Municipal Outreach and Education:

Adaptation Planning Webinar Series

Final Report

*Prepared By:*

Sustainability Solutions Group

To: Nova Scotia Climate Change Directorate Adaptation Fund

From: Sustainability Solutions Group & Elemental Sustainability Consulting Ltd.

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To Whom It May Concern:

Please find enclosed the Final Report from the adaptation planning webinar series, prepared and offered to Nova Scotian municipalities with support from the Nova Scotia Department of Environment, Climate Change Directorate Adaptation Fund. This online municipal outreach and education initiative was developed and implemented by Sustainability Solutions Group (SSG) and Elemental Sustainability Consulting Ltd. (ESC), in support of the Nova Scotia Municipal Climate Change Action Planning (MCCAP) process, mandating the completion of MCCAPs by 2014.

This Final Report contains participant feedback, results analysis as well as recommendations for future initiatives. Appendix A delivers the results of the Accountable Management Strategy while Appendix B contains the itemized list of attachments. Please note that the recorded, archived webinars remain forthcoming and will be forwarded upon completion.

On behalf of SSG and ESC, we would thank the Climate Change Directorate Adaptation Fund for the opportunity to support the development of climate change action planning capacity in Nova Scotian municipalities. We look forward to future opportunities for collaboration and partnership.

Best Regards,

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Anne Warburton
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## 1. Introduction

Between November 2012 and February 2013, SSG and ESC developed and delivered a series of four webinars to support climate change adaptation planning in municipalities In Nova Scotia. The webinars presented a balance of best practices and novel approaches to adaptation from across Canada, providing concrete examples as to how municipalities can prepare MCCAP and the economic, social and environmental benefits that they can expect as a result. The sessions showcased a range of methods and case study examples, and provided practical guidance for evaluating different ways that adaptation can be integrated into planning and decision-making to suit a municipality's goals, capacity and stage of adaptation planning. The webinar format enabled participation by municipalities across NS and Canada and the United States, minimizing travel costs and GHG emissions.

## 2. Participation

Beginning in September, the MCCAP webinar series was promoted via the Nova Scotia Planning Directors Association list-serve, the Climate Change Adaptation Community of Practice list-serve as well as through the UNSM network and by word-of-mouth and flyers at provincial MCCAP workshops. The four webinars received a total of 209 registrations from sixty people. Approximately ten of these were from other provinces and one was from the US. Between 19 and 40 names appeared in each webinar, but in some cases one name represented a group of two to five people who were jointly participating on behalf of their municipality. While participation was highest for the first webinar, participant numbers remained consistent throughout the series. See Appendix B for further details.

## 3. Feedback

Surveys were issued for the first two webinars to solicit feedback on how to improve the webinars, as well as at the conclusion of the webinar series. There were eight respondents to the first survey, one for the second survey and six for the final survey. Responses from the surveys included:

- 100% would recommend the webinar to colleagues in the first survey and 83.3% in the final survey (one respondent indicated not applicable).
- 50% of the respondents found the material somewhat new and 50% found the material very new.
- None of the respondents had completed a MCCAP as of yet (not applicable for two of the respondents)

- With one exception, all of the respondents found the webinars useful or very useful, clear or very clear, the material presented new and an appropriate level of detail.

Positive feedback included:

- Keep doing what you are doing!
- Well done and well researched, I have learned of tools I hadn't previously know about which will be utilized. i.e. CANVIS, etc.
- I will sign up for the next webinar.

Recommendations included:

- Would like to have a copy of the presentation before the webinar, this way you can make notes as you go.
- Record the webinar and make recording available. Send ppt and notes for reading material.
- Perhaps provide an online forum for folks working on this across NS to chat with each other.
- [Provide] Case studies of implementation due to a decision being made on risk assessment criteria alone (ex. not having had a natural disaster act as a driver)
- I need details and scenarios that will capture the passion of municipally elected officials. If they don't buy in, all the plans and policies in the world will sit on the shelf - until the flood-waters carry them away...

One notable and somewhat critical comment was the following:

> Top points for presentation depth, clarity, and educational value. The case studies were very interesting, and the material presented in a well-designed and compelling way. Unfortunately I have to make a major complaint. I'm concerned that the level of intervention portrayed in the case studies was simply above what the vast majority of municipalities are capable of. While I think it was a great way to broaden the minds of municipal managers regarding the types of adaptive methodologies and types of hazards they COULD be thinking about, the examples chosen are simply out of reach for many. The Antigonish geo-planning example is a great case study in how to do good planning, but there's something very unique at play in that situation since most municipalities don't have the capacity to do that level of work - half of our rural municipalities don't even have land use controls

The participants indicated that the most significant challenges that they faced are data gaps, followed by time, followed by community engagement. At the bottom of the list were both cost and expertise.

## 4. Results Analysis

The four webinars were well attended by Nova Scotian municipalities and the majority of participants found the webinars useful and insightful. The following section summarizes the key results and analysis that emerged from the four webinars that were offered.

### *Webinar #1: Tools to assess hazard and risk vulnerability*

The first webinar was hosted on November 14, 2012 by Yuill Herbert of SSG and included a high level overview of the range of simple, low-cost tools available to municipalities for the assessment of hazard and risk vulnerability. The webinar began with a review of the climate change context as well as hazard, risk and vulnerability definitions. When asked about the importance of adaptation to municipalities, participants responded that adaptation is driven by:

- Financial considerations
- Survival
- Infrastructure for basic services
- Avoid social / economic turmoil
- 'Sink or swim'

This question was followed up with further discussion from the host on adaptation drivers, including but not limited to the following:

- Decision-making on the basis of historic climate is no longer robust
- Planned adaptation is more effective than last minute, reactive adaptation.
- Planned adaptation is usually less expensive than responding to an emergency or retrofitting to cope with altered climate risks
- Increasingly, Government, insurers and investors are requiring that climate change be taken into account in decision making.
- Adaptation could provide immediate local benefits, but, adaptation itself cannot solve the climate change problem.

The host then proceeded to discuss and describe the tools available to municipal adaptation planning and decision-making via a six-stage process described in the Table on the next page.

| Stage | Tools |
|---|---|
| 1. Understand climate | A. Historical review |
| 2. Understand future climate | B. Regional climate model |
| 3. Evaluate vulnerability | C. HAZUS, Firetree, Lidar, DEM, Mike 21, HEC |
| 4. Identify adaptation options | D. * |
| 5. Evaluate adaptation options | E. Multi-criteria analysis |
| 6. Communication | F. CanVis, CALP |

* Stage Four tools were briefly reviewed but covered more extensively in Webinars 2 and 3. Adaptation options identification was characterized as a social process involving local knowledge that can be undertaken via broad (consultative process), focused (scenario planning) and limited (GIS analysis) methodological tools and approaches. See also Appendix B.

### *Webinar #2: Case studies of hazard and risk vulnerability assessments*

The second webinar was hosted on December 12, 2012 by Anne Warburton of ESC and presented three case studies on hazard and risk vulnerability assessment. The following sections highlight key messages from the case studies about linking geohazards, climate change and land use planning. The first case study introduced the importance and relevance of geohazards within a land use planning-based hazard assessment process, drawing on the experiences of land-use planning in Antigonish County. In the world of climate change hazard vulnerability assessments, geology is often overlooked. However, geology needs to be considered in the context of climate change geohazards given its linkages to:

- Coastal erosion
- Acid rock drainage
- Karst (sinkhole) terrain
- Slope stability and,
- Heavy metals in soils

The inclusion of geology in the Central Antigonish County Land-use Plan has led to the development of a methodology to incorporate geology into the planning process. The design and production of a geological map and digital database products, in a format that can be readily used by land-use planners (GIS datasets), was the principal outcome of this project. This project is distinct because of the breadth of geological information it included.

The project was chosen as a case study to provide:

- A renewed appreciation for the inclusion of geology in land use planning, and specifically in the context of climate change hazard assessments
- An understanding of what is meant by 'geohazard', and
- An idea of what is involved when a municipality takes on this kind of work.

The second case study discussed climate impact analysis, infrastructure planning and development control in the Town of Stratford, PEI. In 2012, CBCL Consulting Engineers were retained to updated Stratford's Stormwater Management Plan, prepared in 2003. The update was to recommend Stormwater Best Management Practices so that future development would NOT increase peak runoff flows in the drainage systems. In other words, the Town was seeking to manage water in such a way that their current drainage system would be adequate (to the extent possible) going forward. However, in the context of climate change this is interesting because, traditionally, designing rainfall events (scenario rainfall amounts which are the basis of how big our culverts are or high our bridges are) has used information from historical events as summarized in IDF (intensity-duration frequency) curves. However, if rainfall intensities are increasing due to a changing climate, then the assumption that past rainfall is a good indication of what might be expected in the future is no longer valid. So in Stratford's Storm Management Plan update, CBCL were also asked to assess the effects of climate change on rainfall intensity and the impact of these projected changes on the Stormwater Management Plan. The key messages with regards to the outcomes of this project included the following:

- CBCL had to find out how to design rainfall intensities for sub-day durations. They ended up looking at historically derived rainfall intensities for rain events less than 24 hours in length, and assumed that the pattern of rainfall throughout the day-sub-day durations-- would be similar in the future.
- With the new climate-wise rainfall data in hand, CBCL entered model design storms and plausible storm scenarios into Storment, which simulated runoff.
- Many existing culvert do not have capacity to convey peak flows based on historical records, much less estimated peak flows based on climate projections.

With new runoff simulations based on future rainfall estimates, CBCL could update the Stormwater Management Plan and:

- Redefine peak flows to be associated with potential future rainfall events
- Estimate the equivalent pipe diameter of culverts required to convey the peak flows, and
- Estimate the costs for culvert replacements to accommodate peak flows
- Two central strategies emerged:

- Address water storage – natural or human-made ways to hold runoff, and allow for slower release in a manner that doesn't heighten peak flows, and
- Don't allow new development, or redevelopment of land, to result in greater amounts of runoff than existed pre-development.

CBCL's recommendations included:

- All minor drainage structures with capacity less than the estimated maximum peak runoff flows predicted by the modeling completed in this study should be upgraded
- For major drainage systems, there were 4 actionable recommendations:
- examine each watershed in the Town, starting with the watershed where the potential risk of flood damage is greatest, and figure out if and where there are opportunities to increase the capacity for water storage/detention and if existing culverts and structures could withstand a 1 in 100 year return period rainfall as defined by simulated rainfall events modeled in the study.
- Identification of the flood limits generated by the design rainfall event with a 1 in 100-year return period on Town Land Use Mapping
- Conduct consultations with stakeholders (including the Town, property owners at risk, and the Department of Transportation) to define an acceptable level of service for each system
- Develop a prioritized list of modifications to existing structures based on what they now knew about the condition and capacity of existing culverts, as well as stakeholder views on acceptable levels of flood risk.
- Be transparent about the level of service offered (and consider offering a lower level of service) as *part* of your final strategy. Meaning, accept the possibility of some flooding more frequently in those locations where there would be no risk to life, and the costs of repairing damage are significantly less than the costs of building larger infrastructure. Pair this with a flood warning and evacuation plan.

Emerging key messages about the importance of socio-economic considerations in climate impact assessments and adaptation strategy development were assessed in the third case study that introduced a project currently underway in Nova Scotia. The aims of the ongoing project '*Tools for Community Climate Change Adaptation in NS: Socio-Economic Indicators and Scenario Planning*' are to provide tools to guide the inclusion of socio-economic considerations when developing adaptation strategy at the local level. Using socio-economic information to assess a community's vulnerability, adaptive capacity, and resilience, the host introduced a preliminary framework to guide municipal climate change action planning in NS, including consideration of the social impacts of climate change. Currently, the developing

framework deals with this component by asking emergency-management related questions such as, "Can you identify who in your community will be most affected by climate related emergency events?"

The ongoing project has identified 25 key socio-economic evaluation measures currently under development, which can be broadly lumped into 3 pivotal clusters:

- Socioeconomic determinants of vulnerability
- Organizational responsiveness, and
- Social capital

Data collection and monitoring challenges aside, it is believed that the 25 core measures are important to track and measure over time because they influence the ability of a community to respond to threats, changes and shifts related to change (in general) and climate-related events. Through the use of carefully selected indicators,

- It is possible to lessen social vulnerability, improve adaptive capacity and strengthen community qualities that generally characterize resilience. and
- It is possible to ID attributes (qualities) of community vulnerability to climate change.
- It is believed that core indicators are important to track and measure over time because they influence the ability of a community to respond to threats, changes and shifts related to change (in general): climate-related or not.

In the tool, each indicator will be given a one-pager including a brief description of the indicator and a rationale for its usefulness to adaptive capacity and vulnerability studies. Then will be proposed metrics for assessing the community's status, along with data sources where information can be located. As well, there will be a description for how performance on each indicator can be viewed through the lens of the community characterizations. A big benefit of this work is the ability to use the socioeconomic indicators and community characterizations to evaluate and monitor progress on adaptation. It is NOT an evaluation, but instead of basis for discussion and means of incorporating socio-economic realties and projections into adaptation strategy.

As a decision-maker, it is no longer sufficient to say you are interested in the future. You need to be more specific as to which aspects of the future concern you, and what use you intend to make of this information. There are 3 questions that are the backbone of your decision focus.

- What critical uncertainties face the organization?
- What major strategic decisions do you have to make?
- What do you need to know about the future in order to make these decisions?

The goal is to ask the right questions—frame the decision you have to make in such a way that it catalyzes insights into the future that will help you make sound development control and infrastructure decisions. Nested in these questions are insights into adaptive capacity, threat reduction capability, and the consideration of climate trends. A powerful structure for exploring these questions is scenario planning, and the Climate Change Directorate is working toward providing interested municipalities with guidance and / or training on a scenario planning method.

### *Webinar #3: Developing and evaluating adaptation options*

The third webinar was hosted on January 16, 2013 by Erica Crawford of SSG and highlighted several recent case studies for the development and selection of adaptation options that have emerged in BC. The first case study described a sectoral approach to adaptation planning from Saanich, highlighting the importance of community participation, regional relevance and prioritizing actions from a risk mitigation perspective. The second case study discussed Elkford BC, where model, performance based sub-division and servicing bylaws are being developed to address climate impacts such as wildfire, flooding and water issues, and climate change adaptation has been fully integrated into the Municipal Plan. This example highlighted the importance of adaptation integration into municipal business practices and an example of a small municipality excelling at climate change adaptation through optimization of existing opportunities, resources and best practices. The third case study described the provincial policy context for sea-level rise, flood hazard planning and risk tolerance, with examples drawn from Delta, North Vancouver as well as the Green Shores initiative. Discussion of risk tolerance highlighted the importance of community definitions of risk in developing risk mitigation strategies. Key points included the need for considering alternative scenarios in risk mitigation, the provision of appropriate scale of incentives (individual to community) as well as the differences between 'hard and soft' adaptation approaches. Key learning themes from the webinar included the importance of focused, value-added community participation, the importance of taking a locally relevant approach, differences between comprehensive and focused approaches, optimization of existing knowledge, tools and resources, regional collaboration and road-mapping for implementation.

### *Webinar #4: Implementation and monitoring*

The fourth and final webinar was hosted on February 13, 2013 by Brennan Vogel of SSG and showcased emerging examples of adaptive management approaches for climate adaptation, implementation and monitoring of climate change action planning. The webinar began with discussion of the roles and responsibilities for municipal stakeholders in advancing risk mitigation and adaptation implementation

through a review of emerging themes in process, planning and policy for adaptation implementation. Importance was placed on the need to consider the linkages in spatial and temporal scales when developing policy-planning approaches for adaptive governance, as well as ensuring that linkages to overall sustainable development approaches are taken. Inclusive combination of expert and local knowledge, as well as the development of different measures, tools and norms highlighted the opportunity for the improvement of planning tools and governance approaches to mitigate climate related risks and hazards. Approaches that manage and deal with the priorities emerging from today's climate impacts, while optimizing current opportunities for actions that lead to win/win options for co-benefits (GHG mitigation and adaptive capacity) and avoid maladaptation were encouraged. The Nova Scotian MCCAP adaptation context was then discussed in terms of 'mainstreaming adaptation' historic policy development, with a recap of the 2005 provincial vulnerability report commissioned in the wake of Hurricane Juan. This section situated and highlighted the context of MCCAP and ICSP implementation as congruous and innovative opportunities for municipal strategic planning. The webinar then turned to discussion of toolkits and case studies for mainstreaming implementation with the objective of highlight best practices with importance placed on understanding adaptation is not a particular outcome, but rather a process of continuous adjustment towards broader sustainability objectives. A specific case study discussed was the HRM ClimateSMART initiative, which produced the risk management strategy that in turn led to the development of HRM's policy reference point for sea-level rise. A second case study discussed adaptation strategy development in the City of Vancouver. Specific toolkits useful for the development of implementation, as well as indicators for monitoring and evaluation that were discussed included: the Canadian Institute of Planners 2011 Guidebook 'Climate Change Adaptation Planning – A handbook for small communities'; as well as Natural Resources Canada 'Canadian Communities Guidebook for Adaptation to Climate Change'. The webinar sought to enhance capacity for municipalities to address Step 6 of the MCCAP which asks municipalities to identify priorities for adaptation action, describe adaptive planning methods and future options to mitigate current and future risks and hazards.

## 5. Recommendations

1. **Webinars are a useful strategy for outreach to NS municipalities on critical issues**: The municipalities were able to attend without significant GHG emissions. Productive expertise from across Canada was delivered into to municipalities at minimal financial costs and high level of efficiency. This is a very effective information/capacity building dissemination technique for future initiatives.
2. **Offering a second phase of MCCAP capacity-building webinars can sustain efforts for MCCAP implementation**: Emerging case studies and findings from Canada and the United States offer substantial opportunities for education and outreach to promote best

practices and iterative learning for sustainability and adaptation processes in Nova Scotian municipalities.

3. **Use of video conferencing**: Our technology enabled the use of video conferencing, however we did not use it. Video conferencing would enhance the quality of the presentation
4. **Increase the participatory element**: The technology allows for a forum and surveys during the webinar. This would require some training of the participants but would improve the quality of the delivery of the presentations.

## 6. Appendix A: Accountable Management Strategy

SSG Accounting oversaw all fund transactions, including consulting fees and project expenses. Total project expenses were as follows:

| **Expenditure** | **$** |
|---|---|
| Consulting time | $6,800.00 |
| Consulting time (in-kind) | $1,000.00 |
| Adobe Connect | $316.25 |
| Printing | $112.70 |
| Total | $8228.95 |

## 7. Appendix B: Attachments *(PDFs attached separately)*

1. Registration database
2. Participant survey 1
3. Participant survey 2
4. Tools summary
5. Poster
6. Archived webinars (forthcoming)