PROVINCE OF NEW BRUNSWICK

ENVIRONMENTAL TRUST FUND (ETF)

INTERIM REPORT: Project No.: 140220

Extending LiDAR-DEM coverage for flood-prone areas in New Brunswick

This project, supported through ETF and ACASA funding, was used to generate a LiDAR wet-areas mapping coverage across New Brunswick, with priority given to areas with high potential inland and coastal flooding risk. Fig. 1 and Table 1 summarize current LiDAR DEM and wet-areas mapping coverages, which amount to about 700,000 ha, or about 10% of New Brunswick's land base. These coverages have been used for a number of ETF 2014-2015 Projects, as conducted in partnerships with (i) CNBA (Cities of New Brunswick Association, referring to Fredericton, Moncton, Miramichi, and Bathurst, and related wetlands delineations within urban settings), (ii) Sussex Corner Village Council, in referencing to discerning extent of the flooding in January and April 2014; (iii) The Hammond River Association with regard to fine-tuning LiDAR-based wetland delineations with on-the-ground wetland delineations.

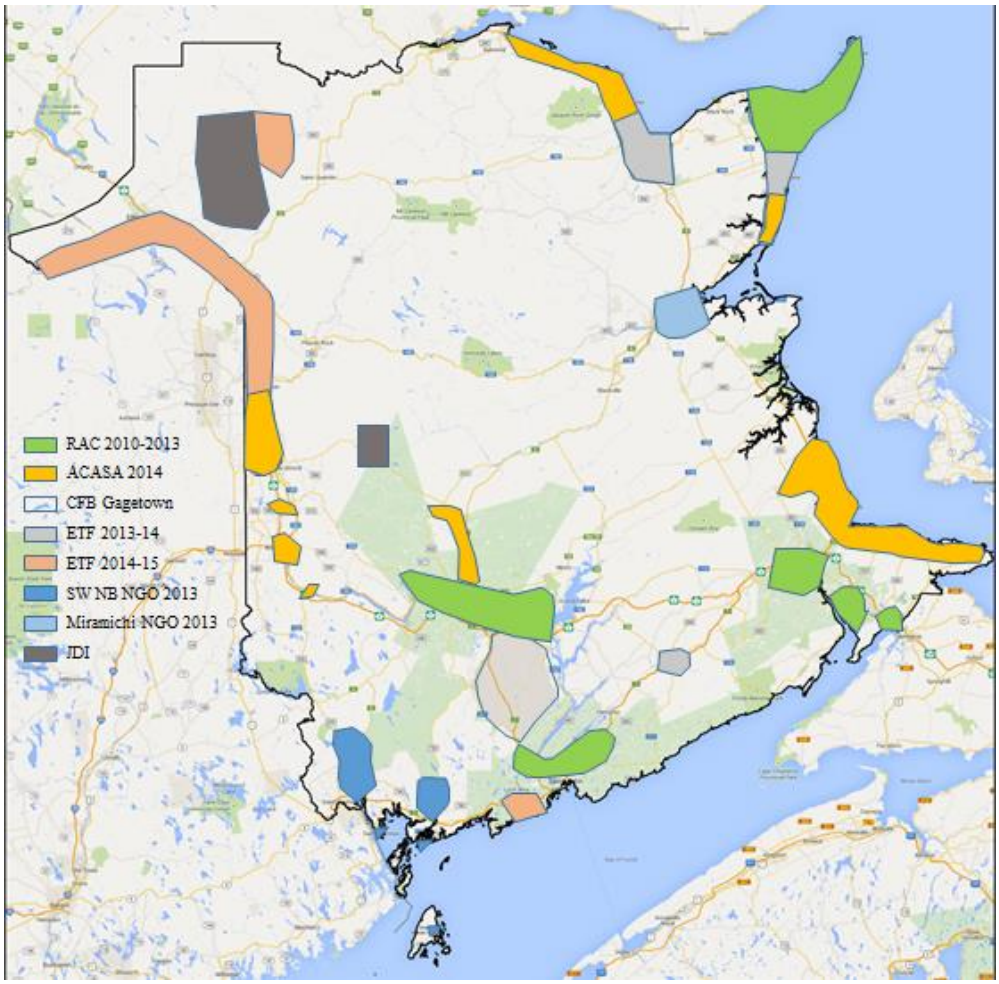

Fig. 1. Additional flood-prone areas prioritized for LiDAR-data acquisition (shaded brown), 2013-2015.

Table 1 summarizes the areas covered by the entries in Fig. 1.

Table 1.Wet-areas mapping locations, by funding sources, year processed and area.

Location	Funding Source	Year processed	Area (ha)
Gagetown	CFB Gagetown	2010	110,000
Lower Saint John River V	RAC	2010-2012	48,243
Fredericton	RAC	2010-2012	47,370
Moncton	RAC	2010-2012	12,408
Sackville	RAC	2010-2012	10,000
Sussex	ETF	2013-2014	4,787
Bathurst	ETF	2013-2014	12,236
Tracadie	ETF	2013-2014	43,003
Miramichi	Miramichi	2013	38,106
Deersdale	JDI	2011	10,000[a]
Black Brook, JDI	JDI	2013-2014	191,437
St. Andrews (SCEP)	SW-NB NGO	2013-2014	5,379
St. Stephen (SCEP)	SW-NB NGO	2013-2015	812
St. George (SCEP)	SW-NB NGO	2013-2016	16,832
Black's Harbour (SCEP)	SW-NB NGO	2013-2017	3,495
Grand Manan (SCEP)	SW-NB NGO	2013-2018	460
Northumberland Straight	ACASA	2014	571.7
Charlo to Bathurst	ACASA	2014	156.9
Bath-Florenceville	ACASA	2014	74.4
Hartland	ACASA	2014	20.9
Woodstock	ACASA	2014	57.6
Meductic	ACASA	2014	10.4
Nackawic	ACASA	2014	21.9
Stanley-Fredericton	ACASA	2014	219.1
Upper Saint John River V	ETF	2014-2015	200,000[a]
Black Brook, Agr. Canad	ETF	2014-2015	40,000[a]
Marsh Creek	ETF	2014-2015	20,000[a]
Tracadie to Neguac	ETF	2014-2015	146.2
Total area wet-area mapped			**686,908**
[a] Approximate			

For each area, the GIS work produced data layers referring to elevation rasters and contours, flow direction, flow accumulation, flow channels, sinks (depressions), and cartographic depth to water

(DTW) relative to coastline and local surface water features such as lakes, pools, and streams. The LiDAR-based DTW layers were produced to map the elevation rise away from flow channels at 4, 1 and 0.25 ha flow initiation. This was to emulate, respectively, levels of soil moisture (i) at end of summer, (ii) when the soils are partially saturated (wet seasons), and (iii) after spring melt Doing so produces datalayers essential for soil trafficability modelling by season, and also assists in calibrating LiDAR-DEM derived borders for wetlands, and local flood current of past and coastal inundations.

Since the acquisition of the LiDAR data is occurring piecewise, the project entailed incorporating these data and the resulting maps into the growing NB-WAM database, to allow for quick data access for detailed mapping purposes. The tile system used corresponds to SNB's tile system for easy and conventional map-layer referencing. Since the wet-areas mapping initiative is continuing, we have expanded our capacity to store, back-up and retrieve all NB wet-area mapping generated data layers and related ArcMap projects. This capacity is sufficiently large to include all of NB wet-area mapping memory requirements, province wide.

Acknowledgements

ACASA and ETF funding support for this project is much appreciated, and enabled the Forest Watershed Research Centre at UNB to produce and house the above mentioned datalayers. Special thanks are due to Jae Ogilvie and Mark Castonguay for making this happen. We do very much appreciate the support and interest from all our partners, including NBELG personnel, esp. Jeff Hoyt, Nelda Craig, David Whyte, Reid McLean, Prativa Pradhan, Mark Miller, Paul Jordan, and Lee Swanson.

Respectfully submitted by

Paul A. Arp
Professor
Forest Watershed Research Centre
Faculty of Forestry & Environmental Management
University of New Brunswick
email: arp2@unb.ca
Tel. 506 453 4931; Fax 506 453 3538
http://watershed.for.unb.ca/

Fredericton, Nov. 15, 2014