South West Nova Scotia (SWNS) Temperature and Solar Radiation Study 2013 Project Summary

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with an Agricultural Applications Summary by John Lewis, AgraPoint



South West Nova Scotia Temperature and Solar Radiation Study

2013 Project Summary

Applied Geomatics Research Group







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South West Nova Scotia Temperature and Solar Radiation Study: 2013 Project Overview

David Colville, Research Scientist and Project Lead Applied Geomatics Research Group (AGRG), NSCC

Introduction

Early in 2011, the three Community Business Development Corporations (CBDCs) of Yarmouth, Shelburne, and Queens/Lunenburg secured funding from more than a dozen sources to launch a project to assess weather conditions and their influence on agriculture potential. Their area of interest was the counties of Digby, Yarmouth, Shelburne, Queens, and Lunenburg. To implement this three-year project the CBDCs approached Perennia (formerly AgraPoint), for their agricultural consulting experience, and the Applied Geomatics Research Group (AGRG), for their years of experience in similar 'weather mapping' initiatives in the Annapolis Valley. The AGRG took the lead in weather station equipment selection, purchase, deployment, maintenance, data collection and processing. This resulted in the deployment of 42 Onset weather stations to measure both temperature and solar radiation (i.e., sunshine units).

Also in 2011, the AGRG deployed 18 more Onset weather stations (with the same specifications as the other 42) within the Kings and Annapolis counties (as a result of an NSERC ARTI grant). These stations replace previously deployed equipment and complement an additional 14 Campbell Scientific stations that the AGRG has had deployed throughout the Annapolis Valley for almost a decade. These 74 stations allow for coverage of the entire South West Nova Scotia (SWNS) geography, and are the focus of this report. The additional 32 stations do not incur any costs for the CBDC project; however, they are a valuable resource to the project since they allow for an excellent comparison to the weather regimes observed in the agriculturally important Annapolis Valley. Additionally, for all 74 stations the AGRG has collected ground-based, aerial, and satellite imagery which will be very useful for measuring the localized conditions around each weather station. Obstructions such as buildings, trees, etc. can have a definite impact on the temperature and solar radiation recorded at a given site and the AGRG's imagery will allow for a quantification of this impact.

Growing Degree Days (GDD) are common units used to quantify temperatures for agricultural purposes. They are calculated by taking the average of the daily maximum and minimum temperatures compared to a base temperature, T_{base} :

$$GDD = \frac{T_{\max} + T_{\min}}{2} - T_{\text{base}}$$

In this study the GDD are calculated using T_{base} values of both 5°C and 10°C to address the criteria of various crop requirements. The Frost Free (FF) period starts after the last spring frost (i.e., a temperature value less than or equal to 0°C) and extends to the killing frost (which for this study has been defined as temperatures less than or equal to -2°C for a period of at least two hours). The frost free period is thus also referred

to as the growing season. Solar radiation is the other focus of this study. It is a measure of the amount of sunshine that occurs at a site and is agriculturally important due to the relationship between plants and sunshine, as well as the drying properties of sunshine.

Station Equipment

The Onset stations are the main equipment used in this study; the Campbell Scientific stations have a number of additional sensors (i.e., wind speed and direction, barometric pressure, relative humidity, rainfall, soil temperature, and soil moisture).

The Onset stations, sold in Canada by Hoskin Scientific Limited, are equipped with a HOBO Micro Station data logger, a CDMA cellular modem, and a 20 Ahr. sealed lead acid battery all enclosed within a Hoffman Nema 4 enclosure. Additionally there is a Smart 12-bit temperature sensor within a radiation shield, a silicon pyranometer sensor (for measuring solar radiation), and a 5 watt solar panel to recharge the battery. All of these components are deployed on a 2m tripod.

The stations established on each site location looks similar to the one shown here. Both the temperature and solar radiation sensors are polled every 10 seconds and the data is averaged to produce a data record which is stored on the data logger every five minutes.

The modem is used to automatically transmit the data to the AGRG office through Bell's cellular network and the Internet. A properly operating modem helps to limit the need for site visits to only a couple of times a year for maintenance purposes. The intention is to maintain each station at the same site for the duration of the study (i.e., three years). DataGarrison's website (<u>www.datagarrison.com</u>) provides a means of viewing the data results as they are downloaded via the modem.

Station Deployment and Maintenance

Stations were deployed in transects (agreed on through meetings with the CBDC) which start with a station on the coast and move inland. Seven transects (Weymouth, Yarmouth, Clyde River, Shelburne, Liverpool, Bridgewater, and Chester) were identified with the CBDC, and then the AGRG included three additional transects (Kentville, Middleton, and Annapolis Royal), plus Brier Island and the Campbell Scientific stations throughout the Valley. This resulted in a total of 12 transects and coast to coast coverage between the Bay of Fundy and the Atlantic Ocean on the South Shore.



The stations were deployed in open areas as free from obstructions (i.e., trees, buildings, etc.) has could be achieved, in areas that had some degree of protection (i.e., people's yard and not in abandoned locations), in areas that indicated some potential for agricultural opportunities, and in areas that had cellular coverage on Bell's network. Considerable time was spent scouting the SWNS area for sites that met these criteria and negotiating with land owners for their permission to host the stations for the three-year duration of the project. Station deployment began in mid-April: was complete for the CBDC transects by mid-May; was mostly complete by mid-July for the other transects; however, some were not deployed until late August. This variability made station comparisons a little difficult for the 2011 year, but after that the data is complete.

All of the stations within the CBDC transects have modems that transmit data to the AGRG office, and the data continues to be accessible through the DataGarrison website as it is downloaded (i.e., every six hours). The Campbell Scientific stations also transmit their data, and the other Annapolis Valley stations are currently transmitting their data. Stations that transmit their data not only allow for acquiring recent observations, but also allow the AGRG to identify stations that are not working properly and need maintenance. The 2013 growing season had a number of minor (i.e., very short) data gaps at a few stations, but overall the equipment worked well.

Report Contents

The contents of this 2013 report are made up of a number of components (most of them similar to the two previous reports). This Project Overview is followed by an Agricultural Applications Summary written by John Lewis from Perennia. John's summary provides an interpretation of the data collected as it relates to the agricultural potential of the area. Eight maps of the SWNS geography are provided next (see the next page for a quick description), followed by five tables which summarize the 2013 data from the 74 stations. The remaining content, the largest section of the report, is comprised of a two-page summary for each station (described later in this Overview).

The five data summary tables are:

- Table 1: 2013 Temperature Data Summary
- Table 2: 2013 Base 5°C Heat Unit Accumulation within the April to November Period
- Table 3: 2013 Base 10°C Heat Unit Accumulation within the April to November Period
- Table 4: 2013 Daily Average Solar Radiation within the April to November Period
- Table 5: 2011 2013 Annual Temperature Comparison

These tables have been designed to easily allow for comparing results between stations. Each table uses a two-page format to present all stations in this study, and each table has the same first four columns which identify the stations, their locations, and their deployment dates. Table 1 focuses on describing the frost free period, the growing degree days (both Base 5°C and 10°C), and the minimum temperatures recorded at each station. Tables 2 and 3 present the monthly (April to November) growing degree day accumulations using Base 5°C and 10°C respectively. These first three tables list the GGD values and the GDD values that have occurred within the station's frost free period (shown in []). Table 4 focuses on the daily average solar radiation values for the same set of months. Table 5 is new this year and provides a comparison of temperature results from the three years of the study, 2011-2013.

Four sets of SWNS maps have been included in this report; the first set provides station location context while the remaining three sets show the heat accumulation and solar radiation results for 2013, 2012, and 2011. The first two maps show the location and Station IDs of the 74 stations on a colourized Digital Elevation Model (DEM) and with Soils Capability information (see the map on the right). The DEM illustrates the elevation of SWNS and thus conveys a sense of the area's topography. There is an obvious link between temperatures, elevations, and a location's proximity to the coast. Some examples of these relationships can clearly be seen based on the heat accumulation values shown on annual Heat Accumulation maps (see the example below). The Soils Capability mapping has been included to illustrate the locations of the best soils throughout SWNS and the location of the weather stations in relation to them.





For each year of the study, Heat Accumulation results for the growing season (Apr-Nov) are provided on the colourized DEM. These can be compared to the results of Solar Radiation Mapping that the AGRG has conducted in SWNS, which are also provided for the growing season (Apr-Nov). These solar maps illustrate solar radiation (i.e., sunshine) information from two sources: (1) NASA's Geostationary Operational Environmental Satellite (GOES) imagery; and (2) the weather stations throughout SWNS. GOES imagery is freely available for North America and beyond. There is a new, 1km-resolution image available every half hour and these images effectively map the movement of clouds. AGRG has produced software which analyzes these images with a DEM of an area and produces a map of the area's solar radiation. These maps show the results of analyzing more than 6000 images of SWNS for each year (throughout Apr-Nov). Additionally, the summary of corresponding solar radiation data

from the SWNS weather stations has been plotted on the maps. These maps show a good correlation between the two solar radiation sources. This is important in that it illustrates an effective means of mapping solar radiation beyond the locations of where stations have been set up. The first page of the two-page Station Summary provides a description of the station, while the second page provides a summary of the 2013 temperature and solar radiation data:

Station Description: a listing of stations information. The Station ID also indicates Onset (O) from Campbell Scientific (C) stations.

Station Panorama: a panorama image of the station location. The station is photographed while facing North, South is near the centre of the image, and the far right wraps around back to North.

South West Nova Scotia Stations Map: illustrates the locations of all stations. The current station is outlined in black. Soils Capability is also presented to help illustrate the best soil locations in SWNS

South West NS Temperature and Solar Radiation Study

Station Description

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Location:
BR3 (0)

Cortact:
Bridgewater

Krivin Johnson
Cittics (1)

Deploymer:
Station ID

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Bridgewater

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Bridgewater

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Krivin Johnson

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Station Photograph: a picture of the station situated on the site. All photos were recorded in August 2011.

Station Locator Map: a section of a 1:50,000 scale National Topographic System (NTS) map showing the location of the station, as represented by the red dot at the centre of the map. The Soils Capability mapping is blended into this map to show the localized soil detail.

Station Graphs: six graphs depicting the daily temperature and solar radiation values for the months of May to October (the most important months of the agricultural growing season).

Station Deployment and Frost Free Information: if a station was deployed after the Frost Free Start date then the start date will be listed as NA.



Monthly Summary Table: provides a month-by-month listing of results observed at the station. Results are provided for the months that the station was active; even if data only exists for part of a month (monthly averages are based on available data). Two columns reference data derived from "All Stations". These are again based on all available data. The "All Stations" results are intended to provide a comparison to the average of all stations included in this study. For further information on any of the details of this study please feel free to contact:

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or

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In addition, there are a number of people that we would like to acknowledge for the support they have provided:

- Chris Atwood, Dixie Redmond, and Krista Harding from the three respective CBDCs who recognized the value of this project and worked hard to pull many of the funding agents together to make this project happen;
- John Lewis from Perennia who was instrumental in site scouting and deployment of some of the stations;
- Keegan Colville for his efforts in finding sites, deploying stations, processing all of the photographs, and automating the generation of page one of the Station Summaries component of this report;
- and, of course, the many land owners who have allowed us to setup the stations on their properties for the duration of this project.

Agricultural Applications Summary – 2011-2013 Data Analysis

John Lewis, M.Sc., P.Ag Horticulture, Perennia

Background

There are numerous challenges facing the rural economies in Southwest Nova Scotia (SWNS), not the least of which are depopulation and undiversified economies based on fisheries or forestry. Historically, many areas throughout the region supported agriculture, usually in the form of small mixed farms, but these have been largely lost in recent decades. While this traditional model may no longer be viable, there are climatic attributes to SWNS that may make alternative agricultural models feasible. One such model is the production of high value perennial fruit crops such as peaches, highbush blueberries, and wine grapes. These relatively new crops to the Province have specific climatic requirements that may best be found in the study region but the climatic variability in this area has only been coarsely defined and a better elaboration is required to attract investors and promote development.

Methods

In a first step toward elaborating the climatic variation in southwest Nova, 42 temperature and solar radiation stations were deployed throughout the South Shore region in the spring of 2011. Located along seven transportation corridors leading from coastal sites inland, these stations were deployed to help define the best opportunity areas for high value agricultural crops within the region. The seven corridors are identified as Chester (CH), Bridgewater (BR), Liverpool (LI), Shelburne (SH), Clyde (CL), Yarmouth (YA), and Weymouth (WE).

During the summer of 2011, the Applied Geomatics Research Group (AGRG) activated three more corridors through the Annapolis Valley encompassing an additional 18 weather stations. With corridors through Annapolis Royal (AN), Middleton (MI), and Kentville (KE), these Valley corridors provide an excellent database from which to compare the seven South Shore corridors as the bulk of current high value fruit crops in the Province are located in the Annapolis Valley. Data for the years 2012 and 2013 are of particular interest as they provide a complete database for all ten corridors in the study.

2011-2013 Results

1. General trends within the study region

a. Trends within corridors

Over the three years of the study, each of the study corridors illustrated the basic trend that as one proceeds from the coast inland, heat accumulation increases while winter minimum temperature decreases. This is illustrated in Table 1 where the average data from the coastal stations is compared to the average data from the farthest inland stations for the two-year period of 2012-2013. Assuming an average distance of 60 kilometers (km) between a coastal station and its most inland companion one can calculate that on average one loses about 5.7 days of frost-free growing time for every 10 kilometers travelled inland, and over a month for the entire 60

kilometer distance. At the same time, the heat unit accumulation (growing degree days) is increasing by about 23 degree days (Base 10°C) for every 10 km distance or approximately 140 degree-days over the 60 km distance from the coast. This represents a 15% increase in heat accumulation from coast to inland sites on average.

Also, winter minimum temperatures are decreasing by about 0.7 degrees Celsius for every 10 km travelled inland so that one can estimate a winter minimum drop of over 4 degrees Celsius over the 60 km distance. Of course these trends are not uniform and substantial station to station variability is observed as influenced by meso- and microclimate variables such as elevation, slope, and proximity to bodies of water; however, the general hypothesis of increasing heat accumulation during the growing season and decreasing frost-free period and winter minima as one proceeds inland is in general substantiated by the data. While increasing heat unit accumulation as one travels inland is desirable for a high value crop such as wine grapes, decreasing frost free period and winter minimums are equally unfavorable. As such, the presence of "sweet spots" or areas within each corridor where there is an equitable balance between the conflicting trends is of great interest. The location and characterization of these sweet spots is one of the fundamental objectives of the study.

Table 1: Comparison of Ten Coastal Station Averages to Farthest Inland Station Averagesfor 2012 and 2013.							
Location	Ave. frost-free period (days)	Ave. growing degree days (Base 10°C)	Ave. minimum winter temp. (°C)	Ave. solar radiation (kWh/m ²)			
Coastal stations	194	906	-15.6	32.7			
Farthest inland stations	160	1045	-19.9	31.5			
Difference	34	139	43	12			

Surprisingly, the data suggests that solar radiation changes very little as one travels inland from the coast and in fact coastal sites have been slightly sunnier over the period of 2012-2013.

As noted above, there are also some deep inland sites that do not follow the usual trends and demonstrate some surprisingly high heat units, long frost free period, and relatively mild winter minima. Examples of these sites include SH6 and SH7 in the Shelburne corridor, YA5 and YA6 in the Yarmouth corridor, WE5 in the Weymouth corridor, and MI5 in the Middleton corridor. These sites exhibit strong positive meso- and microclimate effects that appear to be related to slope, elevation, and proximity to bodies of water (eg. rivers or lakes) and suggest that there are some surprisingly desirable areas for high value crop production deep in the interior of the province.

b. Trends between corridors

In 2012-2013 there were no obvious trends for heat unit accumulation between the ten study corridors (Table 2). However, the Clyde corridor had noticeably reduced GDD's due to its extension into the Atlantic via Cape Sable Island. Despite this, the GDD's for this corridor were still respectable (average of 931) and suggested that some sites in this area may still be suitable for high value crop production. The warmest corridor for the two-year period was Bridgewater (1088), followed closely by Liverpool (1049), Shelburne (1047), Weymouth (1041), Kentville (1040), and Yarmouth (1039), all with essentially equivalent GDD's.

Interestingly, the group of corridors with the lowest GDD's, with the exception of the Clyde corridor, included Chester (1010) and two of the three Valley corridors - Annapolis (1014) and Middleton (1027). Overall, the Valley corridors ranked 5th (Kentville), 7th (Middleton) and 8th (Annapolis) among the 10 study corridors for heat unit accumulation. This again supports the contention that SWNS has sites with at least comparable seasonal heat unit accumulation to that of the highly regarded Annapolis Valley.

Table 2: Average weather data for the ten study corridors examined in 2012 and 2013.						
Corridor	Station Means					
	GDD	Min. Temp	Frost-Free	Solar Radiation		
	(Base 10°C)	(°C)	Period (days)	(kWh/m²)		
Chester (CH)	1010	-20.3	165	31.8		
Bridgewater (BR)	1088	-20.1	169	32.3		
Liverpool (LI) ¹	1049	-18.2	173	32.4		
Shelburne (SH)	1047	-17.1	167	31.7		
Clyde (CL)	931	-16.7	170	32.2		
Yarmouth (YA)	1039	-16.1	184	31.7		
Weymouth (WE)	1041	-16.4	172	32.6		
Annapolis (AN)	1014	-19.3	162	31.9		
Middleton (MI)	1027	-20.7	167	32.3		
Kentville (KE)	1040	-19.9	173	31.9		

¹ Only stations LI3, LI4, LI5, and LI6 were used in the mean calculations.

Examining the 2012-2013 winter minima data in Table 2, an interesting trend of increasingly mild winter minima is illustrated as one proceeds from the Chester corridor westward to Yarmouth and then reversing to gradually colder minima moving eastward, peaking at -20.7°C for the Middleton corridor. In fact the Yarmouth corridor, at an average winter minima of -16.1°C is more than 4°C milder than the Chester and Middleton corridors to the east. This further validates the hypothesis that SWNS is milder than the Annapolis Valley, a great advantage for winter sensitive crops like wine grapes, peaches, and highbush blueberries.

There were no strong trends apparent in the frost free and solar radiation data although it is noteworthy that the Yarmouth corridor had a frost free period 2 to 3 weeks longer than the other corridors. This is very curious and it is thought that the high density of low

elevation lakes south of the corridor creates a unique air drainage accounting for the long frost free period throughout the length of this corridor, presenting a unique attribute for this area.

2. Comparison to minimum climatic standards

Wine grape production is a high value crop for which climatic requirements have been well-defined and as such presents a suitable model for comparison within the study area. Most experts agree that a minimum of 900 growing degree days (GDD) above 10°C are required for wine grape production and ideally above 1300 (Table 3). Additionally, a minimum of 150 frost free days (FFD) are required and ideally up to 180 days. Finally, sites with winter minima below

-26°C would be considered to have poor suitability, and would be considered most suitable if their minima were rarely below -21°C and never below -23°C.

Table 3: Climatic limitations to Wine Grape production.						
Climate rating	Degree Days	Frost-free	Winter Minimums			
	above 10°C	period (days)	(°C)			
Most suitable	>1300	180	-21 3 times or less in 10 yrs.			
			Minimum not less than -23.			
Good suitability	1100-1300	165	-21 5 times or less in 10 yrs.			
			Minimum not lower than -26.			
Fair suitability	900-1100	150	-21 almost every year.			
			-26 or lower only once in 10 yrs.			
Poor suitability	<900	130	-23 5 times or more in 10 yrs.			
			-26 3 times or more in 10 yrs.			

Using the standards identified in Table 3, each of the corridors in the study demonstrated some potential for high value perennial crop production, based on the 2011-2013 weather data. For heat unit accumulation, only four coastal stations (CH1, LI3, CL1, and YA1) had mean GDD's below 900 for the 3-year period (Table 4). Taking an even more conservative approach, sites with high GDD variability that would be expected to have years below the 900 threshold would extend the number of unacceptable sites by one additional station located at the coastal site in the Bridgewater corridor (BR1). Perhaps it is not surprising that 5 of the 10 coastal sites are unsuitable for wine grape production but this author finds it remarkable that <u>all</u> were not found to be unsuitable as per this criterion.

Examining the data further, six stations (excluding BR1) had heat unit accumulations between 900 and 1000 degree days, twenty-one were between 1000 and 1100, and nine were between 1100 and 1200. For comparison, the benchmark site at the Kentville Research Station (KSR a.k.a. KE3) had a 3-year average GDD of 1155 but it is noteworthy that station BR3 in the Bridgewater corridor had a higher 3-year average GDD of 1172 and eight other stations in the study area had comparable GDD's above 1100.

Corridor/station	GDD's (2011-2013)					
	2011	2012	2013	Mean +/- SD		
Chester (CH):						
CH1	856	924	813	864 +/- 56		
CH2	966	1078	981	1008 +/- 61		
CH3	1028	1110	1028	1055 +/- 47		
CH4	1026	1120	1031	1059 +/- 53		
CH5	975	1035	967	992 +/- 37		
CH6	977	1047	983	1002 +/- 39		
Bridgewater (BR):						
BR1	904	986	834	908 +/- 76		
BR2	1110	1195	1141	1149 +/- 43		
BR3	1150	1226	1139	1172 +/- 47		
BR4	1074	1195	1114	1128 +/- 62		
BR5	918	1110	1024	1017 +/- 96		
BR6	1031	1070	1017	1039 +/- 27		
Liverpool (LI) ¹						
LI3	915	940	811	889 +/- 68		
LI4	1087	1160	1102	1116 +/- 39		
LI5	1019	1151	1094	1088 +/- 66		
LI6	1114	1102	1034	1083 +/- 43		
Shelburne (SH):						
SH1	1026	1080	951	1019 +/- 65		
SH2	1051	1075	994	1040 +/- 42		
SH3	1029	1108	1018	1052 +/- 49		
SH4	995	988	927	970 +/- 37		
SH5	1090	1100	1032	1074 +/- 37		
SH6	1033	1172	1025	1077 +/-83		
SH7	1134	1145	1041	1107 +/- 57		
Clyde (CL):						
CL1	716	842	539	699 +/- 152		
CL2	1040	1111	953	1035 +/- 79		
CL3	991	994	899	961 +/- 54		
CL4	1003	1008	949	987 +/- 33		
CL5	1031	1047	971	1016 +/- 40		

Table 4: Base 10°C growing degree days (GDD's) at the South Shore weather stations and the Kentville Research Station (KRS) from 2011 to 2013.

Yarmouth (YA):				
YA1	835	958	807	867 +/- 80
YA2	1034	1109	995	1046 +/- 58
YA3	1064	1112	997	1058 +/- 58
YA4	992	1040	961	998 +/- 40
YA5	1101	1166	1090	1119 +/- 41
YA6	1135	1161	1074	1123 +/- 45
Weymouth (WE):				
WE1	947	1039	906	964 +/- 68
WE2	1017	1073	978	1023 +/- 48
WE3	1050	1065	955	1023 +/- 60
WE4	1080	1117	1023	1073 +/- 47
WE5	1121	1149	1062	1111 +/- 44
WE6	1067	1089	1030	1062 +/- 30
KE3 (KRS)	1143	1220	1102	1155 +/- 60

¹ Stations LI1 and LI2 were not included here.

Recalling the winter minimums in the 2012 data, not even the coldest winter minimum, -20.1°C in the Middleton corridor, was below the -23°C benchmark for injury. Based on this data one would conclude that winter injury concerns are minor in SWNS but such is the risk of drawing conclusions from a single winter of data. When we examine the 2013 data (Table 5) we see a much different picture for this important variable. Using the -23°C threshold, a total of 18 stations, including the benchmark site at the Kentville Research Station, reported winter minimums below -23°C. Not surprisingly, the bulk of these stations were located in the colder eastern study corridors or in deep inland sites. In fact, 9 of the 18 were in the Annapolis Valley corridors and an additional five more were in the Chester corridor. **Not a single station in the Shelburne, Clyde, Yarmouth, or Weymouth corridors was below -23°C in 2013, again validating the superiority of the west end of the study region for this critical variable. With all other variables equal, the milder winters of the South Shore suggest that high value winter sensitive crops (eg. wine grapes, highbush blueberries, and peaches) and cultivars (eg. vinifera wine grapes) would be better placed in the South Shore than in the Annapolis Valley.**

Table 5: Winter minimum temperatures (° C) in 2013						
Corridor/station	Min. T (°C)	Corridor/station	Min. T (°C)			
Chester (CH):		Yarmouth (YA):				
CH1	-22.2	YA1	-15.4			
CH2 ¹	<mark>-23.0</mark>	YA2	-16.2			
CH3	<mark>-25.3</mark>	YA3	-18.0			
CH4	<mark>-23.7</mark>	YA4	-20.4			
CH5	<mark>-25.6</mark>	YA5	-19.2			
CH6	<mark>-23.7</mark>	YA6	-18.7			
Bridgewater (BR):		Weymouth (WE):				
BR1	-17.7	WE1	-16.3			
BR2	-22.2	WE2	-16.0			
BR3	-22.4	WE3	-17.3			
BR4	<mark>-24.3</mark>	WE4	-21.1			
BR5 ²	<mark>-26.2</mark>	WE5	-20.3			
BR6	<mark>-26.1</mark>	WE6	-18.9			
Liverpool (LI):		Annapolis (AN):				
LI3	-17.3	AN1	-18.1			
LI4	-18.7	AN2	-18.1			
LI5	-20.9	AN3	-22.4			
LI6	<mark>-24.0</mark>	AN4	-22.2			
Shelburne (SH):		AN5	<mark>-25.3</mark>			
SH1	-16.1	AN6	<mark>-24.8</mark>			
SH2	-17.1	AN7	<mark>-24.8</mark>			
SH3	-19.8	Middleton (MI):				
SH4	-21.2	MI1	-19.5			
SH5	-21.1	<mark>S30</mark>	<mark>-29.9</mark>			
SH6	-19.3	S70	-22.4			
SH7	-20.4	MI2	<mark>-26.7</mark>			
Clyde (CL):		MI3	-21.9			
CL1	-13.9	MI4	<mark>-23.4</mark>			
CL2	-16.7	MI5	-22.1			
CL3	-20.3	Kentville: (KE):				
CL4	-20.5	KE1	-18.7			
CL5	-21.1	KE2	-21.9			
		KE3 (KRS)	<mark>-23.4</mark>			
		KE4	<mark>-23.2</mark>			
		KE5	<mark>-26.7</mark>			

¹Stations highlighted in yellow have winter minimums below the -23°C risk threshold. ²Stations highlighted in turquoise have winter minimums below the -26°C risk threshold.

Finally, 'frost free period' is a parameter of great importance for successful production of frost sensitive crops such as peaches and wine grapes. Using the criteria illustrated in Table 3, only nine stations had what would be classified as 'poor suitability' of less than 150 frost-free days in the 2012 data; however, much like what we observed for the winter minimum temperature data, 2013 was a very different year and a total of 18 of the 60 stations were below the suitability threshold for this variable (Table 6). Most of these stations were in the most interior locations of the individual corridors but there were notable exceptions, such as in Shelburne and Yarmouth, again suggesting that there are some compelling microclimates in deep inland locations where we would not normally expect to find them.

Not surprisingly, many of the coastal stations had long frost-free periods with more than 180 frost-free days and thus in the 'most suitable' category for this parameter; however, these coastal stations have usually been excluded as desirable sites due to their low heat unit accumulations discussed earlier. Of more interest are high heat unit sites with frost-free periods in the most suitable category and only two sites, YA3 and YA6, both in the Yarmouth corridor, fit this criterion. Coupled with their excellent heat and winter minimum data they are very promising sites indeed for high value crop production.

Corridor/station:	2012	2013	Mean				
Chester (CH):							
CH1	160	146 ¹	153				
CH2	189	164	177				
CH3	170	163	166				
CH4	177	163	170				
CH5	154	160	157				
CH6	177	163	170				
Bridgewater (BR):							
BR1	202	205	203				
BR2	177	178	177				
BR3	177	164	170				
BR4	175	163	169				
BR5	154	<mark>146</mark>	150				
BR6	<mark>149</mark>	<mark>137</mark>	<mark>143</mark>				
Liverpool (LI) ¹							
LI3	191	191	191				
LI4	190	177	183				
LI5	177	164	170				
LI6	<mark>149</mark>	<mark>147</mark>	<mark>148</mark>				
Shelburne (SH):							
SH1	211	201	206				
SH2	173	179	176				
SH3	164	160	162				
SH4	<mark>147</mark>	<mark>133</mark>	<mark>140</mark>				
SH5	153	<mark>138</mark>	<mark>145</mark>				
SH6	177	163	170				
SH7	170	163	167				
Clyde (CL):							
CL1	237	231	234				
CL2	177	164	170				
CL3	154	<mark>148</mark>	151				
CL4	<mark>148</mark>	<mark>147</mark>	<mark>147</mark>				
CL5	<mark>147</mark>	<mark>147</mark>	<mark>147</mark>				

Table 6: Frost-free period (days) at the Southwest Nova Scotia weather stations from 2012-2013.

Yarmouth (YA):			
YA1	214	191	202
YA2	194	177	185
YA3	190	186	188
YA4	169	160	165
YA5	177	176	176
YA6	191	184	187
Weymouth (WE):			
WE1	183	178	180
WE2	170	177	173
WE3	170	<mark>147</mark>	159
WE4	171	163	167
WE5	177	177	177
WE6	177	176	176
Annapolis (AN):			
AN1	184	204	194
AN2	190	179	184
AN3	165	<mark>147</mark>	156
AN4	165	<mark>147</mark>	156
AN5	165	<mark>147</mark>	156
AN6	<mark>149</mark>	<mark>137</mark>	<mark>143</mark>
AN7	<mark>149</mark>	<mark>137</mark>	<mark>143</mark>
Middleton (MI):			
MI1	191	185	188
S30	165	160	162
S70	189	163	176
MI2	<mark>149</mark>	<mark>137</mark>	<mark>143</mark>
MI3	177	164	170
MI4	170	<mark>147</mark>	158
MI5	177	164	171
Kentville (KE):			
KE1	190	184	187
KE2	190	163	177
KE3 (KRS)	177	164	170
KE4	190	164	177
KE5	<mark>149</mark>	<mark>146</mark>	<mark>147</mark>

¹ Station data highlighted in yellow is below the 150-day threshold for frost-free day suitability for sensitive crops like wine grapes and peaches.

3. Best stations from 2011-2013

As there is an incomplete data set for frost-free period, winter minima and solar radiation in 2011 we cannot draw any conclusions for these variables over 2011 to 2013, the three years of the study. However, the data set is complete for heat unit accumulation (GDD's Base 10°C) in the seven South Shore corridors and for the Kentville Research Station (KRS) which has already been noted as an excellent benchmark site for wine grape production. As such, it is interesting to look at the top stations for GGD accumulation relative to the KE3 (KRS) benchmark over the entire 3-year period:

1.	BR3	1172 GGD
2.	KE3 (KRS)	1155 GDD
3.	BR2	1149 GDD
4.	BR4	1128 GDD
5.	YA6	1123 GDD
6.	YA5	1119 GDD
7.	LI4	1116 GDD
8.	WE5	1111 GDD
9.	SH7	1107 GDD
10.	LI5	1088 GDD

What is noteworthy is that the benchmark site is not at the top of the list as would have been expected although it is second validating its characterization as an excellent site for crops having a high heat requirement for growth and yield. It is also noteworthy that the Bridgewater corridor placed 3 stations on this 'top ten list' and that 5 of the 7 corridors had at least one station on this list, suggesting that it is not just an isolated pocket that has high heat numbers but that high suitability sites can potentially be found throughout the study region, being influenced more by meso- and microclimate influences than any other factor.

Conclusions

Based on the 2011-2013 weather data, Southwest Nova Scotia certainly offers significant potential for high value agricultural crop production. The corridor with the highest heat unit accumulation was Bridgewater, while the Liverpool, Shelburne, Yarmouth, Weymouth, and Kentville corridors were very similar to each other but with slightly less heat than Bridgewater (Table 2). A third group including the Chester, Annapolis, and Middleton corridors had slightly lower heat unit totals again from that of the second group while the Clyde corridor represented a fourth category and was the coolest area in the study. Even so, the Clyde corridor with an average heat unit accumulation of 931 GDD's, was still above the minimum threshold for wine grape production and a number of individual sites are very promising for high value crop production in this area.

Examining winter minimums, the western corridors of Clyde, Yarmouth, and Weymouth were the mildest within the study area and winter minima generally decreased as one progressed east, either through the South Shore corridors or the Annapolis Valley corridors. Similarly, average frost free periods were generally longer in the west, becoming progressively shorter moving easterly. The Yarmouth corridor was especially attractive for this variable, retaining long frost free periods regardless of distance inland. Collectively, the evidence for the 2011-2013 period strongly supports the notion that the South Shore region has comparable, and in many cases superior, climatic suitability for high value crops such as peaches, highbush blueberries and grapes, than the agricultural standard represented by the Annapolis Valley.

Solar radiation data showed surprisingly little evidence of fog depression at coastal sites over the three years of the study, nor was there any noticeable trends travelling between eastern and westerly corridors. It is felt that heavy fog seasons would have a dramatic negative effect on climate variables, but unknown at this time is the periodicity of these events, the extent to which their effects might extend inland, and the degree of their effects on other climate variables. Certainly there is evidence of higher GDD variability at coastal sites (Table 4) which introduces another level of risk which, coupled with the unknown fog periodicity, make coastal sites undesirable for high value crop development at this time.

On a more positive note, the data clearly supports the existence of sweets spots where a desirable balance of all weather variables exists within each study corridor. Clearly, from a weather standpoint each corridor has potential for development in these sweet spots and future efforts need to be directed on other site suitability factors such as soil depth before development work can proceed in vigour. Even more exciting, the data also clearly indicates the existence of some deep inland sites that do not follow the usual trends and demonstrate some surprisingly high heat units, long frost free period, and relatively mild winter minima. Examples of these sites include SH6 and SH7 in the Shelburne corridor, YA5 and YA6 in the Yarmouth corridor, WE5 in the Weymouth corridor, and MI5 in the Middleton corridor. These sites exhibit strong positive meso- and microclimate effects that appear to be related to slope, elevation, and proximity to bodies of water (eg. rivers or lakes) and suggest that there are some surprisingly desirable areas for high value crop production deep in the interior of the province where they would not have been expected to be found by this author. Soil depth data is equally necessary in these areas to fully elaborate the development potential of these areas but from a climate standpoint the data is amazingly positive.

Table 1: 2013 Temperature Data Summary (FF = Frost Free; GDD = Growing Degree Days)

Station ID	Location	Contact	Deployment Date	Frost Free Start (>0°C)	Frost Free End (<=-2°C >= 2 hours)	Frost Free Days	Total GDD Base 5°C [FFGDD]	Total GDD Base 10°C [FFGDD]	Min Temp (°C)
AN1	Parkers Cove	Dennis Kingston	7/12/2011	04/05/13 3:55	24/11/13 6:25	204.1	1859 [1781]	911 [906]	-18.12
AN2	Parker Mountain	Stuart Robinson	7/12/2011	04/05/13 3:55	29/10/13 23:50	178.8	1920 [1815]	1000 [987]	-18.12
AN3	Granville Ferry	D. Butler & J. Burnell	7/12/2011	18/05/13 22:50	13/10/13 5:55	147.3	1943 [1673]	1017 [950]	-22.37
AN4	Annapolis	Susan & Gene Lane	7/12/2011	19/05/13 0:55	13/10/13 4:15	147.1	1987 [1720]	1072 [1004]	-22.17
AN5	Milford	Jim Langmire	7/12/2011	19/05/13 1:35	13/10/13 6:20	147.2	1950 [1693]	1041 [980]	-25.33
AN6	South Milford	Leslee Fredericks	7/12/2011	29/05/13 6:10	13/10/13 3:45	136.9	1899 [1606]	1012 [938]	-24.82
AN7	Maitland Bridge	KNP & NHS	8/24/2011	29/05/13 5:56	13/10/13 2:51	136.9	1948 [1632]	1042 [962]	-24.77
BI1	Brier Island	David Pugh	8/26/2011	12/04/13 20:52	24/11/13 6:47	225.4	1764 [1739]	790 [790]	-14.51
BR1	Kingsburg	Donna & Scott Fleming	5/6/2011	22/04/13 6:50	13/11/13 4:20	204.9	1769 [1728]	834 [834]	-17.73
BR2	Crouse Settlement	Bev Martel	5/3/2011	05/05/13 6:15	29/10/13 23:50	177.7	2102 [1979]	1159 [1141]	-22.12
BR3	Bridgewater	Kevin Johnson	5/5/2011	19/05/13 2:10	29/10/13 21:32	163.8	2153 [1917]	1200 [1139]	-22.37
BR4	Northfield	Wayne Broom	5/3/2011	19/05/13 2:05	29/10/13 7:50	163.2	2108 [1887]	1173 [1114]	-24.32
BR5	New Germany	Bill Woodworth	6/8/2011	20/05/13 3:05	13/10/13 6:35	146.2	2015 [1739]	1096 [1024]	-26.19
BR6	Cherryfield	Kevin Munro	5/5/2011	29/05/13 6:20	13/10/13 6:30	137.0	2023 [1690]	1109 [1017]	-26.08
CH1	Blanford	Jeff Hogue	5/17/2011	20/05/13 3:50	13/10/13 4:45	146.0	1762 [1525]	848 [813]	-22.22
CH2	East Chester	Christopher Field	5/17/2011	19/05/13 2:35	30/10/13 2:10	164.0	1927 [1756]	1004 [981]	-22.99
CH3	Chester Grant	Linda & Bruce Brophy	5/17/2011	19/05/13 3:00	29/10/13 6:10	163.1	1974 [1793]	1067 [1028]	-25.27
CH4	Seffernsville	Rudy & Donald Seffern	5/14/2011	19/05/13 3:20	29/10/13 7:40	163.2	1972 [1790]	1068 [1031]	-23.67
CH5	New Ross	Kelly Munroe	5/14/2011	19/05/13 4:45	26/10/13 7:50	160.1	1897 [1715]	1007 [967]	-25.61
CH6	Aldersville	Jackie Russell	5/14/2011	19/05/13 4:50	29/10/13 3:20	162.9	1913 [1733]	1026 [983]	-23.73
CL1	Clark's Harbour	Jimmy Newell	5/11/2011	07/04/13 7:30	24/11/13 15:35	231.3	1520 [1497]	539 [539]	-13.93
- CL2 -	Barrington	Sid Smith	4/28/2011	19/05/13 4:05	30/10/13 0:10	163.8	1966 [1743]	985 [953]	-16.66
CL3	Clyde River	Larry Nickerson	5/11/2011	19/05/13 6:25	14/10/13 5:00	147.9	1886 [1617]	954 [899]	-20.26
CL4	Clyde River	Peter Sutherland	4/28/2011	19/05/13 6:45	13/10/13 5:45	147.0	1939 [1668]	1004 [949]	-20.50
CL5	Clyde River	Ruth Hemeon	4/28/2011	19/05/13 7:01	13/10/13 5:01	146.9	1973 [1692]	1033 [971]	-21.08
KE1	Scotts Bay	Kathleen & Darren Huntley	7/13/2011	29/04/13 5:50	30/10/13 2:55	183.9	1739 [1650]	815 [803]	-18.74
KE2	Canning	Simon Rafuse	7/13/2011	19/05/13 2:38	29/10/13 6:13	163.2	2090 [1871]	1146 [1090]	-21.87
KE3	Kentville	Jeff Franklin	7/13/2011	19/05/13 3:24	29/10/13 23:39	163.8	2111 [1873]	1169 [1102]	-23.36
KE4	South Alton	Dianna & Daniel Niema	7/13/2011	19/05/13 4:00	29/10/13 23:50	163.8	1971 [1777]	1067 [1017]	-23.15
KE5	South Forest Home	Kirk Keddy	7/13/2011	20/05/13 4:05	13/10/13 1:20	145.9	1879 [1647]	1001 [944]	-26.73
LI1	East Port L'Hebert	Dirk Van Loon	5/12/2011	06/05/13 6:51	13/11/13 4:21	190.9	1901 [1813]	959 [958]	-18.12
LI2	Robertson Loop	C. & D. Robertson	5/12/2011	06/05/13 6:25	13/11/13 2:31	190.8	2070 [1965]	1109 [1109]	-19.24
LI3	Strawberry Point	Betty Richardson	5/4/2011	22/04/13 6:35	30/10/13 7:15	191.0	1757 [1674]	820 [811]	-17.34
LI4	Liverpool	Larry Cochrane	5/12/2011	06/05/13 6:30	30/10/13 1:00	176.8	2065 [1936]	1117 [1102]	-18.70
LI5	Middlefield	Hillsview Acres	5/4/2011	19/05/13 2:05	29/10/13 23:30	163.9	2087 [1867]	1144 [1094]	-20.93
LI6	South Brookfield	Mel Waterman	5/4/2011	19/05/13 2:15	13/10/13 4:50	147.1	2035 [1752]	1108 [1034]	-24.00

Table 1: 2013 Temperature Data Summary (FF = Frost Free; GDD = Growing Degree Days)

Station ID	Location	Contact	Deployment Date	Frost Free Start (>0°C)	Frost Free End (<=-2°C >= 2 hours)	Frost Free Days	Total GDD Base 5°C [FFGDD]	Total GDD Base 10°C [FFGDD]	Min Temp (°C)
MI1	Moshers Corner	David Colville	8/13/2011	28/04/13 6:10	30/10/13 0:10	184.8	1936 [1840]	1006 [988]	-19.47
MI2	Albany	Christine & John Skaling	7/14/2011	29/05/13 6:25	13/10/13 0:20	136.8	1844 [1558]	974 [899]	-26.67
MI3	Squirreltown	Don McPherson	7/14/2011	19/05/13 2:03	29/10/13 23:33	163.9	1944 [1750]	1040 [993]	-21.87
MI4	Dalhousie	John Blyde	8/24/2011	19/05/13 4:50	13/10/13 4:15	147.0	1952 [1701]	1049 [989]	-23.41
MI5	Springfield	Robert Whynot	7/14/2011	19/05/13 0:41	30/10/13 1:26	164.0	1989 [1791]	1080 [1029]	-22.07
SH1	Lockes Island	Marilyn & Stewart Moore	5/12/2011	12/04/13 5:55	30/10/13 3:45	200.9	1932 [1855]	961 [951]	-16.08
SH2	Sandy Point	Maria Harding	4/27/2011	19/05/13 5:18	14/11/13 6:53	179.1	2001 [1810]	1016 [994]	-17.13
SH3	Shelburne	Ivan Spears	5/12/2011	19/05/13 5:45	26/10/13 6:15	160.0	2011 [1788]	1064 [1018]	-19.75
SH4	Lower Ohio	Rick Bower	4/28/2011	29/05/13 5:53	09/10/13 7:33	133.1	1911 [1589]	998 [927]	-21.17
SH5	Lower Ohio	Rick Bower	4/27/2011	29/05/13 6:45	14/10/13 5:25	137.9	2072 [1715]	1118 [1032]	-21.08
SH6	Middle Ohio	Ted Siegel	4/27/2011	19/05/13 5:20	29/10/13 7:45	163.1	2032 [1793]	1078 [1025]	-19.29
SH7	Upper Ohio	Leonard Bower	4/27/2011	19/05/13 2:15	29/10/13 7:45	163.2	2050 [1815]	1093 [1041]	-20.40
WE1	Sandy Cove	Andre D'Entremont	5/11/2011	05/05/13 6:37	29/10/13 20:20	177.6	1869 [1752]	915 [906]	-16.33
WE2	Weymouth North	Paul Weaver	4/29/2011	06/05/13 5:47	29/10/13 19:38	176.6	1936 [1804]	994 [978]	-16.00
WE3	Weaver Settlement	Andrew Weaver	4/21/2011	19/05/13 2:06	13/10/13 7:11	147.2	1958 [1677]	1022 [955]	-17.30
WE4	Hassett	Nellie & David Russell	4/29/2011	19/05/13 2:50	29/10/13 6:10	163.1	2020 [1793]	1074 [1023]	-21.08
WE5	Corberrie	Kevin Gaudet	4/29/2011	06/05/13 7:05	30/10/13 2:11	176.8	2042 [1898]	1077 [1062]	-20.31
WE6	Hectanooga	Rudy & Henny Zwaga	5/11/2011	06/05/13 6:51	29/10/13 5:31	175.9	2001 [1862]	1046 [1030]	-18.92
YA1	Chegoggin	Chris Tedford	4/20/2011	28/04/13 6:10	04/11/13 23:30	190.7	1768 [1689]	809 [807]	-15.43
YA2	South Ohio	Truman Hurlburt	4/20/2011	06/05/13 5:16	29/10/13 22:01	176.7	1992 [1845]	1011 [995]	-16.20
YA3	Deerfield	Neil Nicholl	4/19/2011	27/04/13 6:01	29/10/13 22:41	185.7	1977 [1877]	1011 [997]	-17.99
YA4	Pleasant Valley	Leonard Sabine	4/19/2011	19/05/13 4:50	26/10/13 5:20	160.0	1949 [1729]	1008 [961]	-20.40
YA5	Kemptville	Kyle Roberts	4/20/2011	06/05/13 6:10	29/10/13 6:44	176.0	2085 [1934]	1109 [1090]	-19.19
YA6	East Kemptville	DNR	4/20/2011	04/05/13 6:35	04/11/13 5:55	184.0	2051 [1935]	1085 [1074]	-18.70
S10	Moshers Corner	David Colville	9/3/2002	28/04/13 6:10	30/10/13 0:15	184.8	1786 [1707]	919 [905]	-19.12
S20	West Nictaux	Ivan Shilliday	9/9/2003	19/05/13 1:45	13/10/13 1:40	147.0	1888 [1664]	1020 [963]	-26.64
S30	Middleton	David Colville	9/9/2003	06/05/13 6:30	13/10/13 5:25	160.0	2034 [1844]	1100 [1071]	-29.92
S40	South Mountain	Gregory Dixon	5/12/2004	28/04/13 6:15	30/10/13 1:45	184.8	1849 [1775]	964 [953]	-20.31
S60	Sheffield Mills	Dale Hebb	9/19/2003	28/05/13 8:40	29/10/13 6:30	153.9	1980 [1813]	1062 [1038]	-22.13
S70	Nictaux South	Marian & Gordon Foster	9/16/2003	19/05/13 5:50	29/10/13 7:50	163.1	1826 [1654]	953 [908]	-22.38
580	Port Royal	Allan Sloan	9/30/2003	06/05/13 0:35	13/10/13 6:05	160.2	1792 [1692]	858 [841]	-19.25
590	Gaspereau	Chris Wescott	9/30/2003	19/05/13 3:05	29/10/13 7:25	163.2	2070 [1852]	1138 [1078]	-23.23
S100	Marshaltown	Carl Seely	9/30/2003	19/05/13 4:50	13/10/13 2:35	146.9	1649 [1470]	734 [724]	-21.35
S120	Ross Creek	Bill Crowson	5/17/2004	19/05/13 3:50	29/10/13 23:59	163.8	1762 [1608]	888 [857]	-21.15
S130	Bear River	Phyllis & Robert Wood	5/13/2004	05/05/13 6:55	30/10/13 1:25	177.8	1925 [1820]	1010 [996]	-17.11
S140	Morristown	Neil Clem	6/23/2005	19/05/13 6:30	29/10/13 5:35	163.0	1828 [1655]	953 [911]	-19.48
S160	Lily Lake	John Briere	12/15/2006	19/05/13 6:25	30/10/13 8:20	164.1	1836 [1669]	946 [908]	-19.07

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StationID	Location	Contact	Deployment Date	Apr GDD	May GDD	Jun GDD	Jul GDD	Aug GDD	Sep GDD	Oct GDD	Nov GDD	Total GDD FEEGDD1
ANI	Parkers Cove	Doppic Kingstop	7/12/2011	42 [0]	186 [175]	300 [300]	410 [410]	380 [380]	201 [201]	158 [158]	57 [40]	1842 [1781]
AND	Parker Mountain	Stuart Pobinson	7/12/2011	47 [0]	101 [180]	330 [330]	454 [454]	415 [415]	200 [200]	146 [146]	40 [0]	19/08 [1815]
	Granville Ferry	D. Butler & J. Burnell	7/12/2011	49 [0]	199 [96]	328 [328]	468 [468]	415 [415]	294 [294]	131 [72]	44 [0]	1928 [1673]
AN4	Annapolis	Sucan & Gene Lane	7/12/2011	47 [0]	208 [95]	345 [345]	496 [496]	420 [420]	293 [293]	127 [71]	38 [0]	1974 [1720]
AN5	Milford	Jim Landmire	7/12/2011	45 [0]	200 [25]	341 [341]	494 [494]	414 [414]	282 [282]	130 [75]	33 [0]	1941 [1693]
ANG	South Milford	Leslee Fredericks	7/12/2011	41 [0]	191 [27]	334 [334]	491 [491]	405 [405]	278 [278]	118 [71]	32 [0]	1890 [1606]
AN7	Maitland Bridge	KNP & NHS	8/24/2011	45 [0]	207 [28]	344 [344]	498 [498]	410 [410]	278 [278]	123 [74]	33 [0]	1938 [1632]
BT1	Brier Island	David Pugh	8/26/2011	34 [31]	161 [161]	264 [264]	404 [404]	374 [374]	275 [275]	183 [183]	53 [47]	1748 [1739]
BR1	Kinashura	Donna & Scott Fleming	5/6/2011	30 [16]	135 [135]	265 [265]	439 [439]	356 [356]	296 [296]	192 [192]	46 [29]	1759 [1728]
BR2	Crouse Settlement	Bev Martel	5/3/2011	50 [0]	190 [172]	356 [356]	511 [511]	446 [446]	326 [326]	168 [168]	44 [0]	2091 [1979]
BR3	Bridgewater	Kevin Johnson	5/5/2011	54 [0]	216 [95]	373 [373]	519 [519]	447 [447]	324 [324]	159 [159]	47 [0]	2139 [1917]
BR4	Northfield	Wayne Broom	5/3/2011	51 [0]	212 [95]	363 [363]	519 [519]	447 [447]	314 [314]	149 [149]	41 [0]	2096 [1887]
BR5	New Germany	Bill Woodworth	6/8/2011	51 [0]	209 [90]	355 [355]	503 [503]	422 [422]	293 [293]	131 [76]	37 [0]	2001 [1739]
BR6	Cherryfield	Kevin Munro	5/5/2011	49 [0]	216 [33]	376 [376]	500 [500]	414 [414]	291 [291]	130 [76]	35 [0]	2011 [1690]
CH1	Blanford	Jeff Hoque	5/17/2011	30 [0]	144 [69]	279 [279]	448 [448]	359 [359]	290 [290]	160 [80]	42 [0]	1752 [1525]
CH2	East Chester	Christopher Field	5/17/2011	38 [0]	160 [75]	314 [314]	489 [489]	411 [411]	300 [300]	167 [167]	40 [0]	1919 [1756]
СНЗ	Chester Grant	Linda & Bruce Brophy	5/17/2011	40 [0]	177 [82]	341 [341]	496 [496]	430 [430]	301 [301]	143 [143]	38 [0]	1966 [1793]
CH4	Seffernsville	Rudy & Donald Seffern	5/14/2011	44 [0]	179 [83]	342 [342]	497 [497]	428 [428]	298 [298]	142 [142]	33 [0]	1963 [1790]
CH5	New Ross	Kelly Munroe	5/14/2011	42 [0]	184 [84]	332 [332]	485 [485]	404 [404]	290 [290]	121 [120]	31 [0]	1889 [1715]
CH6	Aldersville	Jackie Russell	5/14/2011	40 [0]	188 [86]	334 [334]	480 [480]	420 [420]	284 [284]	129 [129]	31 [0]	1906 [1733]
CL1	Clark's Harbour	Jimmy Newell	5/11/2011	35 [35]	139 [139]	226 [226]	309 [309]	278 [278]	246 [246]	211 [211]	61 [53]	1505 [1497]
CL2	Barrington	Sid Smith	4/28/2011	54 [0]	185 [83]	315 [315]	464 [464]	405 [405]	293 [293]	184 [183]	48 [0]	1948 [1743]
CL3	Clyde River	Larry Nickerson	5/11/2011	43 [0]	173 [80]	320 [320]	465 [465]	393 [393]	274 [274]	152 [85]	46 [0]	1866 [1617]
CL4	Clyde River	Peter Sutherland	4/28/2011	43 [0]	183 [83]	330 [330]	485 [485]	407 [407]	280 [280]	148 [83]	43 [0]	1919 [1668]
CL5	Clyde River	Ruth Hemeon	4/28/2011	50 [0]	190 [86]	332 [332]	490 [490]	415 [415]	286 [286]	146 [83]	46 [0]	1955 [1692]
KE1	Scotts Bay	Kathleen & Darren Huntley	7/13/2011	34 [5]	159 [159]	255 [255]	398 [398]	370 [370]	304 [304]	159 [159]	49 [0]	1728 [1650]
KE2	Canning	Simon Rafuse	7/13/2011	52 [0]	217 [104]	345 [345]	506 [506]	435 [435]	324 [324]	157 [157]	42 [0]	2078 [1871]
KE3	Kentville	Jeff Franklin	7/13/2011	56 [0]	226 [102]	361 [361]	509 [509]	441 [441]	313 [313]	147 [147]	43 [0]	2096 [1873]
KE4	South Alton	Dianna & Daniel Niema	7/13/2011	45 [0]	201 [91]	343 [343]	490 [490]	425 [425]	293 [293]	135 [135]	31 [0]	1963 [1777]
KE5	South Forest Home	Kirk Keddy	7/13/2011	40 [0]	194 [85]	336 [336]	476 [476]	408 [408]	283 [283]	105 [59]	30 [0]	1872 [1647]
LI1	East Port L'Hebert	Dirk Van Loon	5/12/2011	41 [0]	166 [151]	301 [301]	461 [461]	391 [391]	303 [303]	179 [179]	43 [27]	1885 [1813]
LI2	Robertson Loop	C. & D. Robertson	5/12/2011	50 [0]	185 [166]	341 [341]	494 [494]	432 [432]	320 [320]	183 [183]	47 [29]	2052 [1965]
LI3	Strawberry Point	Betty Richardson	5/4/2011	37 [15]	140 [140]	265 [265]	435 [435]	349 [349]	288 [288]	184 [182]	45 [0]	1743 [1674]
LI4	Liverpool	Larry Cochrane	5/12/2011	48 [0]	181 [163]	346 [346]	501 [501]	430 [430]	322 [322]	175 [174]	46 [0]	2049 [1936]
LI5	Middlefield	Hillsview Acres	5/4/2011	48 [0]	200 [90]	353 [353]	506 [506]	438 [438]	315 [315]	166 [165]	47 [0]	2073 [1867]
LI6	South Brookfield	Mel Waterman	5/4/2011	49 [0]	214 [91]	355 [355]	512 [512]	423 [423]	293 [293]	138 [78]	39 [0]	2023 [1752]

Table 2: 2013 Base 5°C Heat Unit Accumulation within April to November Period (FFGDD = Frost Free Growing Degree Days; GDD = Growing Degree Days)

able z. zui	is base of theat office	Accumulation within Apr	n to November	Feriou (11		Frost Free Growing Degree Days, GDD = Growing Degree Days)								
StationID	Location	Contact	Deployment Date	Apr GDD [FFGDD]	May GDD [FFGDD]	Jun GDD [FFGDD]	Jul GDD [FFGDD]	Aug GDD [FFGDD]	Sep GDD [FFGDD]	Oct GDD [FFGDD]	Nov GDD [FFGDD]	Total GDD [FFGDD]		
MI1	Moshers Corner	David Colville	8/13/2011	42 [7]	184 [184]	319 [319]	466 [466]	408 [408]	299 [299]	157 [157]	46 [0]	1921 [1840]		
MI2	Albany	Christine & John Skaling	7/14/2011	41 [0]	196 [27]	326 [326]	476 [476]	398 [398]	272 [272]	100 [59]	27 [0]	1836 [1558]		
MI3	Squirreltown	Don McPherson	7/14/2011	43 [0]	202 [90]	338 [338]	489 [489]	416 [416]	285 [285]	132 [132]	31 [0]	1936 [1750]		
MI4	Dalhousie	John Blyde	8/24/2011	47 [0]	200 [87]	339 [339]	492 [492]	422 [422]	286 [286]	127 [75]	31 [0]	1944 [1701]		
MI5	Springfield	Robert Whynot	7/14/2011	46 [0]	198 [86]	338 [338]	500 [500]	428 [428]	298 [298]	141 [141]	33 [0]	1982 [1791]		
SH1	Lockes Island	Marilyn & Stewart Moore	5/12/2011	43 [33]	174 [174]	319 [319]	450 [450]	382 [382]	296 [296]	202 [201]	47 [0]	1913 [1855]		
SH2	Sandy Point	Maria Harding	4/27/2011	48 [0]	183 [85]	331 [331]	474 [474]	404 [404]	295 [295]	186 [186]	58 [35]	1979 [1810]		
SH3	Shelburne	Ivan Spears	5/12/2011	51 [0]	198 [88]	352 [352]	490 [490]	411 [411]	293 [293]	158 [154]	41 [0]	1994 [1788]		
SH4	Lower Ohio	Rick Bower	4/28/2011	44 [0]	181 [28]	333 [333]	490 [490]	398 [398]	276 [276]	132 [64]	40 [0]	1894 [1589]		
SH5	Lower Ohio	Rick Bower	4/27/2011	59 [0]	204 [29]	354 [354]	511 [511]	430 [430]	301 [301]	154 [90]	43 [0]	2056 [1715]		
SH6	Middle Ohio	Ted Siegel	4/27/2011	57 [0]	206 [88]	351 [351]	467 [467]	424 [424]	294 [294]	170 [169]	46 [0]	2015 [1793]		
SH7	Upper Ohio	Leonard Bower	4/27/2011	53 [0]	202 [85]	346 [346]	498 [498]	424 [424]	300 [300]	163 [162]	47 [0]	2033 [1815]		
WE1	Sandy Cove	Andre D'Entremont	5/11/2011	41 [0]	182 [166]	299 [299]	447 [447]	404 [404]	282 [282]	155 [154]	44 [0]	1854 [1752]		
WE2	Weymouth North	Paul Weaver	4/29/2011	45 [0]	190 [174]	323 [323]	465 [465]	406 [406]	286 [286]	151 [150]	48 [0]	1914 [1804]		
WE3	Weaver Settlement	Andrew Weaver	4/21/2011	44 [0]	198 [91]	332 [332]	481 [481]	412 [412]	284 [284]	143 [77]	44 [0]	1938 [1677]		
WE4	Hassett	Nellie & David Russell	4/29/2011	51 [0]	208 [91]	342 [342]	504 [504]	422 [422]	289 [289]	145 [145]	44 [0]	2005 [1793]		
WE5	Corberrie	Kevin Gaudet	4/29/2011	53 [0]	211 [183]	341 [341]	500 [500]	426 [426]	288 [288]	162 [160]	43 [0]	2024 [1898]		
WE6	Hectanooga	Rudy & Henny Zwaga	5/11/2011	49 [0]	208 [179]	339 [339]	481 [481]	421 [421]	287 [287]	156 [155]	42 [0]	1983 [1862]		
YA1	Chegoggin	Chris Tedford	4/20/2011	32 [6]	168 [168]	276 [276]	414 [414]	365 [365]	265 [265]	177 [177]	53 [18]	1750 [1689]		
YA2	South Ohio	Truman Hurlburt	4/20/2011	48 [0]	198 [170]	322 [322]	471 [471]	414 [414]	290 [290]	179 [178]	49 [0]	1971 [1845]		
YA3	Deerfield	Neil Nicholl	4/19/2011	49 [15]	197 [197]	320 [320]	472 [472]	415 [415]	287 [287]	173 [171]	45 [0]	1958 [1877]		
YA4	Pleasant Valley	Leonard Sabine	4/19/2011	45 [0]	198 [84]	332 [332]	485 [485]	408 [408]	275 [275]	149 [145]	41 [0]	1933 [1729]		
YA5	Kemptville	Kyle Roberts	4/20/2011	59 [0]	217 [187]	341 [341]	501 [501]	433 [433]	298 [298]	175 [174]	45 [0]	2069 [1934]		
YAG	East Kemptville	DNR	4/20/2011	54 [0]	209 [188]	339 [339]	490 [490]	426 [426]	293 [293]	181 [181]	45 [18]	2037 [1935]		
S10	Moshers Corner	David Colville	9/3/2002	36 [6]	175 [175]	306 [306]	454 [454]	350 [350]	278 [278]	138 [138]	37 [0]	1774 [1707]		
S20	West Nictaux	Ivan Shilliday	9/9/2003	41 [0]	204 [98]	340 [340]	481 [481]	403 [403]	275 [275]	117 [67]	13 [0]	1874 [1664]		
S30	Middleton	David Colville	9/9/2003	63 [0]	207 [188]	354 [354]	498 [498]	426 [426]	303 [303]	135 [75]	28 [0]	2014 [1844]		
S40	South Mountain	Gregory Dixon	5/12/2004	33 [0]	178 [178]	313 [313]	467 [467]	403 [403]	283 [283]	131 [131]	33 [0]	1841 [1775]		
S60	Sheffield Mills	Dale Hebb	9/19/2003	41 [0]	177 [98]	351 [351]	470 [470]	434 [434]	310 [310]	150 [150]	37 [0]	1970 [1813]		
S70	Nictaux South	Marian & Gordon Foster	9/16/2003	34 [0]	182 [83]	322 [322]	469 [469]	394 [394]	269 [269]	117 [117]	31 [0]	1818 [1654]		
580	Port Royal	Allan Sloan	9/30/2003	43 [0]	190 [190]	296 [296]	428 [428]	386 [386]	254 [254]	138 [138]	44 [0]	1779 [1692]		
S90	Gaspereau	Chris Wescott	9/30/2003	48 [0]	216 [100]	348 [348]	503 [503]	439 [439]	316 [316]	146 [146]	41 [0]	2057 [1852]		
S100	Marshaltown	Carl Seely	9/30/2003	37 [0]	182 [162]	279 [279]	324 [324]	374 [374]	273 [273]	127 [70]	39 [0]	1635 [1470]		
S120	Ross Creek	Bill Crowson	5/17/2004	37 [0]	161 [78]	291 [291]	441 [441]	394 [394]	275 [275]	129 [129]	30 [0]	1758 [1608]		
S130	Bear River	Phyllis & Robert Wood	5/13/2004	43 [0]	196 [181]	327 [327]	473 [473]	417 [417]	281 [281]	141 [141]	38 [0]	1916 [1820]		
S140	Morristown	Neil Clem	6/23/2005	39 [0]	184 [84]	317 [317]	469 [469]	398 [398]	271 [271]	116 [116]	29 [0]	1823 [1655]		
S160	Lily Lake	John Briere	12/15/2006	42 [32]	186 [186]	265 [265]	412 [412]	411 [411]	322 [322]	163 [163]	62 [52]	1826 [1669]		

Table 2: 2	2013 Base 5°C Heat	Unit Accumulation	within April to Nove	mber Period (FFGD	D = Frost Free Growin	g Degree Days; GDD :	= Growing Degree Days

StationID	Location	Contact	Deployment Date	Apr GDD [FFGDD]	May GDD [FFGDD]	Jun GDD [FFGDD]	Jul GDD [FFGDD]	Aug GDD [FFGDD]	Sep GDD [FFGDD]	Oct GDD [FFGDD]	Nov GDD [FFGDD]	Total GDD [FFGDD]
AN1	Parkers Cove	Dennis Kingston	7/12/2011	5 [0]	65 [65]	150 [150]	264 [264]	234 [234]	142 [142]	38 [38]	13 [13]	911 [906]
AN2	Parker Mountain	Stuart Robinson	7/12/2011	5 [0]	70 [70]	180 [180]	299 [299]	260 [260]	142 [142]	36 [36]	8 [0]	1000 [987]
AN3	Granville Ferry	D. Butler & J. Burnell	7/12/2011	9 [0]	71 [37]	178 [178]	313 [313]	260 [260]	144 [144]	30 [18]	12 [0]	1017 [950]
AN4	Annapolis	Susan & Gene Lane	7/12/2011	7 [0]	80 [40]	195 [195]	341 [341]	265 [265]	145 [145]	29 [18]	10 [0]	1072 [1004]
AN5	Milford	Jim Langmire	7/12/2011	4 [0]	74 [35]	191 [191]	339 [339]	259 [259]	136 [136]	31 [20]	7 [0]	1041 [980]
AN6	South Milford	Leslee Fredericks	7/12/2011	4 [0]	71 [17]	184 [184]	336 [336]	250 [250]	134 [134]	27 [17]	6 [0]	1012 [938]
AN7	Maitland Bridge	KNP & NHS	8/24/2011	4 [0]	77 [18]	194 [194]	343 [343]	255 [255]	133 [133]	29 [19]	7 [0]	1042 [962]
BI1	Brier Island	David Pugh	8/26/2011	0 [0]	26 [26]	114 [114]	249 [249]	219 [219]	125 [125]	49 [49]	8 [8]	790 [790]
BR1	Kingsburg	Donna & Scott Fleming	5/6/2011	0 [0]	20 [20]	115 [115]	284 [284]	201 [201]	146 [146]	62 [62]	6 [6]	834 [834]
BR2	Crouse Settlement	Bev Martel	5/3/2011	5 [0]	62 [60]	206 [206]	356 [356]	291 [291]	176 [176]	52 [52]	11 [0]	1159 [1141]
BR3	Bridgewater	Kevin Johnson	5/5/2011	8 [0]	82 [42]	223 [223]	364 [364]	292 [292]	174 [174]	44 [44]	13 [0]	1200 [1139]
BR4	Northfield	Wayne Broom	5/3/2011	8 [0]	81 [41]	213 [213]	364 [364]	292 [292]	165 [165]	39 [39]	11 [0]	1173 [1114]
BR5	New Germany	Bill Woodworth	6/8/2011	8 [0]	81 [39]	205 [205]	348 [348]	267 [267]	146 [146]	30 [19]	11 [0]	1096 [1024]
BR6	Cherryfield	Kevin Munro	5/5/2011	7 [0]	89 [23]	226 [226]	345 [345]	259 [259]	144 [144]	31 [20]	8 [0]	1109 [1017]
CH1	Blanford	Jeff Hogue	5/17/2011	0 [0]	29 [21]	129 [129]	293 [293]	204 [204]	142 [142]	43 [24]	8 [0]	848 [813]
CH2	East Chester	Christopher Field	5/17/2011	0 [0]	39 [27]	164 [164]	334 [334]	256 [256]	150 [150]	50 [50]	11 [0]	1004 [981]
CH3	Chester Grant	Linda & Bruce Brophy	5/17/2011	6 [0]	54 [31]	191 [191]	341 [341]	275 [275]	152 [152]	38 [38]	10 [0]	1067 [1028]
CH4	Seffernsville	Rudy & Donald Seffern	5/14/2011	5 [0]	58 [34]	192 [192]	342 [342]	273 [273]	152 [152]	38 [38]	8 [0]	1068 [1031]
CH5	New Ross	Kelly Munroe	5/14/2011	6 [0]	60 [33]	182 [182]	330 [330]	249 [249]	144 [144]	29 [29]	7 [0]	1007 [967]
CH6	Aldersville	Jackie Russell	5/14/2011	4 [0]	69 [36]	185 [185]	325 [325]	265 [265]	141 [141]	31 [31]	6 [0]	1026 [983]
CL1	Clark's Harbour	Jimmy Newell	5/11/2011	0 [0]	9 [9]	76 [76]	154 [154]	123 [123]	96 [96]	73 [73]	8 [8]	539 [539]
CL2	Barrington	Sid Smith	4/28/2011	0 [0]	49 [27]	165 [165]	309 [309]	250 [250]	143 [143]	59 [59]	10 [0]	985 [953]
CL3	Clyde River	Larry Nickerson	5/11/2011	0 [0]	51 [29]	170 [170]	310 [310]	238 [238]	125 [125]	45 [27]	15 [0]	954 [899]
CL4	Clyde River	Peter Sutherland	4/28/2011	1 [0]	55 [30]	180 [180]	330 [330]	252 [252]	132 [132]	41 [25]	13 [0]	1004 [949]
CL5	Clyde River	Ruth Hemeon	4/28/2011	4 [0]	60 [31]	182 [182]	335 [335]	260 [260]	137 [137]	40 [26]	15 [0]	1033 [971]
KE1	Scotts Bay	Kathleen & Darren Huntley	7/13/2011	2 [0]	43 [43]	105 [105]	243 [243]	215 [215]	154 [154]	43 [43]	10 [0]	815 [803]
KE2	Canning	Simon Rafuse	7/13/2011	13 [0]	81 [47]	195 [195]	351 [351]	280 [280]	174 [174]	43 [43]	9 [0]	1146 [1090]
KE3	Kentville	Jeff Franklin	7/13/2011	11 [0]	91 [46]	211 [211]	354 [354]	286 [286]	165 [165]	40 [40]	11 [0]	1169 [1102]
KE4	South Alton	Dianna & Daniel Niema	7/13/2011	6 [0]	75 [37]	193 [193]	335 [335]	270 [270]	148 [148]	34 [34]	6 [0]	1067 [1017]
KE5	South Forest Home	Kirk Keddy	7/13/2011	5 [0]	69 [33]	186 [186]	321 [321]	253 [253]	137 [137]	23 [14]	7 [0]	1001 [944]
LI1	East Port L'Hebert	Dirk Van Loon	5/12/2011	0 [0]	45 [45]	151 [151]	306 [306]	236 [236]	154 [154]	58 [58]	9 [8]	959 [958]
LI2	Robertson Loop	C. & D. Robertson	5/12/2011	0 [0]	59 [59]	191 [191]	339 [339]	277 [277]	171 [171]	61 [61]	11 [11]	1109 [1109]
LI3	Strawberry Point	Betty Richardson	5/4/2011	0 [0]	25 [25]	116 [116]	280 [280]	194 [194]	138 [138]	58 [58]	9 [0]	820 [811]
LI4	Liverpool	Larry Cochrane	5/12/2011	2 [0]	57 [57]	196 [196]	346 [346]	275 [275]	172 [172]	56 [56]	13 [0]	1117 [1102]
LI5	Middlefield	Hillsview Acres	5/4/2011	4 [0]	70 [37]	204 [204]	351 [351]	283 [283]	168 [168]	51 [51]	13 [0]	1144 [1094]
LI6	South Brookfield	Mel Waterman	5/4/2011	7 [0]	80 [37]	205 [205]	357 [357]	268 [268]	147 [147]	34 [20]	10 [0]	1108 [1034]

StationID	Location	Contact	Deployment Date	Apr GDD [FFGDD]	May GDD [FFGDD]	Jun GDD [FFGDD]	Jul GDD [FFGDD]	Aug GDD [FFGDD]	Sep GDD [FFGDD]	Oct GDD [FFGDD]	Nov GDD [FFGDD]	Total GDD [FFGDD]
MI1	Moshers Corner	David Colville	8/13/2011	8 [0]	61 [61]	169 [169]	311 [311]	253 [253]	150 [150]	44 [44]	10 [0]	1006 [988]
MI2	Albany	Christine & John Skaling	7/14/2011	4 [0]	75 [17]	177 [177]	321 [321]	243 [243]	128 [128]	21 [13]	5 [0]	974 [899]
MI3	Squirreltown	Don McPherson	7/14/2011	3 [0]	77 [38]	189 [189]	334 [334]	261 [261]	139 [139]	32 [32]	5 [0]	1040 [993]
MI4	Dalhousie	John Blyde	8/24/2011	5 [0]	75 [36]	189 [189]	337 [337]	267 [267]	142 [142]	28 [18]	6 [0]	1049 [989]
MI5	Springfield	Robert Whynot	7/14/2011	5 [0]	75 [36]	188 [188]	345 [345]	273 [273]	153 [153]	34 [34]	7 [0]	1080 [1029]
SH1	Lockes Island	Marilyn & Stewart Moore	5/12/2011	0 [0]	42 [42]	169 [169]	295 [295]	227 [227]	146 [146]	72 [72]	10 [0]	961 [951]
SH2	Sandy Point	Maria Harding	4/27/2011	0 [0]	52 [31]	181 [181]	319 [319]	249 [249]	146 [146]	57 [57]	12 [11]	1016 [994]
SH3	Shelbume	Ivan Spears	5/12/2011	2 [0]	64 [33]	202 [202]	335 [335]	256 [256]	144 [144]	48 [48]	13 [0]	1064 [1018]
SH4	Lower Ohio	Rick Bower	4/28/2011	3 [0]	59 [18]	183 [183]	335 [335]	243 [243]	128 [128]	34 [20]	13 [0]	998 [927]
SH5	Lower Ohio	Rick Bower	4/27/2011	6 [0]	70 [19]	204 [204]	356 [356]	275 [275]	151 [151]	44 [27]	12 [0]	1118 [1032]
SH6	Middle Ohio	Ted Siegel	4/27/2011	5 [0]	70 [35]	201 [201]	322 [322]	269 [269]	144 [144]	54 [54]	13 [0]	1078 [1025]
SH7	Upper Ohio	Leonard Bower	4/27/2011	4 [0]	67 [33]	196 [196]	343 [343]	269 [269]	151 [151]	49 [49]	14 [0]	1093 [1041]
WE1	Sandy Cove	Andre D'Entremont	5/11/2011	1 [0]	49 [48]	149 [149]	292 [292]	249 [249]	132 [132]	36 [36]	7 [0]	915 [906]
WE2	Weymouth North	Paul Weaver	4/29/2011	5 [0]	68 [68]	173 [173]	310 [310]	251 [251]	137 [137]	39 [39]	11 [0]	994 [978]
WE3	Weaver Settlement	Andrew Weaver	4/21/2011	4 [0]	71 [34]	182 [182]	326 [326]	257 [257]	135 [135]	35 [21]	12 [0]	1022 [955]
WE4	Hassett	Nellie & David Russell	4/29/2011	4 [0]	73 [35]	192 [192]	349 [349]	267 [267]	141 [141]	39 [39]	9 [0]	1074 [1023]
WE5	Corberrie	Kevin Gaudet	4/29/2011	4 [0]	71 [70]	191 [191]	345 [345]	271 [271]	140 [140]	45 [45]	10 [0]	1077 [1062]
WE6	Hectanooga	Rudy & Henny Zwaga	5/11/2011	4 [0]	69 [67]	189 [189]	326 [326]	266 [266]	139 [139]	43 [43]	10 [0]	1046 [1030]
YA1	Chegoggin	Chris Tedford	4/20/2011	0 [0]	38 [38]	126 [126]	259 [259]	210 [210]	116 [116]	51 [51]	9 [7]	809 [807]
YA2	South Ohio	Truman Hurlburt	4/20/2011	2 [0]	57 [53]	172 [172]	316 [316]	259 [259]	140 [140]	55 [55]	10 [0]	1011 [995]
YA3	Deerfield	Neil Nicholl	4/19/2011	3 [0]	59 [59]	170 [170]	317 [317]	260 [260]	138 [138]	53 [53]	11 [0]	1011 [997]
YA4	Pleasant Valley	Leonard Sabine	4/19/2011	3 [0]	61 [28]	182 [182]	330 [330]	253 [253]	126 [126]	42 [42]	11 [0]	1008 [961]
YA5	Kemptville	Kyle Roberts	4/20/2011	5 [0]	73 [70]	191 [191]	346 [346]	278 [278]	148 [148]	57 [57]	11 [0]	1109 [1090]
YA6	East Kemptville	DNR	4/20/2011	5 [0]	70 [67]	189 [189]	335 [335]	271 [271]	144 [144]	60 [60]	11 [8]	1085 [1074]
S10	Moshers Corner	David Colville	9/3/2002	5 [0]	56 [56]	157 [157]	299 [299]	228 [228]	131 [131]	34 [34]	9 [0]	919 [905]
S20	West Nictaux	Ivan Shilliday	9/9/2003	7 [0]	80 [44]	190 [190]	326 [326]	248 [248]	138 [138]	26 [17]	3 [0]	1018 [963]
\$30	Middleton	David Colville	9/9/2003	9 [0]	79 [79]	204 [204]	343 [343]	271 [271]	153 [153]	32 [21]	9 [0]	1100 [1071]
540	South Mountain	Gregory Dixon	5/12/2004	4 [0]	62 [62]	164 [164]	312 [312]	248 [248]	137 [137]	30 [30]	7 [0]	964 [953]
S60	Sheffield Mills	Dale Hebb	9/19/2003	5 [0]	52 [43]	201 [201]	315 [315]	279 [279]	160 [160]	40 [40]	10 [0]	1062 [1038]
570	Nictaux South	Marian & Gordon Foster	9/16/2003	3 [0]	67 [34]	173 [173]	314 [314]	239 [239]	124 [124]	24 [24]	9 [0]	953 [908]
S80	Port Royal	Allan Sloan	9/30/2003	6 [0]	55 [55]	146 [146]	273 [273]	231 [231]	106 [106]	30 [30]	11 [0]	858 [841]
S90	Gaspereau	Chris Wescott	9/30/2003	10 [0]	83 [44]	198 [198]	348 [348]	284 [284]	167 [167]	37 [37]	11 [0]	1138 [1078]
S100	Marshaltown	Carl Seely	9/30/2003	3 [0]	53 [52]	130 [130]	169 [169]	219 [219]	125 [125]	27 [18]	8 [0]	734 [724]
S120	Ross Creek	Bill Crowson	5/17/2004	5 [0]	49 [29]	142 [142]	286 [286]	239 [239]	130 [130]	31 [31]	6 [0]	888 [857]
S130	Bear River	Phyllis & Robert Wood	5/13/2004	5 [0]	70 [70]	177 [177]	318 [318]	262 [262]	134 [134]	35 [35]	9 [0]	1010 [996]
S140	Morristown	Neil Clem	6/23/2005	4 [0]	66 [34]	168 [168]	314 [314]	243 [243]	129 [129]	23 [23]	6 [0]	953 [911]
S160	Lily Lake	John Briere	12/15/2006	6 [6]	68 [68]	119 [119]	257 [257]	256 [256]	172 [172]	56 [56]	5 [4]	939 [938]

Station ID	Location	Contact	Deployment Date	Apr kWh/m²/day	May kWh/m²/day	Jun kWh/m²/day	Jul kWh/m²/day	Aug kWh/m²/day	Sep kWh/m²/day	Oct kWh/m²/day	Nov kWh/m²/day	Total Radiation kWh/m²
AN1	Parkers Cove	Dennis Kingston	7/12/2011	4.51	5.16	4.95	5.09	5.32	3.39	2.71	1.06	32.18
AN2	Parker Mountain	Stuart Robinson	7/12/2011	4.47	5.13	5.03	5,35	5.60	3.57	3.02	1.18	33.34
AN3	Granville Ferry	D. Butler & J. Burnell	7/12/2011	4.65	5.33	5.14	5.35	5.67	3,49	2.83	1.15	33.61
AN4	Annapolis	Susan & Gene Lane	7/12/2011	4.19	4.91	4.66	4.92	5.10	3.21	2.67	1.01	30,66
AN5	Milford	Jim Langmire	7/12/2011	4,40	4.92	4.78	5.13	5.26	3.34	2.83	1.18	31,85
AN6	South Milford	Leslee Fredericks	7/12/2011	4.28	4.72	4,74	5.03	5.12	3.30	2.76	1.16	31.10
AN7	Maitland Bridge	KNP & NHS	8/24/2011	4.09	4.65	4.52	4.75	5.04	3.28	2.69	1.09	30.11
BI1	Brier Island	David Pugh	8/26/2011	4.26	4.75	4.97	5.01	5.09	3.35	2.88	1.97	32.27
BR1	Kingsburg	Donna & Scott Fleming	5/6/2011	4.18	4.56	4.69	4.90	5.23	3.78	2.94	1.45	31.72
BR2	Crouse Settlement	Bev Martel	5/3/2011	4.26	4.64	4.68	4.88	5.42	3.85	3.06	1.48	32.26
BR3	Bridgewater	Kevin Johnson	5/5/2011	4.42	4.80	4.79	4.96	5.37	3.61	3.12	1.46	32.53
BR4	Northfield	Wayne Broom	5/3/2011	4.18	4.56	4,48	4.84	5.01	3.41	2.68	1.22	30,38
BR5	New Germany	Bill Woodworth	6/8/2011	4.81	4.56	4,42	4.50	5.20	3.47	2.87	1.70	31.53
BR6	Cherry field	Kevin Munro	5/5/2011	4,42	4.55	4.60	5.15	5.29	3,50	2,85	1.26	31,62
CH1	Blanford	Jeff Hogue	5/17/2011	4.50	4.83	4.75	5.09	5.60	3.93	3.24	1.52	33.45
CH2	East Chester	Christopher Field	5/17/2011	4.27	4.58	4.69	4.92	5.42	3.68	2.97	1.37	31.90
CH3	Chester Grant	Linda & Bruce Brophy	5/17/2011	3.92	4.32	4.34	4.53	4.82	3.21	2,69	1.19	29.00
CH4	Seffernsville	Rudy & Donald Seffern	5/14/2011	4.12	4.47	4.49	4.74	5.20	3.46	2.85	1.25	30.56
CH5	New Ross	Kelly Munroe	5/14/2011	4.20	4.63	4.77	5.12	5.25	3.45	2.86	1.24	31.52
CH6	Aldersville	Jackie Russell	5/14/2011	4.21	4.56	4.73	5.10	5.20	3,40	2.93	1.21	31.32
CL1	Clark's Harbour	Jimmy Newell	5/11/2011	4.33	4.95	4.86	4.72	5.03	3.74	3.05	1.36	32.06
CL2	Barrington	Sid Smith	4/28/2011	4.30	4.97	4.88	4.90	5.28	3.84	3.14	1.39	32.70
CL3	Clyde River	Larry Nickerson	5/11/2011	3,99	4.79	4.73	4.77	5.15	3.58	2.90	1.36	31.27
CL4	Clyde River	Peter Sutherland	4/28/2011	4.18	4.77	4.81	4.86	5.33	3,71	2.97	1.34	31.95
CL5	Clyde River	Ruth Hemeon	4/28/2011	3,96	4.69	4.62	4.62	5.08	3,42	2,85	1.19	30.44
KE1	Scotts Bay	Kathleen & Darren Huntley	7/13/2011	4.59	4.80	4.60	4,71	5.17	3,25	2.77	1.23	31,11
KE2	Canning	Simon Rafuse	7/13/2011	4.53	4.94	5.05	5.23	5.51	3,48	2.91	1.25	32,90
KE3	Kentville	Jeff Franklin	7/13/2011	4,18	4.97	5.10	5.30	5.37	3,42	2,90	1.23	32,47
KE4	South Alton	Dianna & Daniel Niema	7/13/2011	4.33	4.76	4.93	5.26	5.39	3.33	2.91	1.20	32,11
KE5	South Forest Home	Kirk Keddy	7/13/2011	4.16	4.58	4.79	5.08	5.17	3.30	2.82	1.15	31.03
LI1	East Port L'Hebert	Dirk Van Loon	5/12/2011	4.07	4.97	5.05	5.06	5.37	3.84	2,84	1,35	32,55
LI2	Robertson Loop	C. & D. Robertson	5/12/2011	4.00	4.80	4.80	4.86	5.21	3.73	2.92	1.42	31,75
LI3	Strawberry Point	Betty Richardson	5/4/2011	4.14	4.83	4.85	5.11	5.31	3.89	3.12	1.56	32.81
LI4	Liverpool	Larry Cochrane	5/12/2011	4.03	4.74	4.68	4.95	5.16	3.61	2.87	1.38	31,42
LI5	Middlefield	Hillsview Acres	5/4/2011	4.23	4.81	4.76	4.88	5.31	3.67	2.94	1.32	31.93
LI6	South Brookfield	Mel Waterman	5/4/2011	4.11	4.63	4,47	4.77	5.08	3,43	2.84	1.19	30,52

Table 4: 2013 Daily Average Solar Radiation within April to November Period ($kWh/m^2/day = kilowatt hours per metre^2 per day$)

Station	, and the second se	Carlos I	Deployment	Apr	May	Jun	34	Aug	Sen	Oct	Nov	Total Radiation
ID	Location	Contact	Date	kWh/m²/day	kWh/m²							
MI1	Moshers Corner	David Colville	8/13/2011	4.54	5.06	5.06	5.27	5.35	3.30	2.71	1.06	32.34
MI2	Albany	Christine & John Skaling	7/14/2011	4.14	4.62	4,74	5.03	5.16	3,25	2.72	1.07	30.73
MI3	Squirreltown	Don McPherson	7/14/2011	4.29	4.72	4.81	5.11	5.27	3.34	2.85	1.15	31.52
MI4	Dalhousie	John Blyde	8/24/2011	4.17	4.60	4.65	4.95	5.19	3,27	2.80	1.15	30.76
MI5	Springfield	Robert Whynot	7/14/2011	4.22	4,58	4.68	5.02	5.22	3.39	2.81	1.23	31.15
SH1	Lockes Island	Marilyn & Stewart Moore	5/12/2011	4.16	4.91	4.96	4.89	5.23	3,71	2.92	1.42	32.20
SH2	Sandy Point	Maria Harding	4/27/2011	4,11	4.88	4.94	4.93	5.23	3.66	2.60	0.02	30,38
SH3	Shelburne	Ivan Spears	5/12/2011	4.07	4.69	4.86	4.79	5.24	3.59	2.99	1.39	31.62
SH4	Lower Ohio	Rick Bower	4/28/2011	4.17	4.73	4.89	4.74	5.23	3.61	2.94	1.36	31.67
SH5	Lower Ohio	Rick Bower	4/27/2011	4.15	4.79	4.97	4.85	5.20	3.58	2,88	1.34	31,77
SH6	Middle Ohio	Ted Siegel	4/27/2011	3.99	4.69	4.70	4.16	5.38	3.59	2.83	1.26	30.59
SH7	Upper Ohio	Leonard Bower	4/27/2011	4.16	4.82	5.00	4.96	5.33	3.61	2.70	1.34	31.92
WE1	Sandy Cove	Andre D'Entremont	5/11/2011	4.26	4.91	4.81	5.02	5.12	3.26	2.84	1.14	31.36
WE2	Weymouth North	Paul Weaver	4/29/2011	4.35	4.87	4.90	5.13	5.25	3.35	2.96	1.20	32.02
WE3	Weaver Settlement	Andrew Weaver	4/21/2011	4.25	4.90	4,79	5.10	5.22	3,29	2.94	1.22	31.72
WE4	Hassett	Nellie & David Russell	4/29/2011	4.22	4.79	4.57	4.85	5.05	3,25	2.95	1.25	30.94
WE5	Corberrie	Kevin Gaudet	4/29/2011	4,17	4.71	4.77	4.96	5.26	3.37	2.97	1.21	31.41
WE6	Hectanooga	Rudy & Henny Zwaga	5/11/2011	4.17	4.86	4.78	4.84	5.11	3,28	2.85	1.17	31.06
YA1	Chegoggin	Chris Tedford	4/20/2011	4,40	4.94	5.04	5.03	5.34	3.59	3.00	1.25	32.59
YA2	South Ohio	Truman Hurlburt	4/20/2011	4.25	4.89	4.89	4.85	5.09	3.41	2.90	1.16	31,43
YA3	Deerfield	Neil Nicholl	4/19/2011	4.10	4.69	4.74	4.78	5.00	3.28	2.84	1.19	30.62
YA4	Pleasant Valley	Leonard Sabine	4/19/2011	4.10	4.63	4.67	4.77	4.99	3.29	2,88	1.21	30,54
YA5	Kemptville	Kyle Roberts	4/20/2011	3.85	4.39	4.70	4.72	4.95	3.15	2.76	1.16	29.68
YA6	East Kemptville	DNR	4/20/2011	4.13	4.79	4.74	4.83	5.09	3.29	2.85	1.17	30.89
S10	Moshers Corner	David Colville	9/3/2002	5.09	5.61	5.55	5.77	5,46	3.52	2.98	1.15	35.13
S20	West Nictaux	Ivan Shilliday	9/9/2003	4.60	4.96	4.93	5.17	5.41	3,43	2.77	1.08	32.35
530	Middleton	David Colville	9/9/2003	4.46	5.30	5.18	5.30	5.57	3.57	2.91	1.09	33.38
540	South Mountain	Gregory Dixon	5/12/2004	4.65	5.24	5,72	5.50	5.61	3,54	2.97	1.18	34.40
S60	Sheffield Mills	Dale Hebb	9/19/2003	4,49	4.91	5.31	5.29	5.52	3.53	2.94	1,20	33,19
S70	Nictaux South	Marian & Gordon Foster	9/16/2003	4.54	5.07	5.05	5.36	5.44	3,45	2,93	1.16	32,99
580	Port Royal	Allan Sloan	9/30/2003	4.65	5.31	5.06	5.23	5.64	3.50	2.89	1.16	33,42
590	Gaspereau	Chris Wescott	9/30/2003	4.65	5.00	5.11	5.36	5.40	3.50	3.05	1.29	33.35
S100	Marshaltown	Carl Seely	9/30/2003	4.59	5.18	5,71	5.16	5.49	3.47	2.98	1.17	33.75
S120	Ross Creek	Bill Crowson	5/17/2004	4.72	5.04	5.18	5.44	5.60	3.55	2.99	1.31	33,82
S130	Bear River	Phyllis & Robert Wood	5/13/2004	4.61	5.20	5.66	5.26	5.40	3.42	2.93	1.17	33.65
S140	Morristown	Neil Clem	6/23/2005	3.80	4.33	4.55	4.54	4.64	3.19	2.63	1.26	28.95
S160	Lily Lake	John Briere	12/15/2006	4.90	5.48	5.36	5.68	5.88	3.73	3.14	1.28	35.44

Table 4: 2013 Daily Average Solar Radiation within April to November Period (kWh/m²/day = kilowatt hours per metre² per day)

				2011			2012				2013				
Station ID	Location	Contact	Deployment Date	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)
AN1	Parkers Cove	Dennis Kingston	7/12/2011	1		()		184.1	1007	1027	-13.3	204.1	906	911	-18.1
AN2	Parker Mountain	Stuart Robinson	7/12/2011					190,1	1092	1112	-15.7	178.8	987	1000	-18.1
AN3	Granville Ferry	D. Butler & J. Burnell	7/12/2011	1			-	165.0	1109	1154	-16,7	147.3	950	1017	-22.4
AN4	Annapolis	Susan & Gene Lane	7/12/2011		·			164,8	1122	1167	-16.4	147.1	1004	1072	-22.2
AN5	Milford	Jim Langmire	7/12/2011					165.0	1076	1118	-18.6	147.2	980	1041	-25.3
AN6	South Milford	Leslee Fredericks	7/12/2011					148.8	1015	1089	-18.5	136.9	938	1012	-24.8
AN7	Maitland Bridge	KNP & NHS	8/24/2011	· · · · · · · · ·				148.8	1044	1122	-18.7	136.9	962	1042	-24.8
BI1	Brier Island	David Pugh	8/26/2011			1		235.9	978	978	-13.0	225.4	790	790	-14.5
BR1	Kingsburg	Donna & Scott Fleming	5/6/2011	184.0	904	913	-12.0	202.0	986	987	-14.4	204.9	834	834	-17.7
BR2	Crouse Settlement	Bev Martel	5/3/2011	179.3	1110	1124	-14.1	176.9	1195	1230	-15,1	177.7	1141	1159	-22.1
BR3	Bridgewater	Kevin Johnson	5/5/2011	177.3	1150	1163	-14.2	176.8	1226	1275	-16.1	163.8	1139	1200	-22.4
BR4	Northfield	Wayne Broom	5/3/2011	157.3	1074	1130	-14.4	174.8	1195	1236	-18.3	163.2	1114	1173	-24.3
BR5	New Germany	Bill Woodworth	6/8/2011			1		153,8	1110	1172	-19.0	146.2	1024	1096	-26.2
BR6	Cherryfield	Kevin Munro	5/5/2011	177.2	1031	1038	-16.3	148.8	1070	1154	-19,3	137.0	1017	1109	-26.1
CH1	Blanford	Jeff Hogue	5/17/2011					159.7	924	963	-14.2	146.0	813	848	-22.2
CH2	East Chester	Christopher Field	5/17/2011		1			189,0	1078	1084	-15.8	164.0	981	1004	-23.0
CH3	Chester Grant	Linda & Bruce Brophy	5/17/2011	1	10000000	1		169.7	1110	1139	-16.6	163.1	1028	1067	-25.3
CH4	Seffernsville	Rudy & Donald Seffern	5/14/2011					176.8	1120	1149	-17.2	163.2	1031	1068	-23.7
CH5	New Ross	Kelly Munroe	5/14/2011					153.7	1035	1089	-18.9	160.1	967	1007	-25.6
CH6	Aldersville	Jackie Russell	5/14/2011	÷	1			176.9	1047	1076	-18.0	162.9	983	1026	-23.7
CL1	Clark's Harbour	Jimmy Newell	5/11/2011		1			237.0	842	842	-10.1	231.3	539	539	-13.9
CL2	Barrington	Sid Smith	4/28/2011	191.9	1040	1053	-12.8	177.0	1111	1155	-14.8	163.8	953	985	-16.7
CL3	Clyde River	Larry Nickerson	5/11/2011	1		1		153.8	994	1058	-16.0	147.9	899	954	-20.3
CL4	Clyde River	Peter Sutherland	4/28/2011	161.9	1003	1068	-14.1	147.7	1008	1091	-16.4	147.0	949	1004	-20.5
CL5	Clyde River	Ruth Hemeon	4/28/2011	162,1	1031	1088	-14.7	147.0	1047	1135	-16.7	146.9	971	1033	-21.1
KE1	Scotts Bay	Kathleen & Darren Huntley	7/13/2011					189,9	920	938	-16.8	183.9	803	815	-18.7
KE2	Canning	Simon Rafuse	7/13/2011		(E. 11	1		189.9	1209	1234	-16.0	163.2	1090	1146	-21.9
KE3	Kentville	Jeff Franklin	7/13/2011					176.8	1220	1265	-15.9	163.8	1102	1169	-23.4
KE4	South Alton	Dianna & Daniel Niema	7/13/2011					190.0	1107	1125	-17.8	163.8	1017	1067	-23.1
KE5	South Forest Home	Kirk Keddy	7/13/2011					148.8	986	1064	-19.1	145.9	944	1001	-26.7
LI1	East Port L'Hebert	Dirk Van Loon	5/12/2011		3	÷		189.2	1041	1050	-14.2	190.9	958	959	-18.1
LI2	Robertson Loop	C. & D. Robertson	5/12/2011			1.00		190.0	1162	1180	-15.0	190.8	1109	1109	-19.2
LI3	Strawberry Point	Betty Richardson	5/4/2011	202.1	915	917	-12.4	190.9	940	946	-14.3	191.0	811	820	-17.3
LI4	Liverpool	Larry Cochrane	5/12/2011			1		189.7	1160	1178	-14.4	176.8	1102	1117	-18.7
LI5	Middlefield	Hillsview Acres	5/4/2011	185.8	1119	1130	-15.3	176.9	1151	1195	-17.1	163.9	1094	1144	-20.9
LI6	South Brookfield	Mel Waterman	5/4/2011	178.1	1114	1123	-15.3	148.8	1102	1202	-18.6	147.1	1034	1108	-24.0

Table 5: 2011-2013 Annual Temperature Comparison (GDD = Growing Degree Days Base 10°C)

				2011			2012				2013				
Station ID	Location	Contact	Deployment Date	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)	Frost Free Days	Total GDD Frost Free	Total GDD Apr-Nov	Min Temp (°C)
MI1	Moshers Corner	David Colville	8/13/2011			-		190.9	1072	1090	-15.8	184.8	988	1006	-19.5
MI2	Albany	Christine & John Skaling	7/14/2011		1			148.6	986	1060	-20.1	136.8	899	974	-26.7
MI3	Squirreltown	Don McPherson	7/14/2011		1			177.0	1102	1137	-16.6	163.9	993	1040	-21.9
MI4	Dalhousie	John Blyde	8/24/2011	· · · · ·	1	1		169.8	1103	1137	-17.4	147.0	989	1049	-23.4
MI5	Springfield	Robert Whynot	7/14/2011			1		177,0	1124	1159	-16.8	164.0	1029	1080	-22.1
SH1	Lockes Island	Marilyn & Stewart Moore	5/12/2011	·		1		210.7	1080	1083	-12.5	200.9	951	961	-16.1
SH2	Sandy Point	Maria Harding	4/27/2011	192.9	1051	1065	-12.8	173.1	1075	1113	-12.6	179.1	994	1016	-17.1
SH3	Shelburne	Ivan Spears	5/12/2011	1 mar 1	1			164.0	1108	1152	-15.4	160.0	1018	1064	-19.7
SH4	Lower Ohio	Rick Bower	4/28/2011	162.0	995	1046	-15.8	147.0	988	1062	-17.2	133.1	927	998	-21.2
SH5	Lower Ohio	Rick Bower	4/27/2011	163.1	1090	1148	-14.3	153,0	1100	1170	-16,3	137.9	1032	1118	-21.1
SH6	Middle Ohio	Ted Siegel	4/27/2011	188.3	1033	1045	-13.9	176,9	1172	1224	-14.5	163.1	1025	1078	-19.3
SH7	Upper Ohio	Leonard Bower	4/27/2011	185.3	1134	1144	-13.8	170.0	1145	1192	-15.3	163.2	1041	1093	-20.4
WE1	Sandy Cove	Andre D'Entremont	5/11/2011					182.8	1039	1051	-13.7	177.6	906	915	-16.3
WE2	Weymouth North	Paul Weaver	4/29/2011	187.0	1017	1032	-10.0	170.1	1073	1114	-14.1	176.6	978	994	-16.0
WE3	Weaver Settlement	Andrew Weaver	4/21/2011	192.8	1050	1062	-10.7	170.0	1065	1105	-14.2	147.2	955	1022	-17.3
WE4	Hassett	Nellie & David Russell	4/29/2011	187.0	1080	1091	-11.1	170.8	1117	1158	-15.0	163.1	1023	1074	-21.1
WE5	Corberrie	Kevin Gaudet	4/29/2011	187.3	1121	1132	-12.2	177.0	1149	1193	-14.5	176.8	1062	1077	-20.3
WE6	Hectanooga	Rudy & Henny Zwaga	5/11/2011			•		176.9	1089	1134	-15.0	175.9	1030	1046	-18.9
YA1	Chegoggin	Chris Tedford	4/20/2011	196.8	835	846	-11.1	213,8	958	962	-12.3	190.7	807	809	-15,4
YA2	South Ohio	Truman Hurlburt	4/20/2011	196,7	1034	1046	-11.9	194.0	1109	1129	-13.4	176.7	995	1011	-16.2
YA3	Deerfield	Neil Nicholl	4/19/2011	196,7	1064	1076	-12.3	189.8	1112	1132	-12.9	185.7	997	1011	-18.0
YA4	Pleasant Valley	Leonard Sabine	4/19/2011	166.9	992	1053	-12.6	169,0	1040	1081	-16,5	160.0	961	1008	-20.4
YA5	Kemptville	Kyle Roberts	4/20/2011	167.0	1101	1170	-13.2	176,9	1166	1214	-15.2	176.0	1090	1109	-19.2
YA6	East Kemptville	DNR	4/20/2011	212.6	1135	1139	-14.3	190.7	1161	1183	-14,5	184.0	1074	1085	-18.7
S10	Moshers Corner	David Colville	9/3/2002	218.6	916	918	-18.7	190.9	1009	1024	-15.9	184.8	905	919	-19.1
S 20	West Nictaux	Ivan Shilliday	9/9/2003	189.6	858	865	-20.9	164.6	1107	1147	-19.8	147.0	963	1018	-26.6
S30	Middleton	David Colville	9/9/2003	189.8	1043	1048	-19.8	164.8	1076	1118	-19.6	160.0	1071	1100	-29.9
540	South Mountain	Gregory Dixon	5/12/2004		1			190,1	1022	1036	-16.7	184.8	953	964	-20.3
560	Sheffield Mills	Dale Hebb	9/19/2003	192.9	1129	1139	-20.6	170.0	1174	1217	-16.0	153.9	1038	1062	-22.1
570	Nictaux South	Marian & Gordon Foster	9/16/2003	191.7	946	950	-19.3	189.0	1036	1050	-17.1	163.1	908	953	-22.4
580	Port Royal	Allan Sloan	9/30/2003	191,7	890	892	-17.3	165.0	1110	1152	-14.6	160.2	841	858	-19.3
S90	Gaspereau	Chris Wescott	9/30/2003	193.0	1099	1108	-18.6	176.8	1196	1238	-16.4	163.2	1078	1138	-23.2
S100	Marshaltown	Carl Seely	9/30/2003	189.6	561	569	-19.2	152.9	1065	1101	-15.5	146.9	734	724	-21.4
5120	Ross Creek	Bill Crowson	5/17/2004	197.6	794	798	-19.6	177.3	950	973	-16.1	163.8	857	888	-21.2
S130	Bear River	Phyllis & Robert Wood	5/13/2004	192.8	1044	1053	-17.6	187.7	1130	1154	-14,3	177.8	996	1010	-17.1
5140	Morristown	Neil Clem	6/23/2005	189.0	913	918	-16.8	189,1	990	1005	-18.0	163.0	911	953	-19.5
S160	Lily Lake	John Briere	12/15/2006	196.9	938	939	-19.6	189.7	1062	1076	-16.7	164.1	908	946	-19.1

Table 5: 2011-2013 Annual Temperature Comparison (GDD = Growing Degree Days Base 10°C)
















South West NS Temperature and Solar Radiation Study

Station Description





South West NS Temperature and Solar Radiation Study

Station Description





South West NS Temperature and Solar Radiation Study

Station Description

Station ID:AN3 (O)Location:Granville FerryCounty:AnnapolisContact:D. Butler & J. BurnellDeployment:7/12/2011

Easting: 302103.319 Northing: 4959444.306 Height (m): 3.79 [UTM Zone 20, NAD 83]



COGS Centre of Geographic Sciences **NSCC** Applied Research
















































































Water

Little Gr

Gairdne

Liverpop

77

50 Kilometres























South West NS Temperature and Solar Radiation Study

Station Description Station ID: KE2 (O) Easting: 390773.278 Location: Canning Northing: 5001146.206 County: Kings 17.08 Height (m): Contact: Simon Rafuse [UTM Zone 20, NAD 83] Deployment: 7/13/2011 COGS nscc AGRG Centre of Geographic Applied Geomatics Research Group **Applied Research** Sciences




































South West NS Temperature and Solar Radiation Study

Station Description

Station ID:LI6 (O)Location:South BrookfieldCounty:QueensContact:Mel WatermanDeployment:5/4/2011

AGRG

Applied Geomatics Research Group Easting: 343189.814 Northing: 4914288.717 Height (m): 85.94 [UTM Zone 20, NAD 83]



Applied Research































5 Very severe limitations

6 Perennial forage crops Extremely little capability

O Organic soils

Water

50 Kilometres

119

Island

Strap Tub Rock Tub

rdan Bay Gull Rock






























































South West NS Temperature and Solar Radiation Study

Station Description

Station ID: YA4 (O) 262854.078 Easting: Location: **Pleasant Valley** Northing: 4875443.777 County: Yarmouth 31.38 Height (m): Contact: Leonard Sabine [UTM Zone 20, NAD 83] Deployment: 4/19/2011 COGS nscc AGRG Centre of Applied Research Geographic Applied Geomatics Research Group Sciences Brier Island -**CLI Soil Capability Classes** 2 Moderate limitations Liverpop 3 Moderately severe limitations 4 Severe limitations 5 Very severe limitations 6 Perennial forage crops Extremely little capability O Organic soils 50 Kilometres 151 Water



















South West NS Temperature and Solar Radiation Study

Station Description


































2013 Temperature and Solar Radiation Summary for Station S130





2013 Temperature and Solar Radiation Summary for Station S140





2013 Temperature and Solar Radiation Summary for Station S160

