

# *Climate Data Training Sessions for Engineers, Planners and Decision Makers*

Post-Training Report

May 2017

## Recommended Citation

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## Acknowledgements

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## Introduction

### A. Overview

The **objective** of this event was to improve the understanding of municipal practitioners on climate change and their confidence in working with climate change data.

The climate data training sessions were held at the Ontario Science Centre on April 26, 2017 in Toronto, Ontario and hosted by the Ontario Climate Consortium. The agenda of the training sessions were structured to first provide contextual information for the trainees. The topics of national and provincial climate change adaptation policy, climate change modelling concepts, climate impacts in Ontario, as well as the link between data and the process of building resilience were covered for all trainees.

Subject specific training was then provided, specifically focused on engineering practice and planning. Training topics relevant for these disciplines were covered through a suite of case studies, which incorporated important lessons on climate information and on building resilience in Ontario. Finally, an overview of the legal implications and importance of climate change were presented to wrap up these training sessions. This legal aspect of the training included the concepts of due diligence and negligence, in light of climate change. This topic was covered in order to emphasize the importance of incorporating and understanding the best information and data available in these practitioners' work.

Trainers who presented at the event were practitioners and academics with experience on how to use various sources of available climate data to move adaptation forward within specific contexts. These included members of McMaster University, York University, University of Waterloo, the City of Toronto, City of Mississauga, City of Markham, City of Vaughan, York Region, Durham Region, Region of Peel, the Toronto and Region Conservation Authority, Ontario's Ministry of Transportation, Toronto Hydro, Metrolinx, Zizzo Strategies Inc., Risk Sciences International, the Ministry of the Environment and Climate Change, and the Ontario Climate Consortium Secretariat. Appendix I provides a full list of the trainers involved and their affiliations.

### B. Overview of Attendees

The climate data training sessions received high levels of interest online when the event was initially promoted; the diverse range of affiliations as well as the number of attendees on April 26<sup>th</sup> reflected this accordingly. In fact, the event page, which was posted online in late March 'sold out' for the event in less than a week. By April 26<sup>th</sup>, the Ontario Climate Consortium (OCC) was managing a waitlist of about 30 additional people (from the available venue capacity) from other organizations who were interested in attending training. The venue where the training sessions were hosted could accommodate approximately 100 people, which was filled to capacity. It should also be noted that the OCC made all slides presented during the training sessions available online and notified those in attendance, as well as those in the waitlist.

Figure 1 illustrates where attendees came from for the climate data training sessions and what organizations and agencies were represented for local and upper tier municipalities across Ontario. As

illustrated, municipal staff from Kitchener to Oshawa to Hamilton to Newmarket made the trip to attend the training provided.

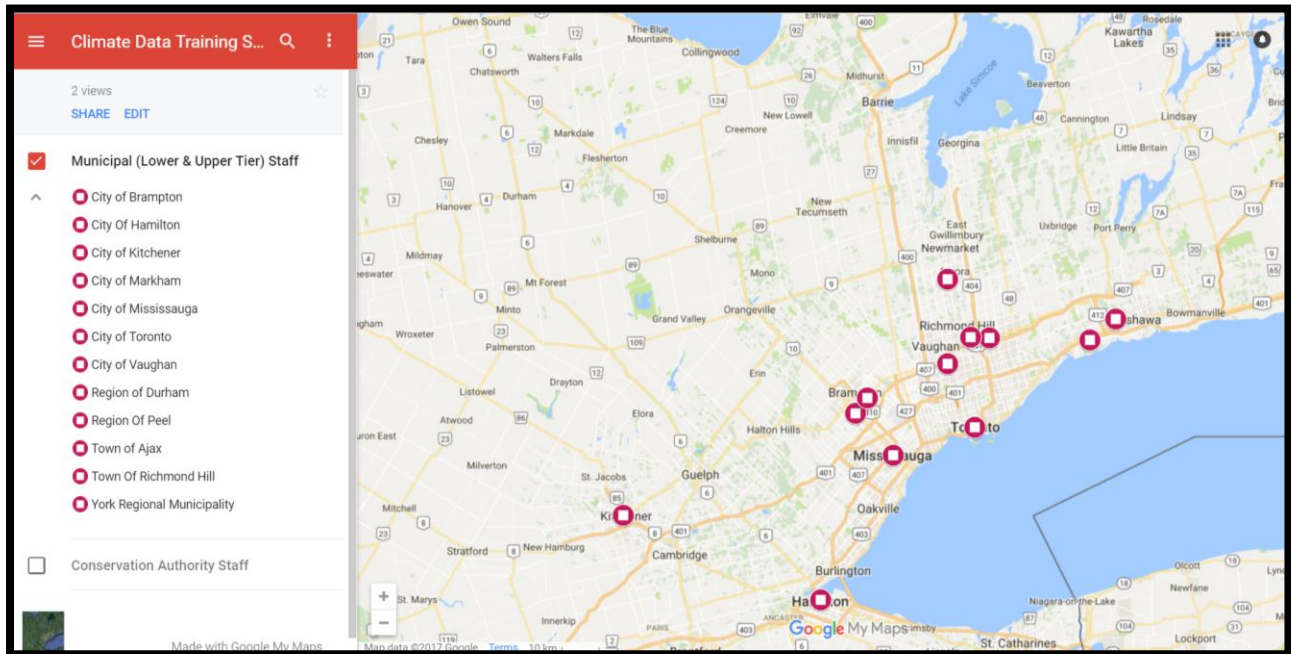


Figure 1: Origins of Municipal Staff in Attendance at the Climate Data Training Sessions

Similarly, Figure 2 illustrates where conservation authority attendees came from for the climate data training sessions. As illustrated, conservation authority staff from as far as Barrie to Peterborough to Strathroy (St. Clair Region C.A.) was in attendance.

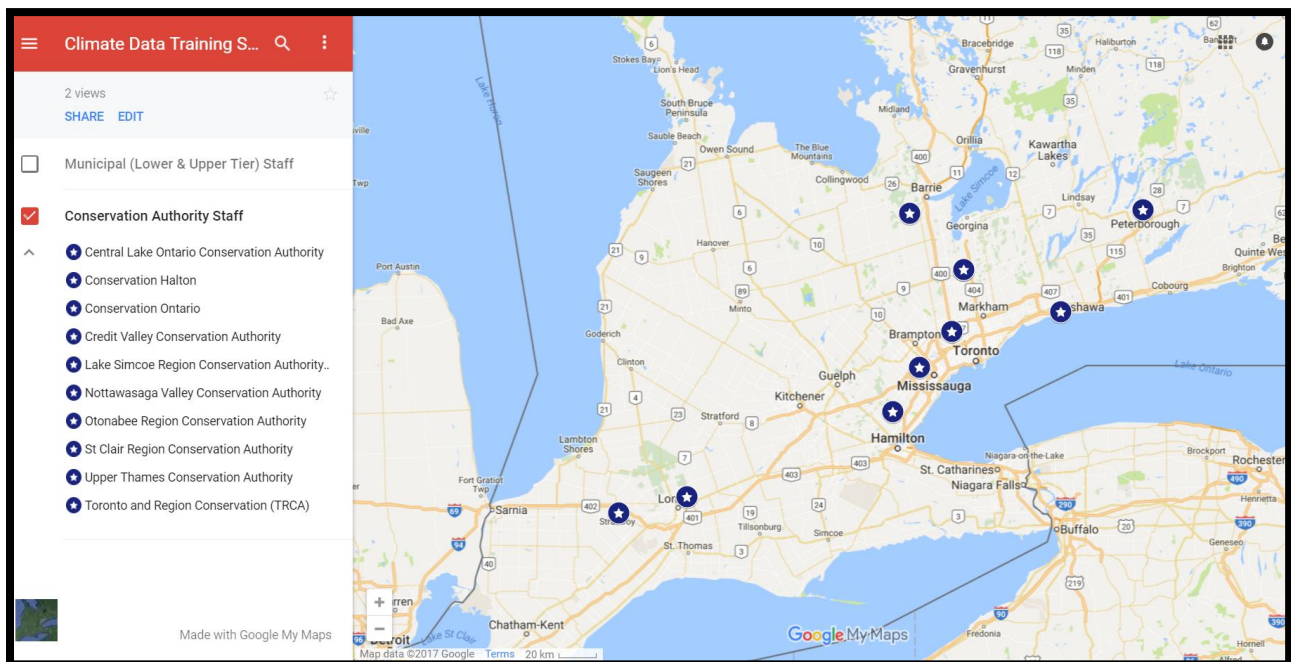


Figure 2: Origins of Conservation Authority Staff in Attendance at the Climate data Training Sessions

In addition to municipality and conservation authority staff, numerous attendees represented provincial agencies as well as academia, non-governmental organizations. Appendix II provides a full list of all attendees who participated in the climate data training sessions as well as their affiliations.

## Summaries from Training Sessions

### C. Introduction to Climate Change

The following section provides a more detailed overview of the climate data training sessions based on what was presented and what conversations were had throughout training.

#### Welcome and Overview

**Christine Tu, Ontario Climate Consortium**

To begin, Christine Tu welcomed all attendees to the training sessions. She highlighted the importance of due diligence, and professional learning for engineers, planners and decision makers in the context of climate data. Information sharing and responsible use of climate data were highlighted as important tools for practitioners when dealing with an uncertain climate. She introduced the morning, which also included four presentations which covered the overall climate change adaptation issue in Ontario, an introduction to the concepts on climate change and evolution of climate data use among practitioners, information on climate data from Southern Ontario and the translation between climate data to resilience building initiatives for the built and natural environment. These set of presentations provided the fundamentals on the importance of climate data for planners and engineers and provided ideas on how it has been used to date as well as future possibilities to reduce vulnerabilities and build resilience.

#### Climate Change Adaptation in Ontario

**Kathleen O'Neil, Ministry of Environment and Climate Change**

Kathleen O'Neill, Director Strategic Policy at MOECC mentioned the impact of climate change in Ontario with special focus on the agriculture sector, infrastructure, national economy and financial sector. Ontario has been active in addressing climate change with targeted policy in mitigation and adaptation. Following this, the MOECC diversified and mainstreamed climate change in various sectoral policies including infrastructure. She mentioned the preparation of a new provincial adaptation action plan to be released in 2017 encompassing the work of 18 departments. The establishment of a Climate Modelling Collaborative will be one of the signature actions of the new adaptation plan. Public consultations of the Climate Modelling Collaborative will begin this summer and its launch is expected by the end of the year.

## Climate 101 – Introduction to Climate Change Data Concepts and Vocabulary

**Heather Auld, Risk Sciences International**

Heather Auld, a principal climate scientist at Risk Sciences International (RSI) gave an overview on climate change science and specific examples of climate change trends and impacts from Canada. She stressed that partnerships are key for the future in obtaining accurate, relevant and reliable climate data since no one agency can provide enough resources on their own. Accuracy is fundamentally impossible for the future. She was clear in saying that we need to consider different models in our answer and understand that all models have biases.

## Evidence of Change in Climate in the Southern Ontario Region

**Dr. Hussein Wazneh, McMaster University**

Dr. Wazneh from the McMaster Centre for Climate Change presented a case study utilizing four precipitation and four temperature indices to quantify the effects of climate change on South Ontario's current climate and assess spatial and temporal patterns and trends in climate indices in that region. The study concluded that total annual precipitation and extreme events had increased. Frequencies of warm temperatures as well as minimum and maximum temperatures had increasing trends while frequency of cold temperatures had decreasing trends.

## From Climate Data to Climate Intelligence: Building Resilience

**Glenn Milner, Ontario Climate Consortium**

Milner's presentation focused on moving from climate data to climate intelligence, and specifically how climate information should and has been used in building resilience in Ontario. He presented key principles of how climate data should be communicated for less technical audiences and cautioned the audience to always include information or guidance about what the data limitations are, including caveats surrounding the varying levels of confidence we have in climate projections. Milner also discussed climate data's use in vulnerability and risk assessment frameworks, and provided much needed information surrounding moving from climate model output to vulnerability indicators as a means to feed into the climate adaptation initiatives.

## D. Planning

**Dr. Laura Taylor** from York University chaired the training on planning. She highlighted the current initiatives and programs on community energy planning, climate change adaptation and mitigation, and the work being performed by and for municipal planners. The current body of knowledge on climate data and its utilization is leading the way to the future. The future questions for climate practitioners could be on how to use available data for the planning process, how the data on planning could be utilized by other streams and how to compile lessons learned to move forward on climate change process.

## Planning Policy for Climate Change Resiliency

**Dr. Daniel Henstra, University of Waterloo**

Dr. Henstra described emergence of the policy area that deals with local government and climate change responses in the context of a growing body of knowledge as evident over the previous ten years. The overall objective of climate change adaptation is to reduce vulnerability and response associated to risk through communication and collaboration. Communication should be between government and communities. Municipalities can be very effective in terms of reducing exposure to climate change while utilizing their planning tools (zoning, subdivision controls). Feedback from practitioners is always key for effective adaptation - the issue is the difficulty in having political will.

He presented a case study that evaluated 63 climate change plans across Canada. The findings highlighted that the plans were more mitigation focus with weak monitoring, evaluation, public consultation sections, but that the plans had proper stakeholder engagement. The focus of mitigation over adaptation in plans may be due to the availability of structured guides for mitigation and lack of guidance for adaptation planning. The studied plans were a mix of climate focused activities to sectoral specific activities which referenced other available plans.

## Toronto's Examples of Action to Address Climate Change Through Planning

**Stewart Dutfield, City of Toronto**

Dutfield started his presentation by showing prepared action documents to address climate change from the last ten years from the City of Toronto: the most recent being "Resilient City – Preparing for Climate Change, Update and Next Steps (2016) and "Transform TO" (2017). He mentioned the importance of Toronto Climate Change Risk Assessment Tool (their process and software) in assisting city service and infrastructure providers to identify and mitigate climate change-related risks. Dutfield also presented on Toronto's Resilient City Working Group, which was formed to facilitate the process of climate change risk assessment with key city agencies, corporations and boards and organizations like Hydro One, Enbridge, Enwave, Toronto Water, Metrolinx, Toronto Transit Commission, Rogers, Telus, etc. The Public Infrastructure Engineering Vulnerability Committee (PIEVC) protocol was mentioned as a tool to assist in the mainstreaming of climate risk assessment into existing and new infrastructure decision-making that improves its resilience to the impacts of climate events.

Toronto's Climate Change Risk Management Policy was adopted in 2014 and is now applied in the City of Toronto and other major city agencies and corporations like TRCA, Toronto Hydro, Toronto Public Health, TTC and others. The policy helps the implementation of collective action to increase Toronto's resilience. Implementation of the policy has been guided by a High Level Risk Assessment (HLRA) process designed by the Resilient City Working Group. Future projects include the exploration of GIS enabled decision support tools and implementation of Transform-TO to achieve Toronto's long-term target of reducing 80% carbon emission by 2050.

## Durham Region's Examples of Action to Address Climate Change Through Planning

**Brian Kelly, Durham region**

Kelly described the climate change adaptation planning process in Durham region. The planning process was data driven with strong emphasis on climate change projections, impact modelling, incorporation of climate extremes and its implications, and corrective actions. The accumulated information was disseminated with major stakeholders such as conservation authorities, municipalities, and the chamber of commerce. The planning process was characterized as consultative, rigorous, peer-based, collaborative and comprehensive. There were three key components that have helped the planning process:

- A governance structure in Durham region to work on climate change
- Identified future climate conditions through climate projections
- Expert taskforces with seven teams and 63 subject experts

Eighteen discrete programs were identified to make sure coordinated implementation tools were made available. In 2017, priorities will be on funding and costing of identified activities. The plan will then be incorporated in future business plans and annual reporting of programs with the vision of resilient, livable and prosperous Durham Region. The plan awaits council approval and approval from municipalities and other stakeholders by June 2017.

The floor discussion after the presentation was focused on the assessment of vulnerability and resilience. There were thoughts shared on the risk assessment overview process, and the next steps of characterizing the vulnerabilities of the systems in question. Participants pointed out the prescriptive nature of the presented plan and the challenges that may exist in the enforcement of prescriptive plans. Further discussion was centered on the governance structure around the proposed plan and the working relationship with local municipalities.

## Peel Region's Examples of Action to Address Climate Change Through Planning

**Mark Pajot, Region of Peel**

Pajot started by saying that Region of Peel has unique approach to climate change as its strategic priority is to adapt to and mitigate the effects of climate change. The Peel Climate Change Strategy was adopted in 2011 and aimed to strengthen the partnership, reduce community vulnerability and reduce community GHG.

He mentioned Peel Region's evidence informed approach to climate change planning which is designed to lead towards transformation. He quoted Peel's own climate projection report prepared in 2015 by RSI and OCC that projected 2°C higher temperatures on average in the Region of Peel with 90-100% probability and double the number of extreme heat days (over 30°C). He noted with 66-100% probability that intensity of bad storms will increase by 28-51% and the length of the growing season will extend by 20%.



Region of Peel completed numerous vulnerability assessments, such as a finalized report on the natural systems led by TRCA and OCC that displayed increased heat stress for plants. Peel Region is producing a synthesis report identifying key vulnerabilities and the interactions across vulnerability assessments including: public health, natural systems, water infrastructure, community services, the economy, and the agriculture system. Peel Region is proactive in tackling the issue of climate change as it is the first municipal government to establish an office of climate change. He concluded by emphasizing that there is no one-size-fits-all approach possible. He highlighted that the reduction of GHG emissions is achievable with the adoption of comprehensive approach to include multiple sectors and by ensuring partnership in planning which in turn could buffer and increase capacity to manage the risk.

### Mississauga's Corporate Climate Risk Assessment

**Julius Lindsay, City of Mississauga**

Lindsay started his presentation by stating that the corporate climate risk assessment was all about transformation and engagement, and was developed based on the ICLEI framework and PIEVC protocol. Climate projections for the 2050 were leveraged from Peel Region's climate projections report produced by RSI and OCC (2015). For this period, the projection showed warmer winters, longer growing season, more heat waves with 33-45 more extreme heat days, more winter precipitation and more intense rainfalls with high confidence. Mississauga's temperature in 2050 and 2100 will likely be very similar to the one currently in Kansas State and Mediterranean countries respectively.

The city used a numerical likelihood rating on a scale of 1 to 5 as a probability percentage to measure impact, and qualified consequences in a numerical ranking on a scale of 1 to 5 to help describe the climate risks. The methodology looked at single and cross category risks when reporting back and proposing a prioritization of the risks, where:

- Single Category Risk = Impact Scenario Likelihood x Highest Category of Consequence Rating
- Cross Category Risk = Impact Scenario Likelihood x Sum of Consequence Ratings

### York Region's Examples of Action to Address Climate Change Through Planning

**Teresa Cline, York Region**

Cline provided an overview of the planning hierarchy. She mentioned the role of planners and highlighted a requirement to consider climate change in land use planning decisions going forward in the process. In York Region, the climate change adaptation plan was drafted a few years ago but it was not formally completed. York Region has since formed a Municipal Climate Change Working Group, which was designed to bring together lower tier municipalities across the region. York Region will be responsible to move objectives forward and address relevant issues under both climate mitigation and adaptation. York Region used the City of Toronto's vulnerability and risk assessment framework as well as OCC's PCRAFT tool to develop historic and future climate characterization and engage municipal staff to assess overall vulnerabilities. She stated that the work assisted to increase the level of comfort among staff to use climate information and it has made their decisions more defensible.

## Example of Action to Address Climate Change Through The Environmental Assessment (EA) Process

**Ken Dion, Toronto and Region Conservation Authority**

Dion presented on an environmental assessment process conducted by the TRCA for the Don River Mouth Naturalization and Port Lands Flood Protection Project EA (DMNP EA). This assessment process includes comparing design alternatives and understanding their ability to meet the overarching goals identified by project stakeholders. Criteria were aligned with identified objectives and tables were developed to do the analysis. The work on aligning climate change with the environmental assessment process demanded a shift in consideration. It required transformative shift on the thought process as if larger rainfall events became a new normal to address climate change.

### E. Engineering

**David Lapp** from Engineers Canada chaired the session on Engineering training. He highlighted the importance of this discipline understanding and working with climate change data to implement adaptation and mitigation interventions, and acknowledged the important work being conducted by all practitioners in Ontario on these topics. He also acknowledged the importance of understanding vulnerability and risks that could be present in the existing systems that engineers design and/or manage.

### Uncertainty and Impact Assessment Challenges for Adaptation Planning

**Ryan Ness, Toronto and Region Conservation Authority**

Ness talked about the use of Intensity-Duration-Frequency (IDF) curves in engineering design and operation of infrastructure as tools to communicate probability of occurrence of extreme rainfall events of various rates and durations. The demand for methods to incorporate climate change in water management has increased in recent years and this often comes in the shape of updated IDFs, as municipal water management and stormwater design are currently heavily dependent on the use of IDF curves. However, there is significant uncertainty in updated IDFs which incorporate climate change. Profound effect on calculating these updated IDF come from selected climate models, emissions scenario and even climate station data. Uncertainty cannot be eliminated but methodological permutations can help quantify it (e.g., ensembles of climate models). He stated a need to shift our focus away from the derivation of a single, definitive set of future IDF curves to a probability based approach. As closing thoughts, he reiterated the greater and irreducible uncertainty that exists within impact assessments and decision making processes. For example, the uncertainty associated with impact modelling can be just as large as or larger than uncertainty associated with climate modelling data. Science could improve this in the future, but it may never be perfect or definitive. Therefore, practice needs to move forward intelligently and adaptively.

## City of Markham's Municipal Study and Action in Storm-Water to Address Extreme Weather and Climate Change

**Rob Muir, City of Markham**

Muir's presentation used climate data sets from two different universities as part of Markham's infrastructure renewal program to address known and future flood vulnerability and risk. Mapping and known locations of risk were presented and Muir emphasized the importance of improving design standards and that specifically those after 1980 assisted in adapting to climate change to some extent. He acknowledged as well that Markham's use of their existing IDF curves are considered conservative based on current observational trends. However, participants were curious as to the future projected IDF curves that were used to 'stress test' the system and a question was raised on how to compare two IDF curves used in the University of Regina model and University of Waterloo curve. There was a discussion around scenario planning and possible implications of understanding the range of probability on ideas of changes and risks. The difference lies in the model used by two universities. University of Regina used Regional Climate Model (RCM) that has 25kms resolution in compare to University of Waterloo Global Climate Model (GCM) with more than 100km resolution. The GCM models cannot get the storm information as it does not understand the local dynamics. On the other hand, the dynamic downscaling will provide better ideas on flooding. It should be emphasized that all presentations in the Engineering stream showed the power of GIS in clearly visualizing climate impacts and their location within a system, which strengthens stories to be shared.

## Enhance Resilience to Climate Change, Toronto Hydro's Climate Change Action

**Rob McKeown, Toronto Hydro**

McKeown presented a pilot case study done in two phases aiming to evaluate the vulnerability of Toronto Hydro's electrical distribution system within the City of Toronto to a changing climate by employing the PIEVC protocol. The study itself was a high level screening analysis designed to determine where infrastructure vulnerabilities to climate change may be present, to suggest avenues for adapting infrastructure to climate change and to identify areas of further study. Phase 1 of the study was focused on current climate and a small portion of distribution system, which was completed in September 2012. Phase 2 of the study was on the entire distribution system and was completed in 2015 taking into consideration future conditions between now and the 2050s. Twenty climate parameters including high temperature, heavy rainfall, snowfall, freezing rain, high winds and lightning were considered in this assessment. All high risk interactions were deemed as vulnerabilities for Toronto Hydro. Much of the existing Toronto Hydro infrastructure was designed using statistics based on historical climate and there are risks that need to be addressed due to climate change. A challenge that was mentioned was that codes, standards and regulations typically use historical values, in this context Toronto Hydro would need to review equipment specifications and investigate impacts of climate projections.

He described the adaptation roadmap of Toronto Hydro, which was based on the Canadian Electricity Association's Climate Change Adaptation Management Planning Guide and included the study of climate

data. Key aspects of the guide are the scientific evidences on unequivocal warming of the climate system

### **Studying Climate Change Risk Through Storm Water Engineering and Assessment Management Engagement**

**Chris Wolnik, City of Vaughn**

Wolnik presented the City of Vaughn's vulnerability and risk assessment of climate change impacts on their stormwater system. One of the positive outcomes he mentioned was the increased awareness and better understanding of the issue among the staff and relevant professionals. There was also increased staff engagement, and the process assisted in creating a better inventory and higher knowledge on climate scenarios and impacts in the city.

Overall comments from participants were positive on the work presented and the level of analysis put into it. A participant found the presentation very informative, particularly the mapped hazard areas in the city and the definitions of the proxies used in the study. There were queries on how hazard mapping can be beneficial in flood risk assessment, how the topography of the area impact flood risk in low lying areas. The information with regards to the relationships between water table and topography in the context of flooding was raised as an interesting item within this study. Participants agreed on the data availability limitations and the hindrances that this creates to perform flood risk mapping and similar analysis in this and other municipalities.

### **Addressing Climate Change Through Engineering Practice**

**Dr. Hani Farghaly, Ministry of Transportation**

Dr. Hani presented details of the New Policy from Ontario's Ministry of Transportation for infrastructure design and associated tool. Important considerations included that the design must satisfy both the start and end life design constraints and it continues to be in accordance with the MTO Drainage Design Standards using engineering judgement. Designers should apply future rainfall values for the year corresponding to the end of the Design Service Life of the structure in the design for conveyance, erosion, scour and storm water management components. The design for fish passage should also meet the low flow requirements at the present and future flow conditions.

Dr. Hani defined key future steps which were as follows:

- Continue to update the MTO IDF curve online application as new rainfall data and better climate change predictions become available;
- Keep up-to-date with climate change modelling research to take advantage of advancements in the science and engineering; and
- Integrate new design methods in other systems such as MNRF OFAT system.

## About Climate Change Uncertainty and Risk Tolerance

**Dr. Kurt Kornelsen, McMaster University (FloodNet)**

Dr. Kornelsen spoke about Hydro Climatic Uncertainty and Risk where, if you rely on past precedent you may miss the future. A series of studies showcasing the uncertainty associated with modeling were presented. However, the point was made that water risks are associated with the novelty of dynamical possibilities that have significant potential consequences to human and ecological systems, and not with probabilities based on historical precedence. He distinguished between true uncertainty, which for example, comes as a surprise with the misdirected Slims River due to melting Kaskawulsh glacier in Yukon Territory in 2016, and Regular Uncertainty as quantifiable variability in models and statistical error.

Another case study on uncertainty that was presented analyzed and visualized a complete vertical chain of models and techniques exploiting operational meteorological ensemble forecasts. Accuracy and reliability are intrinsic characteristics for the ensemble model. Thus, a user can select risk tolerance. He noted that tools such as Analysis of Variance (ANOVA) can be used to quantify uncertainty contribution by source with examples of Rhine River and Norway. However, if we only account for climate model uncertainty, we may miss some other key features. Therefore, is important to go through the exercise of examining risk tolerance. A key message from this presentation was that data availability, communication, cost, and one line policies are also potential challenges.

## An Integrated Approach to Become Climate Resilient

**Dr. Quentin Chiotti, Metrolinx**

The presentation began with an introduction to Metrolinx and the large ongoing expansion in the GTHA's rapid transit network of over \$30B in investment with a focus on GO Rail service with faster electric trains. He noted that Metrolinx is the largest parking lot owner in North America. Their Regional Transportation Plan developed in consultations with municipalities, residents and many stakeholders is a multi-modal, long range plan for the GTHA. It provides strategic direction for planning and designing.

Dr. Chiotti showed the changes in climate and increasing climate change impact on Metrolinx's infrastructure. He stated that Metrolinx's actions on resiliency will be impacted by provincial policy and guidelines. In 2016, Metrolinx completed a PIEVC vulnerability assessment of six key assets representative of the network. Metrolinx has provided input in provincial plans such as the Proposed Growth Plan in 2016 and Ontario's Climate Adaptation Plan in 2017, and Metrolinx's Sustainability Strategy 2015-2020 was prepared and includes a goal to become climate resilient. The key next steps include to finalize Metrolinx's Corporate Climate Adaptation Plan, and develop climate resilience requirements for inclusion with technical standards, manuals and guidelines.

## F. Climate Change Liability and the Use of Information

Laura Zizzo, Zizzo Strategies Inc.

To wrap up the climate data training sessions, Laura Zizzo noted that climate change is re-defining risk management, legal liabilities and business imperatives. She stated that significant economic impacts of climate change are increasingly being recognized and provided some examples:

- Bank of Canada warning that estimated cost of inaction could amount to \$21-43 billion/year by 2050;
- World Economic Forum named climate change the top trend in their 2017 Global Risks Report; and
- The Financial Stability Board created a task force on climate related financial disclosures to improve and standardize the integration of climate change in financial reporting.

Federal and provincial policy developments are responding to these trends and providing opportunity to Canadian leadership in the transition to a low-carbon and climate resilient economy with Cap and Trade, Carbon Tax as examples.

There are greater adaptation requirements in legislation which incorporate climate change considerations. She noted that historical data can no longer adequately predict the future. We are in need for better vulnerability assessment tools like PIEVC, Building Code evolution and the broader application of climate models. She noted the economic impacts that have been felt across the country, and highlighted a few evolving class actions, including the 2016 Muskoka class action \$900 million lawsuit by residents due to flooding caused by high water levels and abnormal spring runoff.

She provided a quote from Mark Carney, a Canadian economist currently the Governor of the Bank of England who said 'Climate Change is the greatest risk for capital markets'. Climate change is ubiquitous but differentiated with industry impacts being unique. For the future, we should be incorporating more Environmental, Social and Governance (ESG) considerations and disclosing ESG impacts. She highlighted that amongst other action the Industry-led Task Force on Climate-related Financial Disclosures (TFCD) will develop climate-related financial risk disclosures for use by companies and will consider the physical, liability and transition risks associated with climate change. The roadmap for Canada included regulatory action, stewardship, corporate reporting, and investor education.

### **Based on OCC's post-event Feedback Survey:**

- **100% of respondents thought the training session was excellent or very good.**
- **100% of respondents thought the training session was instructive**
- **100% of respondents agreed they will be using the knowledge from this training session in their ongoing work.**
- **93% of respondents thought the event was either very unique or fairly unique**

## Key Messages from the Training Sessions

Participants of the data training sessions were enthusiastic and particularly satisfied with the way sessions were organized. There were some key messages identified and observed during the training sessions including:

- There is a growing group of practitioners who are utilizing climate data/evidence to better inform/position their work and planning process. This in turn could provide more confidence and buy in to the process selected.
- It is evident that the work on climate change is becoming prevalent among practitioners in Ontario. However, there is little consistency in tools and analysis.
- While uncertainty in future climate data is real, and possibly irreducible, frameworks do exist for various disciplines to move forward and mitigate the impacts of climate change.
- There is no single approach/framework to find all the solutions for climate adaptation; therefore, partnerships focused on specific activities are crucial.
- Formal and informal partnerships should include entities such as the provincial government, municipalities, conservation authorities, utilities, and the public to address the shared responsibility for specific systems, sectors or processes.
- Use of well-supported frameworks is important; however, to move climate adaptation forward it is important to understand well the components of the frameworks that comprised climate data, indicators and other technical information.
- Evidence should be used to inform the frameworks when performing analysis and communicating information internally and externally.
- Guidance on best practices to utilize the available climate data and system data in different available frameworks is needed.
- The variety of practices among the case studies showed the importance of organizational culture, leadership, and the governance of science when dealing with variety of climate change issues in different administrative boundaries.
- Standalone projects on climate may be not as effective as they could be. This may be because culture plays a very important role in shaping the decision process in any organization, and thus there should be strong effort to establish or support organizational culture that enables action on climate change adaptation.
- Communicate and consider climate change as a public safety issue rather than an environmental issue.
- Key messaging is crucial for information and knowledge dissemination and there should be a strong focus to roll out key messages from science and data-based analysis to stakeholders and the public.
- The projects and/or initiatives that are being carried out now could be influential for our future management decisions. Thus, there should be programs to track, monitor, and assess outcomes.

## Next Steps

Communication among participants following the climate data training sessions revealed what went well in the training and what they are looking for into the future. Participants indicated they want more discussion times after each presentation, and there were suggestions to include more 'analytical' working sessions in future trainings to ensure all participants can have expert advice on how to use available climate data effectively in their programs. What was also demonstrated following the event was that practitioners are moving forward from policy to implementation when it comes to climate change adaptation using data. This was made evident by the fact that there were suggestions to include discussions surrounding the legal aspect of climate change.

In summary, the post climate data training sessions survey demonstrated further overwhelming interest and support to organize a 'hands-on', similar or even more advanced training sessions. The focus could further be on deep analysis and approaches with outcomes to inform practitioners on the front line.

As mentioned earlier, this climate data training sessions had a waiting list of approximately 30 people and OCC suggests that two future sessions could be valuable to address this demand. Each session could target two different audiences:

- Senior decision-makers (senior management, directors, etc.)
- Private sector practitioners and decision-makers (consultants and decision makers, etc.)

Furthermore, any future training sessions could incorporate the feedback received from the event on April 26<sup>th</sup>. Specifically, it could have:

- More networking time for participants to share successes and learnings, and ask questions of their peers;
- More diverse focus in terms of climate related program implementation and indulge on cross disciplines such as law, social science, etc.; and
- More detailed, subject specific training sessions (hands-on learning).

### Social Media

A total of 5,322 Twitter impressions were produced specifically for the event on April 26<sup>th</sup>, and another 1,704 impressions were produced the day after on the same topics.



## Appendix I – List of Trainers and their Affiliation

The following provides a comprehensive list of all trainers (speakers and moderators) who participated in the event, as well as their affiliations:

Brian Kelly, Durham Region  
Chris Wolnik, City of Vaughan  
Christine Tu, Ontario Climate Consortium Secretariat  
Daniel Henstra, University of Waterloo  
David Lapp, Engineers Canada  
Edmundo Fausto, Ontario Climate Consortium Secretariat  
Glenn Milner, Ontario Climate Consortium Secretariat  
Hani Farghaly, Ministry of Transportation (MTO)  
Heather Auld, Risk Sciences International  
Hussein Wazneh, McMaster Centre for Climate Change  
Julius Lindsay, City of Mississauga  
Kathleen O'Neill, Ministry of Environment and Climate Change (MOECC)  
Ken Dion, Toronto and Region Conservation Authority (TRCA)  
Kurt Kornelsen, McMaster University (FloodNET)  
Laura Taylor, York University  
Laura Zizzo, Zizzo Strategies  
Mark Pajot, Peel Region  
Quentin Chiotti, Metrolinx  
Rob McKeown, Toronto Hydro  
Rob Muir, City of Markham  
Ryan Ness, Toronto and Region Conservation Authority (TRCA)  
Stewart Dutfield, City of Toronto  
Teresa Cline, York Region

## Appendix II – List of Attendees

The following provides a comprehensive list of attendees for the climate data training sessions, summarized in four categories:

1. Municipal Staff
2. Conservation Authority Staff
3. Provincial Agency Staff
4. Non-Governmental Organizations, Academics and Consulting Staff

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### Municipal Staff

Mohammad Alam, City of Brampton  
Bino Varghese, City of Brampton  
Eniber Cabrera, City of Hamilton  
Esther De La Cruz, City of Hamilton  
John Mabira, City of Hamilton  
Richard Paola, City of Hamilton  
Catherine Parsons, City of Hamilton  
Dustin Carey, City of Kichener  
Rob Muir, City of Markham  
Julius Lindsay, City of Mississauga  
Hazel Breton, City of Toronto  
Sarah Duff, City of Toronto  
Jose A La O, City of Toronto  
Anthony Paolini, City of Toronto  
Adam Zietara, City of Toronto  
Amal Wahab, City of Toronto, Toronto  
Community Housing  
Paul Clements, City of Toronto, Toronto Water  
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