#### What Will Grow Where? : Mapping the Meteorological Landscape of Southwestern Nova Scotia





David Colville March 29, 2014



# Presentation Overview ...

- 'Spatial' Data Analytics
- Temperature Mapping in the Annapolis Valley
- Temperature & Solar Mapping in Southwest Nova Scotia (SWNS)
- What's next?



## Meteorological Monitoring ... in the



Temperature Data Logger

#### **Meteorological Station**



## Climate standards for wine grape production ...

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

## Desire to move from point locations to area maps



Temperature Interpolation Modeling ...



... modeling the April to November period, the three most statistically relevant variables were ...







### SWNS Weather Station Configuration ...







## 2013 Temperature Data Summary (sample) ...

Table 1: 2013 Temperature Data Summary (FF = Frost Free; GDD = Growing Degree Days)											
Station ID	Location	Contact	Deployment Date	Frost Free Start	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		

#### Heat Unit Growing Season — 2 Accumulation — 2

**Temperatures** 

Mihimum Winter



#### 2013 Temperature and Solar Radiation Summary for Station BR3









GOES-12 2006-06-15 23:15 UTC Green Power Labs Inc. and the AGRG have developed a GIS-based toolset to calculate and map MSC/SMC-CMC GOES-12 2006-06-15 13:45 UTC solar irradiance from GOES images MSC/SMC-CMC GOES-12 2006greenpowerlabs GRG GOES-12 2006-06-14 02:45 UTC MSC/SMC-CMC NASA's 1km resolution Geostationary Operational Environmental Satellite (GOES) imagery; new image available every half hour

(Image series: Hurricane Alberto June 2006)

Comparison of the past six months of July

More than 1400 GOES images are used to produce each monthly result.

July 2012



Bay of Fundy

Say of Fund

Monthly Average Insolation: 3.162 to 5.446 kWh/m²/day

July 2007

Www of Europy

**July 2008** 

Bay of Fund

July 2009

Bay of Fundy

July 2010

July 2011









## What's Next? ...

- Continue Monitoring, Modeling, and Mapping in SWNS throughout 2014, 2015, and 2016
- Add Wind, Rain, and Relative Humidity sensors to all stations; expand applications
- AGRG ... Data rich, Analytics hungry
  ... We Encourage Collaboration

David.Colville@nscc.ca

