium kalmii var. fasciculatum	Kalm's Hawkweed	S1?			1	48 ±5
p Calamagrostis stricta var. stricta	Slim-stemmed Reed Grass	S1S2			1	89 ±10
p Platanthera flava var. herbiola	Tuberclad Orchid	S1S2			2	79 ±0
p Najas gracillima	Thread-Like Naiad	S1S2			1	47 ±0.1
p Juncus greenii	Greene's Rush	S1S2			3	47 ±10
p Carex tenera	Tender Sedge	S1S2			5	47 ±0.1
p Carex pensylvanica	Pennsylvania Sedge	S1S2			2	23 ±0.1
p Carex bebbii	Bebb's Sedge	S1S2			3	54 ±5
p Gratiola neglecta	Clammy Hedge-Hyssop	S1S2			2	27 ±0.1

p	Ranunculus sceleratus	Cursed Buttercup	S1S2	3	48 ±0.5
p	Hepatica nobilis var. obtusa	Round-lobed Hepatica	S1S2	17	3 ±10
p	Hepatica nobilis	Round-Lobe Hepatica	S1S2	2	56 ±0.1
p	Anemone virginiana var. alba	Virginia Anemone	S1S2	2	39 ±10
p	Conopholis americana	American Cancer-root	S1S2	3	88 ±1
p	Arabis hirsuta var. pycnocarpa	Western Hairy Rockcress	S1S2	1	70 ±0.1
p	Huperzia selago	Northern Firmoss	S1S3	14	34 ±10
p	Equisetum pratense	Meadow Horsetail	S2	9	28 ±0
p	Woodsia glabella	Smooth Cliff Fern	S2	2	52 ±10
p	Dryopteris fragrans var. remotiuscula	Fragrant Wood Fern	S2	9	49 ±10
p	Asplenium trichomanes-ramosum	Green Spleenwort	S2	7	65 ±10
p	Asplenium trichomanes	Maidenhair Spleenwort	S2	6	76 ±0.1
p	Potamogeton friesii	Fries' Pondweed	S2	4	39 ±10
p	Piptatherum canadense	Canada Rice Grass	S2	4	23 ±1
p	Spiranthes lucida	Shining Ladies'-Tresses	S2	10	6 ±1
p	Platanthera macrophylla	Large Round-Leaved Orchid	S2	6	50 ±1
p	Platanthera flava var. flava	Tubercled Orchid	S2	1	78 ±10
p	Platanthera flava	Tubercled Orchid	S2	3	54 ±10
p	Listera australis	Southern Twayblade	S2	4	23 ±0.1
p	Goodyera pubescens	Downy Rattlesnake-Plantain	S2	5	3 ±1
p	Cypripedium reginae	Showy Lady's-Slipper	S2	10	13 ±10
p	Cypripedium parviflorum var. makasin	Yellow Lady's-slipper	S2	2	58 ±0.1
p	Cypripedium parviflorum var. pubescens	Yellow Lady's-slipper	S2	8	35 ±1
p	Allium schoenoprasum var. sibiricum	Wild Chives	S2	1	39 ±10
p	Vallisneria americana	Wild Celery	S2	4	18 ±1
p	Eriophorum gracile	Slender Cottongrass	S2	7	38 ±10
p	Carex hystericina	Porcupine Sedge	S2	5	64 ±1
p	Carex comosa	Bearded Sedge	S2	4	41 ±0.1
p	Carex castanea	Chestnut Sedge	S2	1	48 ±0
p	Carex atratiformis	Scabrous Black Sedge	S2	1	84 ±1
p	Carex atlantica ssp. capillacea	Atlantic Sedge	S2	1	65 ±10
p	Viola nephrophylla	Northern Bog Violet	S2	9	26 ±10
p	Tiarella cordifolia	Heart-leaved Foamflower	S2	11	9 ±10
p	Saxifraga paniculata ssp. neogaea	White Mountain Saxifrage	S2	3	80 ±10
p	Salix sericea	Silky Willow	S2	1	21 ±1
p	Salix pedicellaris	Bog Willow	S2	4	32 ±0.1
p	Galium boreale	Northern Bedstraw	S2	6	59 ±1
p	Ranunculus flammula var. flammula	Lesser Spearwort	S2	4	18 ±0.1
p	Caltha palustris	Yellow Marsh Marigold	S2	1	98 ±0.1
p	Anemone virginiana var. virginiana	Virginia Anemone	S2	2	29 ±10
p	Anemone virginiana	Virginia Anemone	S2	8	30 ±10
p	Anemone quinquefolia	Wood Anemone	S2	7	9 ±10
p	Anemone canadensis	Canada Anemone	S2	4	49 ±10
p	Pyrola minor	Lesser Pyrola	S2	1	98 ±10
p	Samolus valerandi ssp. parviflorus	Seaside Brookweed	S2	2	86 ±0
p	Primula mistassinica	Mistassini Primrose	S2	4	35 ±1
p	Plantago rugelii	Rugel's Plantain	S2	6	28 ±0.5
p	Rumex salicifolius var. mexicanus	Triangular-valve Dock	S2	6	55 ±1
p	Polygonum arifolium	Halberd-leaved Tearthumb	S2	6	80 ±0.1
p	Oenothera fruticosa ssp. glauca	Narrow-leaved Evening Primrose	S2	7	39 ±10
p	Myriophyllum verticillatum	Whorled Water Milfoil	S2	1	38 ±10
p	Myriophyllum farwellii	Farwell's Water Milfoil	S2	7	9 ±10
p	Vaccinium uliginosum	Alpine Bilberry	S2	2	54 ±10
p	Vaccinium caespitosum	Dwarf Bilberry	S2	7	40 ±1
p	Vaccinium boreale	Northern Blueberry	S2	4	45 ±10
p	Shepherdia canadensis	Soapberry	S2	10	49 ±10
p	Crassula aquatica	Water Pygmyweed	S2	1	75 ±0.1
p	Triosteum aurantiacum	Orange-fruited Tinker's Weed	S2	18	41 ±10
p	Hudsonia ericoides	Pinebarren Golden Heather	S2	4	45 ±10
p	Stellaria humifusa	Saltmarsh Starwort	S2	4	44 ±0.1
p	Minuartia groenlandica	Greenland Stitchwort	S2	14	18 ±0.1
p	Draba arabisans	Rock Whitlow-Grass	S2	3	83 ±0.1
p	Cardamine parviflora var. arenicola	Small-flowered Bittercress	S2	3	70 ±50.1
p	Arabis drummondii	Drummond's Rockcress	S2	6	62 ±0
p	Betula michauxii	Newfoundland Dwarf Birch	S2	9	21 ±10
p	Caulophyllum thalictroides	Blue Cohosh	S2	21	8 ±10
p	Impatiens pallida	Pale Jewelweed	S2	2	82 ±1
p	Symphyotrichum undulatum	Wavy-leaved Aster	S2	4	42 ±10
p	Senecio pseudoarnica	Seabeach Ragwort	S2	7	39 ±10
p	Rudbeckia laciniata var. gaspereaensis	Cut-Leaved Coneflower	S2	5	45 ±10
p	Rudbeckia laciniata	Cut-Leaved Coneflower	S2	1	49 ±0
p	Lactuca hirsuta var. sanguinea	Hairy Lettuce	S2	3	31 ±10
p	Iva frutescens ssp. oraria	Big-leaved Marsh-elder	S2	7	72 ±1
p	Iva frutescens	Big-leaved Marsh-elder	S2	3	73 ±0
p	Hieracium robinsonii	Robinson's Hawkweed	S2	2	36 ±1
p	Erigeron philadelphicus	Philadelphia Fleabane	S2	2	34 ±1
p	Osmorhiza longistylis	Smooth Sweet Cicely	S2	15	47 ±10
p	Conioselinum chinense	Chinese Hemlock-parsley	S2	2	34 ±0.1
n	Timmia megapolitana	a Moss	S2?	1	68 ±1
n	Paludella squarrosa	a Moss	S2?	1	47 ±10
p	Dichanthelium linearifolium	Narrow-leaved Panic Grass	S2?	5	57 ±10
p	Juncus dudleyi	Dudley's Rush	S2?	6	26 ±1
p	Eleocharis ovata	Ovate Spikerush	S2?	3	61 ±0.5
p	Carex peckii	Peck's Sedge	S2?	2	28 ±0.5
p	Carex houghtoniana	Houghton's Sedge	S2?	2	18 ±5
p	Amelanchier fernaldii	Fernald's Serviceberry	S2?	1	98 ±5

p	Epilobium coloratum	Purple-veined Willowherb	S2?	3	35 ±0.1
p	Symphytotrichum boreale	Boreal Aster	S2?	3	39 ±10
p	Hieracium kalmii var. kalmii	Kalm's Hawkweed	S2?	5	47 ±10
p	Hieracium kalmii	Kalm's Hawkweed	S2?	3	47 ±5
n	Sphagnum wulfianum	a Peatmoss	S2S3	1	16 ±0.1
p	Ophioglossum pusillum	Northern Adder's-tongue	S2S3	5	35 ±10
p	Botrychium simplex	Least Moonwort	S2S3	5	41 ±0.1
p	Botrychium lanceolatum var. angustisegmentum	Triangle Moonwort	S2S3	6	68 ±10
p	Potamogeton zosteriformis	Flat-stemmed Pondweed	S2S3	6	1 ±1
p	Potamogeton richardsonii	Richardson's Pondweed	S2S3	2	84 ±5
p	Potamogeton obtusifolius	Blunt-leaved Pondweed	S2S3	1	83 ±0
p	Poa glauca	Glaucous Blue Grass	S2S3	4	47 ±1
p	Panicum tuckermanii	Tuckerman's Panic Grass	S2S3	8	42 ±0
p	Alopecurus aequalis	Short-awned Foxtail	S2S3	13	20 ±5
p	Spiranthes ochroleuca	Yellow Ladies'-tresses	S2S3	6	35 ±1
p	Cypripedium parviflorum	Yellow Lady's-slipper	S2S3	19	47 ±0.1
p	Coeloglossum viride var. virescens	Long-bracted Frog Orchid	S2S3	2	57 ±0.1
p	Lilium canadense	Canada Lily	S2S3	50	3 ±10
p	Eleocharis olivacea	Yellow Spikerush	S2S3	1	36 ±10
p	Carex hirtifolia	Pubescent Sedge	S2S3	20	8 ±10
p	Carex adusta	Lesser Brown Sedge	S2S3	8	23 ±10
p	Polygonum raii	Sharp-fruited Knotweed	S2S3	1	82 ±1
p	Polygonum buxiforme	Small's Knotweed	S2S3	6	39 ±10
p	Polygala sanguinea	Blood Milkwort	S2S3	12	32 ±5
p	Fraxinus nigra	Black Ash	S2S3	33	13 ±10
p	Hedeoma pulegioides	American False Pennyroyal	S2S3	12	28 ±5
p	Empetrum eamesii ssp. eamesii	Pink Crowberry	S2S3	1	56 ±0.5
p	Empetrum eamesii ssp. atropurpureum	Pink Crowberry	S2S3	1	56 ±0.5
p	Hypericum dissimulatum	Disguised St John's-wort	S2S3	3	35 ±0.5
p	Suaeda calceoliformis	Horned Sea-blite	S2S3	5	45 ±10
p	Symphytotrichum ciliolatum	Fringed Blue Aster	S2S3	7	12 ±1
p	Asclepias incarnata ssp. pulchra	Swamp Milkweed	S2S3	5	16 ±1
p	Schizaea pusilla	Little Curlygrass Fern	S3	5	33 ±1
p	Botrychium dissectum	Cut-leaved Moonwort	S3	6	64 ±0
p	Isoetes acadiensis	Acadian Quillwort	S3	4	48 ±10
p	Equisetum variegatum	Variegated Horsetail	S3	6	16 ±0.1
p	Sparganium natans	Small Burreed	S3	7	16 ±1
p	Dichanthelium clandestinum	Deer-tongue Panic Grass	S3	4	1 ±0
p	Platanthera orbiculata	Small Round-leaved Orchid	S3	9	39 ±10
p	Platanthera hookeri	Hooker's Orchid	S3	8	55 ±1
p	Platanthera grandiflora	Large Purple Fringed Orchid	S3	12	30 ±1
p	Goodyera repens	Lesser Rattlesnake-plantain	S3	4	70 ±0.1
p	Corallorhiza trifida	Early Coralroot	S3	16	29 ±5
p	Juncus subcaudatus	Woodland Rush	S3	5	27 ±10
p	Juncus marginatus	Grass-leaved Rush	S3	1	47 ±10
p	Eleocharis nitida	Quill Spikerush	S3	8	36 ±5
p	Carex rosea	Rosy Sedge	S3	12	28 ±1
p	Carex lupulina	Hop Sedge	S3	4	32 ±0
p	Carex eburnea	Bristle-leaved Sedge	S3	2	27 ±0.1
p	Verbena hastata	Blue Vervain	S3	38	27 ±0.1
p	Laportea canadensis	Canada Wood Nettle	S3	11	3 ±10
p	Limosella australis	Southern Mudwort	S3	7	39 ±5
p	Geocaulon lividum	Northern Comandra	S3	2	69 ±0.1
p	Salix petiolaris	Meadow Willow	S3	8	28 ±1
p	Agrimonia gryposepala	Hooked Agrimony	S3	9	47 ±1
p	Rhamnus alnifolia	Alder-leaved Buckthorn	S3	4	3 ±1
p	Ranunculus gmelinii	Gmelin's Water Buttercup	S3	1	28 ±0.5
p	Pyrola asarifolia	Pink Pyrola	S3	8	23 ±50.1
p	Primula laurentiana	Laurentian Primrose	S3	2	88 ±10
p	Rumex maritimus	Sea-Side Dock	S3	1	90 ±0
p	Polygonum scandens	Climbing False Buckwheat	S3	14	39 ±10
p	Polygonum pensylvanicum	Pennsylvania Smartweed	S3	14	17 ±10
p	Epilobium strictum	Downy Willowherb	S3	1	75 ±1
p	Utricularia radiata	Little Floating Bladderwort	S3	5	71 ±1
p	Teucrium canadense	Canada Germander	S3	3	33 ±5
p	Proserpinaca pectinata	Comb-leaved Mermaidweed	S3	1	52 ±1
p	Proserpinaca palustris var. crebra	Marsh Mermaidweed	S3	2	16 ±5
p	Geranium bicknellii	Bicknell's Crane's-bill	S3	2	88 ±0
p	Bartonia virginica	Yellow Bartonia	S3	3	21 ±10
p	Empetrum eamesii	Pink Crowberry	S3	7	45 ±10
p	Viburnum edule	Squashberry	S3	1	67 ±0
p	Stellaria longifolia	Long-leaved Starwort	S3	6	16 ±0.1
p	Campanula aparinoides	Marsh Bellflower	S3	22	44 ±0.1
p	Packera paupercula	Balsam Groundsel	S3	8	27 ±1
p	Megalodonta beckii	Water Beggarticks	S3	5	1 ±0.5
p	Hieracium paniculatum	Panicled Hawkweed	S3	1	89 ±0.1
p	Erigeron hyssopifolius	Hyssop-leaved Fleabane	S3	4	28 ±0.5
p	Asclepias incarnata ssp. incarnata	Swamp Milkweed	S3	1	92 ±0.1
p	Asclepias incarnata	Swamp Milkweed	S3	11	3 ±10
p	Polypodium appalachianum	Appalachian Polypody	S3?	4	38 ±0
p	Lycopodium sitchense	Sitka Clubmoss	S3?	2	46 ±5
p	Lycopodium sabiniifolium	Ground-Fir	S3?	2	42 ±0.1
p	Potamogeton praelongus	White-stemmed Pondweed	S3?	7	32 ±5
p	Elodea canadensis	Canada Waterweed	S3?	1	88 ±0
p	Carex tribuloides	Blunt Broom Sedge	S3?	2	82 ±0
p	Carex cryptolepis	Hidden-scaled Sedge	S3?	1	83 ±0

p	Carex foenea	Hay Sedge	S3?	5	28 ±0
p	Lycopodiella appressa	Southern Bog Clubmoss	S3S4	3	23 ±5
p	Lycopodium complanatum	Northern Clubmoss	S3S4	4	45 ±0
p	Equisetum scirpoides	Dwarf Scouring-Rush	S3S4	15	27 ±1
p	Cystopteris bulbifera	Bulblet Bladder Fern	S3S4	10	27 ±0.5
p	Trisetum spicatum	Narrow False Oats	S3S4	3	75 ±0
p	Liparis loeselii	Loesel's Twayblade	S3S4	4	26 ±5
p	Luzula parviflora	Small-flowered Woodrush	S3S4	2	60 ±0
p	Sisyrinchium angustifolium	Narrow-leaved Blue-eyed-grass	S3S4	2	74 ±0.1
p	Carex argyrantha	Silvery-flowered Sedge	S3S4	1	82 ±0.1
p	Viola sagittata var. ovata	Arrow-Leaved Violet	S3S4	1	51 ±0
p	Lindernia dubia	Yellow-seeded False Pimperel	S3S4	17	47 ±0
p	Sanguinaria canadensis	Bloodroot	S3S4	17	31 ±1
p	Utricularia gibba	Humped Bladderwort	S3S4	1	13 ±10
p	Atriplex franktonii	Frankton's Saltbush	S3S4	1	87 ±1
p	Isoetes lacustris	Lake Quillwort	S4	3	40 ±0.5

4.2 FAUNA

	scientific name	common name	prov. rarity	prov. status	COSEWIC	obs	dist.km
a	Sterna dougallii	Roseate Tern	S1B	Endangered	E	22	41 ±1
a	Dermochelys coriacea	Leatherback Sea Turtle	S1S2N	Endangered	E	2	69 ±5
a	Calidris canutus rufa	Red Knot rufa ssp	S2S3M	Endangered	E	23	34 ±0.5
i	Gomphus ventricosus	Skillet Clubtail	S1		E	2	18 ±0.5
a	Salmo salar pop. 1	Atlantic Salmon - inner Bay of Fundy pops	S2		E	28	8 ±10
a	Numenius borealis	Eskimo Curlew	SXM		E	1	77 ±0.5
a	Glyptemys insculpta	Wood Turtle	S3	Vulnerable	T	65	3 ±10
a	Morone saxatilis	Striped Bass	S1		T	4	8 ±10
a	Caprimulgus vociferus	Whip-Poor-Will	S1?B		T	5	13 ±5
a	Dolichonyx oryzivorus	Bobolink	S3S4B		T	155	3 ±5
a	Histrionicus histrionicus pop. 1	Harlequin Duck - Eastern pop.	S2N	Endangered	SC	7	71 ±10
a	Falco peregrinus anatum	Peregrine Falcon anatum ssp	S1B	Vulnerable	SC	10	50 ±50.1
a	Passerculus sandwichensis princeps	Savannah Sparrow princeps ssp	S1B		SC	1	67 ±0.1
a	Bucephala islandica (Eastern pop.)	Barrow's Goldeneye (Eastern pop.)	S1N		SC	2	94 ±0.1
a	Asio flammeus	Short-eared Owl	S1S2		SC	4	78 ±5
i	Alasmodonta varicosa	Brook Floater	S1S2		SC	5	3 ±0.1
i	Danaus plexippus	Monarch	S2B		SC	8	38 ±1
a	Euphagus carolinus	Rusty Blackbird	S2S3B		SC	90	2 ±0.1
a	Aegolius funereus	Boreal Owl	S1B		NAR	2	26 ±5
a	Fulica americana	American Coot	S1B		NAR	3	26 ±5
a	Glaucomys volans	Southern Flying Squirrel	S2S3		NAR	3	78 ±10
a	Hemidactylium scutatum	Four-toed Salamander	S3		NAR	25	8 ±10
a	Sialia sialis	Eastern Bluebird	S3B		NAR	19	6 ±0.1
a	Sterna hirundo	Common Tern	S3B		NAR	81	12 ±5
a	Accipiter gentilis	Northern Goshawk	S3S4		NAR	50	8 ±5
a	Alces americanus	Moose	S1	Endangered		11	48 ±10
a	Sorex dispar	Long-tailed Shrew	S1			1	56 ±10
i	Strophitus undulatus	Creeper	S1			2	88 ±0.1
i	Leptodea ochracea	Tidewater Mucket	S1			2	96 ±0.1
i	Enallagma signatum	Orange Bluet	S1			2	28 ±0.1
i	Coenagrion resolutum	Taiga Bluet	S1			2	32 ±1
i	Williamsonia fletcheri	Ebony Boghaunter	S1			1	79 ±0.5
i	Somatochlora franklini	Delicate Emerald	S1			2	43 ±1
i	Somatochlora brevicincta	Quebec Emerald	S1			1	34 ±0.1
i	Ophiogomphus aspersus	Brook Snaketail	S1			4	54 ±0.1
i	Oeneis jutta	Jutta Arctic	S1			2	43 ±1
i	Polygonia gracilis	Hoary Comma	S1			2	38 ±1
i	Polygonia satyrus	Satyr Comma	S1			2	49 ±1
i	Plebejus saepiolus	Greenish Blue	S1			1	48 ±1
i	Satyrrium acadica	Acadian Hairstreak	S1			2	88 ±1
i	Lycaena hyllus	Bronze Copper	S1			2	22 ±1
a	Perimyotis subflavus	Eastern Pipistrelle	S1?			4	8 ±10
a	Acipenser oxyrinchus	Atlantic Sturgeon	S1?			4	8 ±10
a	Vireo gilvus	Warbling Vireo	S1?B			7	31 ±5
a	Toxostoma rufum	Brown Thrasher	S1?B			5	45 ±5
a	Tringa solitaria	Solitary Sandpiper	S1?B,S4S5M			7	39 ±0.5
a	Sturnella magna	Eastern Meadowlark	S1B			2	68 ±5
a	Hylocichla mustelina	Wood Thrush	S1B			12	27 ±0.1
a	Progne subis	Purple Martin	S1B			4	76 ±5
a	Gallinula chloropus	Common Moorhen	S1B			6	57 ±5
a	Alca torda	Razorbill	S1B,S4N			2	91 ±0.1
a	Fratercula arctica	Atlantic Puffin	S1B,S4S5N			3	91 ±0.1
a	Calidris minutilla	Least Sandpiper	S1B,S5M			7	12 ±5
i	Stylurus scudderii	Zebra Clubtail	S1S2			4	11 ±0.5
i	Somatochlora kennedyi	Kennedy's Emerald	S1S2			2	43 ±1
i	Ophiogomphus rupinulensis	Rusty Snaketail	S1S2			3	11 ±0.5
i	Nymphalis vaualbum j-album	Compton Tortoiseshell	S1S2			5	32 ±1
i	Callophrys lanoraieensis	Bog Elfin	S1S2			7	26 ±1
a	Passerina cyanea	Indigo Bunting	S1S2B			4	39 ±5
a	Eremophila alpestris	Horned Lark	S1S2B,S4N			4	13 ±5
a	Charadrius semipalmatus	Semipalmated Plover	S1S2B,S5M			10	71 ±0.1
a	Martes pennanti	Fisher	S2			2	97 ±10
a	Myotis septentrionalis	Northern Long-eared Bat	S2			5	8 ±10
a	Salmo salar	Atlantic Salmon	S2			47	23 ±10
a	Asio otus	Long-eared Owl	S2			9	42 ±0.1
i	Lampsilis radiata	Eastern Lampmussel	S2			24	3 ±0.1
i	Somatochlora forcipata	Forcinate Emerald	S2			3	46 ±1

i	<i>Epithea princeps</i>	Prince Baskettail	S2	5	32 ±0.1
i	<i>Gomphus desertus</i>	Harpoon Clubtail	S2	2	76 ±1
i	<i>Nymphalis milberti</i>	Milbert's Tortoiseshell	S2	6	35 ±1
i	<i>Polygonia comma</i>	Eastern Comma	S2	4	47 ±1
i	<i>Boloria chariclea</i>	Arctic Fritillary	S2	4	46 ±1
i	<i>Strymon melinus</i>	Gray Hairstreak	S2	2	94 ±1
i	<i>Callophrys niphon</i>	Eastern Pine Elfin	S2	10	32 ±1
i	<i>Callophrys henrici</i>	Henry's Elfin	S2	7	32 ±1
i	<i>Satyrus calanus falacer</i>	Banded Hairstreak	S2	1	49 ±0.5
i	<i>Satyrus calanus</i>	Banded Hairstreak	S2	5	41 ±10
i	<i>Lycaena dospassosi</i>	Salt Marsh Copper	S2	7	78 ±0.1
i	<i>Pieris oleracea</i>	Mustard White	S2	6	32 ±1
i	<i>Amblyscirtes vialis</i>	Common Roadside-Skipper	S2	4	21 ±1
i	<i>Amblyscirtes hegong</i>	Salt and Pepper Skipper	S2	8	17 ±1
i	<i>Thorybes pylades</i>	Northern Cloudywing	S2	3	47 ±1
a	<i>Lasiurus cinereus</i>	Hoary Bat	S2?	2	21 ±10
a	<i>Vireo philadelphicus</i>	Philadelphia Vireo	S2?B	7	25 ±5
a	<i>Piranga olivacea</i>	Scarlet Tanager	S2B	12	29 ±5
a	<i>Myiarchus cinerascens</i>	Great Crested Flycatcher	S2B	12	20 ±5
a	<i>Empidonax traillii</i>	Willow Flycatcher	S2B	1	41 ±5
a	<i>Rallus limicola</i>	Virginia Rail	S2B	15	11 ±5
a	<i>Anas strepera</i>	Gadwall	S2B	3	43 ±0.1
a	<i>Anas clypeata</i>	Northern Shoveler	S2B	5	12 ±5
a	<i>Anas acuta</i>	Northern Pintail	S2B	11	11 ±5
a	<i>Rissa tridactyla</i>	Black-legged Kittiwake	S2B,S4S5N	1	91 ±0.1
a	<i>Bucephala clangula</i>	Common Goldeneye	S2B,S5N	50	40 ±10
i	<i>Alasmodonta undulata</i>	Triangle Floater	S2S3	15	1 ±0.1
i	<i>Erynnis juvenalis</i>	Juvenal's Duskywing	S2S3	10	32 ±1
a	<i>Icterus galbula</i>	Baltimore Oriole	S2S3B	31	8 ±5
a	<i>Poocetes gramineus</i>	Vesper Sparrow	S2S3B	18	17 ±5
a	<i>Phalaropus fulicaria</i>	Red Phalarope	S2S3M	1	77 ±0.5
a	<i>Phalaropus lobatus</i>	Red-necked Phalarope	S2S3M	3	41 ±0.5
i	<i>Amphispiza caesia</i>	Eastern Red Damsel	S3	1	38 ±1
i	<i>Nannothemis bella</i>	Elfin Skimmer	S3	9	38 ±0.5
i	<i>Erythrodiplax berenice</i>	Seaside Dragonlet	S3	1	100 ±0.1
i	<i>Somatochlora tenebrosa</i>	Clamp-Tipped Emerald	S3	7	34 ±0.1
i	<i>Gomphaeschna furcillata</i>	Harlequin Darter	S3	5	32 ±1
i	<i>Boyeria grafiana</i>	Ocellated Darter	S3	5	49 ±1
i	<i>Aeshna constricta</i>	Lance-Tipped Darter	S3	14	11 ±1
i	<i>Aeshna clepsydra</i>	Mottled Darter	S3	9	11 ±1
i	<i>Ophiogomphus carolus</i>	Rifle Snaketail	S3	20	12 ±0.1
i	<i>Lanthus parvulus</i>	Northern Pygmy Clubtail	S3	4	39 ±5
i	<i>Enodia anthedon</i>	Northern Pearly-Eye	S3	4	32 ±1
i	<i>Polygonia faunus</i>	Green Comma	S3	6	32 ±1
i	<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S3	10	32 ±1
i	<i>Satyrus liparops strigosus</i>	Striped Hairstreak	S3	1	49 ±0.5
i	<i>Satyrus liparops</i>	Striped Hairstreak	S3	2	32 ±1
i	<i>Hesperia comma laurentina</i>	Laurentian Skipper	S3	11	17 ±1
i	<i>Hesperia comma</i>	Common Branded Skipper	S3	1	26 ±1
a	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	S3?B	28	8 ±5
a	<i>Mimus polyglottos</i>	Northern Mockingbird	S3B	22	41 ±5
a	<i>Sterna paradisaea</i>	Arctic Tern	S3B	32	41 ±5
i	<i>Polygonia interrogationis</i>	Question Mark	S3B	11	38 ±1
a	<i>Tringa melanoleuca</i>	Greater Yellowlegs	S3B,S5M	28	12 ±5
a	<i>Mergus serrator</i>	Red-breasted Merganser	S3B,S5N	45	26 ±5
a	<i>Limosa haemastica</i>	Hudsonian Godwit	S3M	11	34 ±0.5
a	<i>Numerius phaeopus</i>	Whimbrel	S3M	11	37 ±0.5
a	<i>Pluvialis dominica</i>	American Golden-Plover	S3M	19	36 ±0.5
a	<i>Calidris maritima</i>	Purple Sandpiper	S3N	17	42 ±10
a	<i>Cardinalis cardinalis</i>	Northern Cardinal	S3S4	15	32 ±5
a	<i>Cephus grylle</i>	Black Guillemot	S3S4	21	43 ±5
i	<i>Polygonia progne</i>	Gray Comma	S3S4	9	35 ±0.5
i	<i>Speyeria aphrodite</i>	Aphrodite Fritillary	S3S4	12	26 ±1
i	<i>Callophrys polios</i>	Hoary Elfin	S3S4	13	26 ±1
i	<i>Feniseca tarquinius</i>	Harvester	S3S4	13	7 ±1
a	<i>Sayornis phoebe</i>	Eastern Phoebe	S3S4B	50	3 ±5

4.3 RANGE MAPS

The legally protected taxa listed below are linked to the study area by predictive range maps based upon expert estimates of distribution. Ranges of rank 1 indicate possible occurrence, those of rank 2 and 3 increasingly less probable.

scientific name	common name	prov. rarity	prov. status	COSEWIC	range rank
a <i>Glyptemys insculpta</i>	Wood Turtle	S3	Vulnerable	T	1
p <i>Listera australis</i>	Southern Twayblade	S2			1
p <i>Isoetes macrospora</i>	Prototype Quillwort	S2	Vulnerable	SC	1
i <i>Danaus plexippus</i>	Monarch	S2B		SC	1
a <i>Salmo salar</i> pop. 1	Atlantic Salmon - inner Bay of Fundy	S2		E	1
n <i>Erioderma phaeum</i>	Boreal Felt Lichen (Atlantic pop.)	S1S2	Endangered	E	2

5.0 SOURCE BIBLIOGRAPHY

The recipient of this data shall acknowledge the ACCDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

recs	source
447	Lepage, D. 2009. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 143,498 recs.
303	Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs.
302	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
287	Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs.
192	Pronych, G. & Wilson, A. 1993. Atlas of Rare Vascular Plants in Nova Scotia. Nova Scotia Museum, Halifax NS, I:1-168, II:169-331. 1446 recs.
168	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
149	Blaney, C.S. & Spicer, C.D.; Popma, T.M.; Basquill, S.P. 2003. Vascular Plant Surveys of Northumberland Strait Rivers & Amherst Area Peatlands. Nova Scotia Museum Research Grant, 501 recs.
105	Brunelle, P.-M. (compiler). 2009. ADIP/MDDO Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs.
88	Newell, R.E. 2005. E.C. Smith Digital Herbarium. E.C. Smith Herbarium, Irving Biodiversity Collection, Acadia University, Web site: http://luxor.acadiau.ca/library/Herbarium/project/ . 582 recs.
87	Roland, A.E. & Smith, E.C. 1969. The Flora of Nova Scotia, 1st Ed. Nova Scotia Museum, Halifax, 743pp.
82	Zinck, M. & Roland, A.E. 1998. Roland's Flora of Nova Scotia. Nova Scotia Museum, 3rd ed., rev. M. Zinck; 2 Vol., 1297 pp.
78	Morrison, Guy. 2006. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 52 taxa, 570 sites, 11496 surveys. 59704 recs.
78	Hicks, Andrew. 2009. Coastal Waterfowl Surveys Database, 2000-08. Canadian Wildlife Service, Sackville, 46488 recs (11149 non-zero).
75	Blaney, C.S. 2000. Fieldwork 2000. Atlantic Canada Conservation Data Centre. Sackville NB, 1265 recs.
42	Chardine, J.W. & et al. 2008. Colonial Waterbird Database. Canadian Wildlife Service, Sackville, 2699 sites, 9623 recs (7882 obs).
37	Blaney, C.S.; Spicer, C.D.; Popma, T.M.; Hanel, C. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 2037 recs.
32	Scott, F.W. 2002. Nova Scotia Herpetofauna Atlas Database. Acadia University, Wolfville NS, 8856 recs.
30	Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs.
29	Benjamin, L.K. (compiler). 2001. Significant Habitat & Species Database. Nova Scotia Dept of Natural Resources, 15 spp, 224 recs.
25	Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs.
24	Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs.
21	Cameron, E. 2008. Canadian Gypsum Co. survey 2007-08. Conestoga-Rovers & Assoc., 623 recs.
20	Blaney, C.S.; Spicer, C.D. 2001. Fieldwork 2001. Atlantic Canada Conservation Data Centre. Sackville NB, 717 recs.
19	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
18	Hall, R.A. 2003. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 189 recs.
15	Blaney, C.S. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 1042 recs.
13	Powell, B.C. 1967. Female sexual cycles of <i>Chrysemy spicta</i> & <i>Clemmys insculpta</i> in Nova Scotia. Can. Field-Nat., 81:134-139. 26 recs.
13	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
12	Blaney, C.S.; Mazerolle, D.M.; Klymko, J.; Spicer, C.D. 2006. Fieldwork 2006. Atlantic Canada Conservation Data Centre. Sackville NB, 8399 recs.
12	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
9	Archibald, D.R. 2003. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 213 recs.
8	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (<i>Isoetes prototypus</i>). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
8	Benjamin, L.K. (compiler). 2002. Significant Habitat & Species Database. Nova Scotia Dept of Natural Resources, 32 spp, 683 recs.
7	Stewart, J.I. 2010. Peregrine Falcon Surveys in New Brunswick, 2002-09. Canadian Wildlife Service, Sackville, 58 recs.
7	Morrison, Guy. 2007. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 1149 recs (1373 by species).
7	Gilhen, J. 1984. Amphibians & Reptiles of Nova Scotia, 1st Ed. Nova Scotia Museum, 164pp.
7	Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs.
7	Boyne, A.W. & Grecian, V.D. 1999. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 23 recs.
7	Blaney, C.S.; Mazerolle, D.M. 2008. Fieldwork 2008. Atlantic Canada Conservation Data Centre. Sackville NB, 13343 recs.
6	Benjamin, L.K. & Boreal Felt Lichen, Mountain Avens, Orchid and other recent records. 2009. Nova Scotia Dept Natural Resources, 105 recs.
5	Pulsifer, M.D. 2002. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 369 recs.
5	Popma, T.M. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 113 recs.
5	Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003.
5	Hall, R.A. 2001. S.. NS Freshwater Mussel Fieldwork. Nova Scotia Dept Natural Resources, 178 recs.
5	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
4	Hall, R. 2008. Rare plant records in old fieldbook notes from Truro area. Pers. comm. to C.S. Blaney. 6 recs, 6 recs.
4	Cameron, R.P. 2009. Nova Scotia nonvascular plant observations, 1995-2007. Nova Scotia Dept Natural Resources, 27 recs.
4	Blaney, C.S.; Spicer, C.D.; Mazerolle, D.M. 2005. Fieldwork 2005. Atlantic Canada Conservation Data Centre. Sackville NB, 2333 recs.
3	Standley, L.A. 2002. <i>Carex haydenii</i> in Nova Scotia. , Pers. comm. to C.S. Blaney. 4 recs.
3	Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J; ONHIC, 487 recs.
3	Neily, T.H. 2010. Erioderma Pedicellatum records 2005-09. Mersey Tobatic Research Institute, 67 recs.
3	Mills, Pamela. 2007. <i>Iva frutescens</i> records. Nova Scotia Dept of Natural Resources, Wildlife Div. Pers. comm. to S. Basquill, 4 recs.
3	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
3	Clayden, S.R. 2005. Confidential supplement to Status Report on Ghost Antler Lichen (<i>Pseudevernia cladonia</i>). Committee on the Status of Endangered Wildlife in Canada, 27 recs.
3	Cameron, E. 2007. Canadian Gypsum Co. survey 2005-07. Dillon Consulting Ltd, 40 recs.
3	Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08.
3	Benjamin, L.K. 2009. NSDNR Fieldwork & Consultants Reports. Nova Scotia Dept Natural Resources, 143 recs.
3	Basquill, S.P. 2009. 2009 field observations. Nova Scotia Dept of Natural Resources.
3	Adams, J. & Herman, T.B. 1998. Thesis, Unpublished map of C. insculpta sightings. Acadia University, Wolfville NS, 88 recs.
2	Whittam, R.M. 1999. Status Report on the Roseate Tern (update) in Canada. Committee on the Status of Endangered Wildlife in Canada, 36 recs.
2	Newell, R. E., MacKinnon, C. M. & Kennedy, A. C. 2006. Botanical Survey of Boot Island National Wildlife Area, Nova Scotia, 2004. Canadian Wildlife Service, Atlantic Region, Technical Report Series Number 450. 3 recs.
2	Newell, R. & Neily, T.; Toms, B.; Proulx, G. et al. 2011. NCC Properties Fieldwork in NS: August-September 2010. Nature Conservancy Canada, 106 recs.
2	Nelly, T.H. 2006. <i>Cypripedium arietinum</i> in Hants Co. Pers. comm. to C.S. Blaney. 22 recs, 22 recs.
2	Neily, P.D. Plant Specimens. Nova Scotia Dept Natural Resources, Truro. 2006.
2	Matthew Smith. 2010. Field trip report from Avon Caving Club outlining the discovery of <i>Cypripedium arietinum</i> and <i>Hepatica nobilis</i> populations. Public Works and Government Services Canada.
2	Daur, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (<i>Bucephala islandica</i>) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp.
2	Cody, W.J. 2003. Nova Scotia specimens of <i>Equisetum pratense</i> at the DAO herbarium in Ottawa. , Pers. comm. to C.S. Blaney. 4 recs.
2	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
2	Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.

- 2 Cameron, R.P. 2005. *Erioderma pedicellatum* unpublished data. NS Dept of Environment, 9 recs.
- 2 Bredin, K.A. 2002. NS Freshwater Mussel Fieldwork. Atlantic Canada Conservation Data Centere, 30 recs.
- 2 NSDNR. 2007. Restricted & Limited Use Land Database (RLUL).
- 1 Sollows, M.C.. 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs.
- 1 Scott, F.W. 1988. Status Report on the Southern Flying Squirrel (*Glaucomys volans*) in Canada. Committee on the Status of Endangered Wildlife in Canada, 2 recs.
- 1 Robinson, C.B. 1907. Early intervale flora of eastern Nova Scotia. Transactions of the Nova Scotia Institute of Science, 10:502-506. 1 rec.
- 1 Macaulay, M. Notes on newly discovered *Hepatica nobilis* var. *obtusa* population in Cumberland Co. NS. Pers. comm. to S. Blaney, 1 rec.
- 1 Lautenschlager, R.A. 2010. Miscellaneous observations reported to ACCDC (zoology). Pers. comm. from various persons, 2 recs.
- 1 Klymko, J.J.D. 2010. Miscellaneous observations reported to ACCDC (zoology). Pers. comm. from various persons, 3 recs.
- 1 Jacques Whitford Ltd. 2003. Cananda Lily location. Pers. Comm. to S. Blaney. 2pp, 1 rec, 1 rec.
- 1 Crowell, A. 2004. *Cypripedium arietinum* in Weir Brook, Hants Co. Pers. comm. to S. Blaney, 1 rec.
- 1 Clayden, S.R. 2006. *Pseudevernia cladonia* records. NB Museum. Pers. comm. to S. Blaney, Dec, 4 recs.
- 1 Brunelle, P.-M. (compiler). 2010. ADIP/MDDS Odonata Database: NB, NS Update 1900-09. Atlantic Dragonfly Inventory Program (ADIP), 935 recs.
- 1 Benedict, B. Connell Herbarium Specimens, Digital photos. University New Brunswick, Fredericton. 2005.
- 1 Benedict, B. Connell Herbarium Specimen Data . University New Brunswick, Fredericton. 2003.
- 1 Basquill, S.P. 2004. *C. americana* and *Sedum* sp records, 2002. Pers. comm. to C.S. Blaney. 2 recs, 2 recs.
- 1 Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
- 1 NS DOE. Protected Areas

An Environmental Screening for archaeological and historical sites and remains, fauna, flora and paleontology was completed by the Nova Scotia Museum.

There are two archaeological sites near the project area, a pre-contact site and a nineteenth century farm site. The NS Museum recommends an assessment for archaeological resources be conducted.

No records of species of concern were identified for the project footprint; however, species of concern have been identified within ten kilometres of the project site. Breeding records of four bird species of concern were identified. The project site is in the Shubenacadie River watershed, and three fish species of concern could potentially be in waters in the vicinity of the project site. Lake Egmont, southeast of the project area, contains one of the greatest diversity of fish species of any freshwater lake in Nova Scotia, including two uncommon species. Three species of amphibians/reptiles were identified, including an unusual population of salamanders. Wetlands associated with Lake Egmont contain a large portion of the province's gastropods (snails and slugs). There is one record of a damselfly of concern within ten kilometres of the site. The screening also noted at least one cave in the area which may be a potential bat hibernaculum. There are three species of bats that have been recorded as hibernating in such habitat. Seventeen plant species of concern were noted as being present or potentially present.

One area of concern in paleontology relevant to the project was noted. There has been a report of a Carboniferous fish vertebrate from the Lower Carboniferous Windsor Group. If such specimens are found, they should be reported to the Nova Scotia Museum.



**Communities, Culture
& Heritage
Heritage Division**

1747 Summer Street Tel: (902) 424-6475
Halifax, Nova Scotia Fax: (902) 424-0560
B3H 3A6

May 11, 2011

Amanda Facey
Conestoga-Rovers & Associates
45 Akerley Boulevard
Dartmouth, NS B3B 1J7

Dear Ms. Facey:

**RE: Environment Screening 11-04-27
Gays River Mine Southwest Expansion
Conestoga-Rovers & Associates**

Further to your request of April 27th, 2011, staff of the Heritage Division have reviewed their files for reference to the presence of heritage resources in the study area. Please be aware that our information is not comprehensive, in that it is incomplete and of varying degrees of accuracy with respect to the precise location and condition of heritage resources.

Archaeological and Historical Sites and Remains

There are two recorded archaeological sites very near the study area and on file in the provincial database - a pre-contact site and a 19th century farm site.

It is therefore recommended that an assessment for archaeological resources take place.

Natural Heritage

The staff of the Nova Scotia Museum Collections Unit (Natural History) have reviewed their records and make the following observations:

Zoology

Staff have reviewed NSM Zoological Records for species of concern and offer the following observations:

Staff have no records of species or species assemblages of concern for the specific mine site footprint, but they do have several issues that arise within the 10 km area outlined.

Breeding records of the following bird species of concern within the proposed area include:

Northern Oriole (*Icterus galbula*)
Bobolink (*Dolichonyx oryzivorus*) (provincially yellow-listed)
Eastern Kingbird (*Tyrannus tyrannus*)
Northern Goshawk (*Accipiter gentilis*) (provincially yellow-listed)

It should be noted that, as part of the Maritime Breeding Bird Initiative, underway at this time - in collation stage, that our knowledge of breeding distribution of birds may change in the next several years. Staff note that this is part of the Shubenacadie River watershed area. As such we have, present in the watershed, and potentially in the waters in the immediate vicinity of the mine site, the following fish species of concern:

Atlantic Sturgeon (*Acipenser oxyrhynchus*) (spawning sites not identified within the watershed)
Atlantic Salmon (*Salmo salar*) (Inner Bay of Fundy population (SARA - endangered)
- spawning and nursery areas
Striped Bass (*Morone saxatilis*) - under review by SARA (COSEWIC - threatened)
- spawning and nursery areas

In addition, Lake Egmont contains one of the greatest diversity of fish species in any freshwater lake in the Province (10 species confirmed). This includes the uncommon red-belly dace (*Phoxinus eos*) and Blacknose shiner (*Notropis heterolepis*).

Amphibians and Reptiles are present within this area, including:
Wood turtle (*Glyptemus insculpta*) (provincially yellow-listed)
Four-toed salamander (*Hemidactylium scutatum*)

There are also records, nearby of unusual populations of polyploid Blue-spotted salamanders (*Ambystoma laterale*), although not within the site circumscribed.

Other considerations that should be taken into account include the fact that wetland areas associated with sites such as Lake Egmont, contain, a substantial proportion of the Gastropod species found in the Province. As such, these, combined with the ichthyo-fauna suggest an area of unusually high bio-diversity in the Province.

There are also several dragonflies and damselflies of concern within the general area, although we only have one record, the Little Bluet (*Enallagma minisculum*) - provincially yellow-listed - from within the site circumscribed.

Staff notes that with the confirmed presence of at least one cave within the area, the potential exists for the presence of bat hibernacula. With that issue, we have at least three species of bats that have been recorded as hibernating in such habitats (all provincially yellow-listed), including the Little brown bat (*Myotis lucifugus*), The Northern Long-eared bat (*Myotis septentrionalis*) and the Eastern Pipistrelle (*Pipistrellus subflavus*). In that such sites often provide habitat for uncommon-rare cave fauna, consideration should be made to impact on such groups, in relation

to activity with seismic enhancement.

Staff note that this is an area that is under-represented in the NSM zoological database, so the data may be incomplete.

Botany

Staff have reviewed the area as delineated in the request and find the following plant species-at-risk to be present or potentially present. These species should be field-checked with respect to their presence/absence during their growing season or when they can be identified with certainty. Results should be stated in any report.

Anenome quinquefolia (provincially yellow- listed)
Betula michauxii (provincially yellow- listed)
Carex hirtifolia (provincially yellow- listed)
Caulophyllum thalictroides (provincially yellow- listed)
Cypripedium reginae (provincially red-listed)
Dirca palustris (provincially red-listed)
Euthamia caroliniana (provincially yellow- listed)
Hepatica nobilis (provincially yellow- listed)
Laportea canadensis (provincially yellow- listed)
Lilium canadense (provincially yellow- listed)
Listera australis (provincially red-listed)
Megalodonta beckii (provincially yellow- listed)
Potamogeton zosteriformis (provincially yellow- listed)
Rhamnus alnifolia (provincially yellow- listed)
Salix sericea (provincially yellow- listed)
Spiranthes lucida (provincially red-listed)
Spiranthes ochroleuca (provincially yellow- listed)

The presence/absence of these species should be determined during field assessment and reported in any submission. Any species at risk encountered and not listed above should also be acknowledged. Our recommendation is that field assessment be conducted during the growing season or when the identity can be determined to species or variety.

Palaeontology

There are two areas of concern in palaeontology:

There has been a recent report of a Carboniferous fish vertebrate (ie possible amphibian) from the Lower Carboniferous Lower Windsor Group. Very few vertebrate specimens have been discovered from the Lower Windsor Group. If such specimens are found, they should be reported to the NSM as soon as possible.

If the project includes the removal of gypsum in their mining efforts, the proponent should be mindful of the possibility of discovering very significant vertebrate remains such as mastodons, turtles, frogs, fish, and others such as beavers and caribou. Again, should they discover these, they should contact the NSM as soon as possible.

I have attached an invoice for the staff time spent reviewing our records and compiling this response. If you have any questions, please contact me at 424-6475.

Sincerely,

Laura Bennett,
Coordinator, Special Places

Enclosure

APPENDIX G

OVERVIEW OF GROUNDWATER AND SURFACE WATER PROGRAMS

Table 1: Overview of Groundwater and Surface Water Programs

Dates	Owner /Proponent	Type of Program	Program Components	Key Results	Source
1970					
1974	Cuvier Mines/Eso Minerals Canada	Baseline Environmental Study			September 1999 Environmental Registration/Screening Document
1976	Cuvier Mines/Eso Minerals Canada	Preliminary Impact Assessment			September 1999 Environmental Registration/Screening Document
1977	Cuvier Mines/Eso Minerals Canada	Survey of fishery resources			September 1999 Environmental Registration/Screening Document
1978	Cuvier Mines/Eso Minerals Canada	Environmental Assessment			September 1999 Environmental Registration/Screening Document
1985					
1986	Seabright Resources Inc.	Operational compliance monitoring			
1988	Westminer Canada	Operational compliance monitoring			
1989/1990	Westminer Canada	-Domestic well survey (baseline)	-Survey of wells of residences within 1500 metres of mine workings for RCA & total/ faecal coliform bacteria		September 1999 Environmental Registration/Screening Document
1989/1990	Westminer Canada	-Groundwater Monitoring/baseline	- 4 piezometer nests (at Stations WCI-GR-P1, P2, P4, P5), one single piezometer installed (Station WCI-GR-P6) (11 total); water samples collected from 8 for general chemistry analysis and metal scan - rehabilitation of 2 surficial wells (WCI-GR-P3A and P3B)	- no samples taken from surficial wells; wells remained dry	September 1999 Environmental Registration/Screening Document
January 1989 - February 1992	Westminer Canada	-Compliance monitoring	- Liquid effluent (at final discharge from tailings pond, Station WCI-GR-1): Susp. solids, pH daily; Fe, Hg, As, Co, Pb, Ni, Zn, Al, NH3, CN-, Organic C, oil/grease weekly; toxicity quarterly; Total/fecal coliform bi-weekly, summer & monthly, winter - Groundwater monitoring, 5 monitoring stations (WCI-GR-P1 through P5): Static water level weekly; chemical analysis (RCA) quarterly; metal scan Annually (September) *6th monitoring well WCI-GR-P6 added in March1992	- Liquid effluent: all parameters were within their respective discharge limits; toxicity test (96 hr static using fingerling rainbow trout) showed 0/5 mortality rate, with exception of 1/5 on Sept 27, 1991; coliform results variable; with total up to 500/100ml and fecal up to 350/100ml - Groundwater monitoring: permit did not provide limits associated with monitoring, intent was to compare collected data with the baseline established prior to full scale operation by Westminer	September 1999 Environmental Registration/Screening Document
April 1990 - May 1992	Westminer Canada	-Compliance monitoring	- Liquid Effluent at Point A: generally included same parameters and frequencies as WCI-GR-1; no coliform monitoring	- all parameters within their respective guideline limits with the exception of excessive suspended solids on 2 occasions, Dec 1990 and Jan 1992 - 0 mortality rate for toxicity tests	September 1999 Environmental Registration/Screening Document
July 1991 - September 1991	Westminer Canada	-Compliance monitoring	- Liquid effluent at WCI-GR-2: generally included same parameters and frequencies as WCI-GR-1; no toxicity testing or coliform monitoring	- all parameters within their respective guideline limits	September 1999 Environmental Registration/Screening Document
March 1992 - November 1996	Westminer Canada	-"Care and maintenance" period - phased reduction of compliance sampling	-Liquid effluent: full sampling (at WCI-GR-1 and Point A) until discharge is complete; weekly sampling for 4 weeks with exception of toxicity and coliform; monthly for 3 months with one toxicity test and one coliform test during this period; annually in September until discharge is resumed - Groundwater: static water level weekly for 4 weeks, then quarterly; 6th monitoring station added to program (WCI-GR-P6)		September 1999 Environmental Registration/Screening Document
November 1996 - 1997(?)	Savage Resources Canada Company	- continuation of reduced compliance monitoring (liquid effluent monitored weekly April-May 1997 at WCI-GR-1 and weekly July-December 1997 at WCI-GR-2) - introduction of non-compliance monitoring, November 1996	- Compliance: liquid effluent monitoring (WCI-GR-1 &2) and groundwater monitoring (WCI-GR-P1 to P6) - Non-compliance: Surface water stations (SW1 to 5) for general chemistry and misc. metals; flow monitoring; groundwater level monitoring (GA-series piezometers, dewatering and observation wells)(1997-1998)	-Non-compliance: surface water results show profound effects on water quality from rainfall events: increases/excedences in turbidity, aluminum and manganese	September 1999 Environmental Registration/Screening Document
1998 - ????	Savage Resources Canada Company	- Monitoring in accordance with 1997 amendment to permit #90-007 until May 31, 1998; followed by annual monitoring commencing October 1998	- Liquid effluent monitoring at station WCI-GR-2 for metals, TSS, TOC, total extractable hydrocarbons, acute toxicity, total and fecal coliforms - Groundwater monitoring at MW-GR-P6 for metals only	-results in compliance with the associated permits and regulations	Phase I ESA Update, April 2011
1999-2000	Savage Resources Canada Company	- mine operational???			
2000-2005	Savage/ScoZinc Limited	-"Care and maintenance" period			
2002	ScoZinc Limited (merged company)				

Table 1: Overview of Groundwater and Surface Water Programs

Dates	Owner /Proponent	Type of Program	Program Components	Key Results	Source
2006	ScoZinc/ Acadian Gold Corporation	- Domestic well survey	- Survey of wells of residences within 1500 metres of mine (~45 residences) for general chemistry, metals and bacteria and a 1 hr discharge test		Industrial Approval Application Supporting Document, November 2006
2006	ScoZinc/ Acadian Gold Corporation	- Monitoring program: baseline, operation and post-reclamation monitoring	<p>- Groundwater: Baseline: evaluation of 11 existing monitoring wells to determine suitability for monitoring; baseline monitoring to occur monthly for general chemistry and metals Development and Operation: level monitoring monthly after first year of site work; water quality sampling quarterly after one year of site work</p> <p>- Surface water: Baseline: 4 surface water monitoring stations to be established (SW1-4); baseline monitoring for water entering and exiting site, to be monitored monthly for general chemistry, metals and TSS; flow monitoring to be completed monthly; stream discharge monitoring over 5 separate flow events; level monitoring with continuous pressure transducer loggers and staff gauges Development and Operation: monthly sampling for general chemistry, metals, TSS and flow</p>		Industrial Approval Application Supporting Document, November 2006
February 2007 - December 2008	ScoZinc/ Acadian Gold Corporation	- Approval to construct, operate, reclaim mine outlining compliance monitoring; requires compliance monitoring program	<p>-Establishment of 6 surface water stations (SW1 - 6) to be monitored monthly for parameters in Appendix I; SW3 & 4 to be monitored monthly for dissolved oxygen; SW6 to be monitored monthly for total petroleum hydrocarbons; SW1-5 to be monitored monthly for water level and flow</p> <p>- Establishment of 25 groundwater monitoring stations to be monitored monthly for static water levels, wells in 'List I' to be monitored monthly for parameters in Appendix A (NSE Parameter List) except TSS for a period of one year following commencement of production and then quarterly thereafter; wells in 'List III' to be monitored for the baseline water parameters in Appendix A except TSS</p>		February 26, 2007 Industrial Approval to Construct, Operate, Reclaim mine
December 2008 - present	ScoZinc/ Acadian Gold Corporation/ Selwyn	-"Care and Maintenance" period; regular compliance monitoring	<p>-Groundwater collected monthly from 25 (11 wells - due to malfunctioning/destroyed wells) monitoring wells for general chemistry</p> <p>-Surface water collected monthly (except SW1A, during discharge only) from 7 monitoring stations for general chemistry (including cyanide at SW1 and TPH at SW6) and DO</p> <p>- Water quantity: quarterly download of datalogger data (5 locations)</p>	<p>- Groundwater: water levels in monitoring wells near pit tend to decrease or dry completely upon dewatering of pit; some exceedences noted, including some metals and colour</p> <p>- Surface water: some metals and DO exceedences</p> <p>- water quantity: 3 of 5 dataloggers missing or destroyed (SW2, 3 &5) as of May, 2009; water levels fluctuating seasonally</p>	059551 quarterly reports