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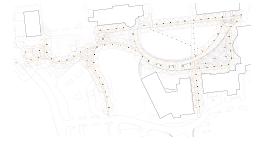
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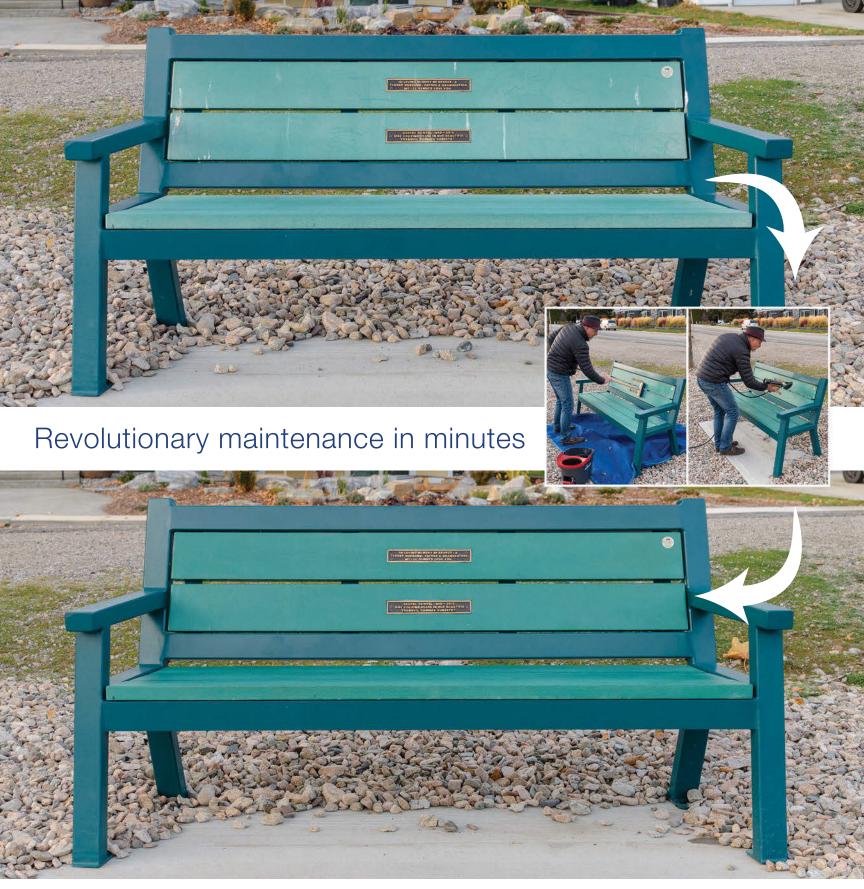
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automne 19 | réconciliation (l'AP et les questions autochtones)

date de tombée 15 avril

hiver 19 | beauté

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printemps 20 | paysages sacrés + spirituels

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LANDSCAPES | PAYSAGES is published by the Canadian Society of Landscape Architects to provide a national platform for the exchange of ideas related to the profession. The views expressed in LANDSCAPES | PAYSAGES are those of the authors and do not necessarily reflect those of CSLA. Guest editors and contributors are volunteers, and article proposals are encouraged. Articles may be submitted in either English or French.

LANDSCAPES | PAYSAGES est publiée par l'Association des architectes paysagistes du Canada pour servir de plate-forme nationale destinée à l'échange d'idées sur la profession. Les opinions exprimées dans LANDSCAPES | PAYSAGES appartiennent aux auteurs et ne reflètent pas forcément celles de l'AAPC. Nos rédacteurs invités contribuent bénévolement. Nous attendons, en français ou en anglais, vos propositions d'articles.



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HOPE PARNHAM, APALA, CSLA, MCIP **GUEST EDITOR | RÉDACTRICE INVITÉE**

LOW CARBON RESILIENCE

EN I WAS A STUDENT IN THE MLA PROGRAM at the University of Manitoba when An Inconvenient Truth was released in 2006. I remember thinking climate change was a trendy topic to get involved in at the time. I couldn't have imagined that the need to take action on this topic would still be an issue of political and social debate over 10 years later.

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released the Special Report on Global Warming of 1.5°C that warned that unless significant reductions in emissions are attained before 2030, increases in the mean global temperature will surpass 1.5°C. To put it bluntly, the world's scientists just gave us a 10-year countdown to make the necessary changes to avoid the anticipated and more severe risks predicted of a 2°C change. I've been working in this field for some time and I've read many similar reports on global projections, but this report was unique in its clarity, certainty, and in the collective exasperation of its authors. Lo! We have just 10 years (deep breath)...

It's not going to be easy, but nothing worth doing ever is. I remain optimistic in believing that together we can do this. We can - we must - do our part.

As founding members of the CSLA Committee on Climate Adaptation and co-chairs of the IFLA Working Group on Climate. Colleen Mercer Clarke and I are privileged to collaborate with landscape architects from across the country and around the globe to see, firsthand, how LAs have been actively engaged in responding to this global threat. We continue to advocate for the profession because we believe that LAs are uniquely qualified to lead an ecosystem-based approach to policy, planning, design and decision-making. By combining mitigation and adaptation strategies as two halves of a single path, we can reduce emissions, sequester carbon and enhance sustainable societies.

We're thrilled to finally have a name for what we've been talking about, and for that we thank Simon Fraser University's ACT (Adaptation to Climate Change Team) team.

They call it Low-Carbon Resilience.

As guest editors of this timely issue of L|P, we are excited to have the opportunity to introduce you to a few of the many climate change champions we've met along the way. Many of the authors in this issue are not just practicing professionals but also volunteers on the committees and working groups of landscape architecture's professional associations. They are LAs and allied professionals, committed to community outreach, interdisciplinary collaboration and research. We have invited them to share their stories with you and to further disseminate their climate change tools and resources, and we commend them on their work and their pursuit of a sustainable future.

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LA RÉSILIENCE **FAIBLE EN CARBONE**

FR À LA SORTIE D'UNE VÉRITÉ OUI DÉRANGE, en 2006, j'étudiais à la maîtrise en architecture du paysage à l'Université du Manitoba. Je pensais que le changement climatique ferait tendance. Je n'aurais pas pu imaginer qu'on débattrait encore de la nécessité d'agir plus d'une décennie plus tard.

En octobre 2018, le Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC) publiait son Rapport spécial sur le réchauffement planétaire de 1,5 °C. On y apprend que, à moins de réduire considérablement nos émissions d'ici 2030, l'augmentation de la température mondiale moyenne dépassera 1,5 °C. En clair, les scientifiques du monde entier ont annoncé le début d'un compte à rebours de dix ans pour mettre en branle les changements requis afin d'éviter les risques anticipés, plus graves, d'un réchauffement de 2 °C. Je travaille dans ce domaine depuis quelque temps. J'ai lu de nombreux rapports similaires sur les projections mondiales. La clarté, la conviction et l'exaspération collective des auteurs de celuici en font un rapport unique en son genre.

Ce ne sera pas facile, comme tout ce qui vaut la peine d'être fait. Mais je crois fermement qu'ensemble nous pouvons y arriver. Nous pouvons participer; c'est notre devoir.

En tant que membres fondatrices du Comité sur l'adaptation climatique de l'AAPC et coprésidentes du groupe de travail de l'IFLA sur le climat, Colleen Mercer Clarke et moi avons le privilège de collaborer avec des architectes paysagistes de tout le pays et du monde entier pour constater de visu les efforts déployés par les gens de notre profession pour combattre cette menace planétaire. Nous défendons la profession, parce que nous croyons que les AP sont particulièrement qualifiés pour mener une approche écosystémique des politiques, de la planification, de la conception et de la prise de décision. En combinant stratégies d'atténuation et d'adaptation comme les deux moitiés d'une même voie, nous pouvons réduire les émissions, séquestrer le carbone et rendre la société plus pérenne.

Nous sommes ravies d'avoir enfin un nom pour cela. Nous en remercions d'ailleurs l'équipe d'adaptation au changement climatique (ou ACT) de l'Université Simon Fraser.

Cette équipe parle de résilience faible en carbone.

En tant que rédactrices invitées de ce numéro de L|P, nous sommes heureuses d'avoir l'occasion de vous présenter quelques-uns des champions du changement climatique que nous avons rencontrés au fil du temps. La plupart des auteurs de ce numéro, en plus d'exercer leur profession, font du bénévolat au sein de comités et de groupes de travail d'associations professionnelles d'architecture paysagère. Ces AP et ces professionnels apparentés sont actifs dans la sensibilisation populaire, la collaboration interdisciplinaire et la recherche. Nous les avons invités à partager leurs histoires et à faire connaître leurs outils et leurs ressources sur le changement climatique. Nous les félicitons pour leur travail et leur quête d'un avenir durable.

OUR WRITERS NOS RÉDACTEURS





OUR GUEST EDITORS | NOS RÉDACTRICES INVITÉES

HOPE PARNHAM

Hope Parnham, B.Sc., B.EnvD., M.L.A, APALA, CSLA, MCIP, is the principal of Dv8 Consulting, offering landscape architecture, planning and climate change research services in Charlottetown, Prince Edward Island. Hope grew up on the beaches of PEI and she is passionate about her research on the Island's vulnerable coastline. She advocates for a more responsible practice of erosion control techniques, recognizing the need to adapt to coastal risks associated with climate change and the intrinsic value of the natural landscape of the shoreline

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COLLEEN MERCER CLARKE

Colleen Mercer Clarke, M.Sc., M.L.A., Ph.D., APALA, FCSLA, is both an ecologist and a landscape architect, which is why ecosystembased approaches to low carbon resilience speaks so clearly to her heart. Like Hope, Colleen has spent most of her life on or in the rivers, lakes and shores of Newfoundland and Nova Scotia, with a few diversions to sunnier climes on the islands of the Caribbean Sea. As the climate shifts and weather becomes more severe, these ecosystems will be the first to feel the damage, as will the human populations they have sheltered through time. There is no time left in which to ponder and discuss. There is only time now to anticipate, to create, to do.

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DEBORAH HARFORD

As executive director of ACT, SFU, Deborah Harford is responsible for development of the initiative's vision and its partnerships with the public and private sectors. A thought leader on the concept of integrated climate action, or "low carbon resilience," Deborah recently established the Integrated Climate Action Planning in BC Communities Initiative with support from the Real Estate Foundation of BC. She directs ACT's projects and communication of the program's outcomes, and contributes to numerous publications and research collaborations. Deborah's work with ACT has gained her national recognition as a resource for those seeking information on climate change strategies. She was a member of the recent federal Expert Panel on Adaptation and Resilience Results, which developed a set of adaptation indicators for Canada, and is currently serving on the Council of Canadian Academies' Expert Panel on Climate Risks



ALISON SHAW

Dr. Alison Shaw is co-lead of the Integrated Climate Action Planning in BC Communities Initiative at ACT, SFU, which aims to develop practical pathways and replicable approaches to embed integrated climate action into municipal decision-making. She has worked as a climate change and sustainability strategist on behalf of NGOs, municipalities and nation states. Alison spent over a decade in academia, leading intersectoral climate change and sustainability projects, before founding FlipSide Sustainability, a coaching | consulting company that helps organizations from all sectors navigate cuttingedge sustainability strategy. As a science-policy specialist, Alison has worked and published extensively on the interconnections between climate change adaptation, mitigation and sustainable development and ways of strategically integrating them into organizational strategy, policy and operations.



JANE WELSH

Jane is a landscape architect and current president of the OALA. As project manager for the environmental policy unit in Toronto City Planning, she is responsible for creating new innovative solutions to address sustainably, climate change and resilience such as the Toronto Green Standard; Green Roof Bylaw; and the first Ravine Protection Bylaw, Ravine Strategy and Biodiversity Strategy for Toronto. Her downtown office on the 22nd floor includes a view of Lake Ontario and many green roofs!

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IAN MAURO

Dr. Ian Mauro, PhD, is the Principal of the Richardson College for the Environment and Co-Director of the Prairie Climate Centre at the University of Winnipeg. He is an environmental and social scientist, a filmmaker and Fellow of the Royal Society of Canada's College of New Scholars, Artists and Scientists.



PAMELA CONRAD

Pamela Conrad is a Senior Associate practicing at CMG Landscape Architecture in San Francisco, California, where she lives in a cottage built in 1899. "Although it is a place that seems to have endless needs and repairs, it also feels like living one of those 'choose your adventure' books that you can pick up anytime and have a journey to set your mind free from everything else happening in the world."

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DANIEL H. LEEMING

Dan, BA, Dip CP, MES, FCIP, RPP, is a founding partner of The Planning Partnership and has worked on the design and development of new towns and various sizes of planned communities for private and public agencies throughout Ontario and the US over his 35year career. His areas of expertise include community planning, from regional to neighbourhood scale with the application of urban design, sustainable and public health initiatives through facilitation to create meaningful and complete communities while satisfying the needs of the marketplace. Dan also works with various universities and is an adjunct professor at the University of Guelph, has taught Urban Design at the University of Toronto and was the 2014-2015 University of Waterloo "Planner in Residence.'

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MIRIAM MUTTON

Miriam Mutton (BLA Guelph 1983, MA Sustainability Studies Trent 2015) is a landscape architect in private practice in her hometown Cobourg, Ontario. Currently, President of the Northumberland Land Trust Board of Directors, she is a life-long community advocate and was elected twice to Cobourg Town Council (2006-2014). An early adopter of urban natural gardens, her boulevard meadow garden is in The Book of Lists (2017).

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MARIE-PIERRE MCDONALD

Marie-Pierre McDonald holds a Bachelor in Landscape Architecture and a Masters in Architecture and Urban Design from McGill University. In 2012, she received the student excellence award from the Quebec Association of Landscape Architects with the project Wanaki, terre de leurs enfants, which involved the relocation of the Kitcisakik community. After graduation, she worked in Nunavik for the Kativik Regional Government as a land use planner, where she managed regional and municipal land use planning projects. In June 2017, she joined Groupe BC2, a land-use planning and development firm, as a project director working on Indigenous communities' projects.



HILDA SNOWBALL

Hilda Snowball grew up in the community of Kangiqsualujjuaq, which is in the eastern most of Nunavik, Quebec. She completed a degree of "Educator's in Native and Inuit Childcare Services" at CEGEP de St-Felicien. She was also accepted to the forth cohort of the Jane Glassco Northern Fellowship for two-year policy program of The Gordon Foundation. Hilda has been extremely active in her community in various fields of planning, organizing and implementing. Hilda ran for Mayor of Kangiqsualujjuaq in November 2012 and was reelected in 2015. During her two terms, she was involved in many projects and development that are beneficial to the community and its people. Today, Hilda is representing the Nunavik Region as the Vice-Chairperson of the Kativik regional government.



MARIANNE LAFONTAINE-CHICHA

Marianne a récemment complété une maîtrise en architecture de paysage à l'Université de Toronto. Elle travaille présentement pour FABRICations aux Pays-Bas, ou elle travaille sur des strategies regionales pour des villes plus résiliantes, Son travail de thèse portait sur la navigation commercial sur le fleuve Saint-Laurent et a été récompensé par l'American Society of Landscape Architects.



RYAN HENNESSEY

Ryan Hennessey has 15 years' experience working as a landscape architect and planner across Canada. Over the past decade he has specialized as a project manager, working for Natural Resources Canada, Yukon College and the Government of Yukon, to deploy over 90 climate change projects to reduce greenhouse gas emissions and build local resilience in rural communities. He is currently a Senior Energy Planner for the Government of Yukon where he leads a capacity support program designed to support climate action in collaboration with First Nation and municipal governments

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01/

INTERNATIONAL FEDERATION OF LANDSCAPE ARCHITECTS (IFLA)

THE GLOBAL ACCORD

adaptation for a changing world



LANDSCAPE ARCHITECTS, and their affiliated professions, understand that to ensure a prosperous future and a sustainable environment, we must create societies characterized by an enhanced capacity for resilience, a willingness to transform to a better state, and a commitment to ensuring the long-term sustainability of environments, cultures and well-being for all.

By encouraging our memberships to focus on these key principles, IFLA hopes to build competence and to promote innovation in planning and design decisions that embrace the challenges and opportunities of the changing world. In working across environmental and cultural systems, landscape architects are uniquely positioned to engage professions, industries and governments in new alliances better equipped to address complex social and ecological problems and to fully express the opportunities inherent in principles of equity, sustainability, resiliency and democracy.

To this end, IFLA has initiated the Global Accord, an agreement on practice supported by individuals and organizations, governments and industries. The Accord establishes three guiding principles for decision-making and encourages collaboration across disciplines

and geographic and national boundaries. The Canadian Society of Landscape Architects (CSLA) was the first national association to ratify the Accord, and is also the first to have completed ratification by all its regional, provincial and territorial components including:

- Alberta Association of Landscape Architects
- Association des architectes paysagistes du Québec
- Atlantic Provinces Association of Landscape Architects
- British Columbia Society of Landscape Architects
- Manitoba Association of Landscape Architects
- Northwest Territories Association of Landscape Architects
- Nunavut Association of Landscape Architects
- Ontario Association of Landscape Architects
- Saskatchewan Association of Landscape Architects

For more information on the IFLA Global Accord visit our website at www.iflaonline.org/climatechange. Or contact Colleen Mercer Clarke (mercerclarke@bell.net), or Hope Parnham (hparnham@outlook.com), Co-chairs, IFLA Climate Change Working Group.

PAYSAGES Mentioned Paysages and Paysages and

Wendy Graham, AAPQ, FCSLA, was the graphic designer for L|P for over 12 of the last 20 L|P years. She confesses to missing the pleasure of laying out the pages since leaving after the 2018 Awards issue. To compensate she remains on the magazine's Editorial Board for now.

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02/ HAPPY BIRTHDAY L/P MAGAZINE

20 years and still going strong...

WENDY GRAHAM

THE FIRST ISSUE of CSLA *Landscapes I Paysages* magazine hit the presses in the fall of 1999. Twenty years later, close to 80 issues have been published, hundreds of volunteers have contributed countless, stories, opinions, news, interviews, book reviews, and the magazine is still going strong. It just keeps on getting better.

Thousands of stunning images of designed spaces and planned places that inspire combined with provocative and insightful editorial comment about landscape architecture in Canada, written for and by Canadian landscape architects, have made our magazine an award winning review. Simply said, Landscapes I Paysages represents our shared collective passion about the world around us, spread

across paper pages that bear witness to how our profession has evolved over the last 20 years.

Kudos to founding editor, Cecelia Paine, OALA, FCSLA, and members of the editorial board at the time who worked relentlessly to establish a forum and find the funding so that LAs could share ideas and showcase Canadian design excellence. Kudos to our subsequent editors, editorial board chairs and members – and to everyone who contributed to making it happen over and over again.

Celebrating 20 years of L|P celebrates us all. Happy Birthday L|P! Visit the CSLA website and peruse all the back issues of L|P: bit.ly/LParchive.

03/ PAAWG **WORKING TOGETHER** TO FIND SOLUTIONS

BEV WINDIACK





ASSOCIATIONS' ADAPTATION WORK GROUP, is an extraordinary initiative of the

PAAWG, THE PROFESSIONAL

BC Climate Action Secretariat (CAS), Ministry of Environment and Climate Change Strategy. The working group, which began in 2014 with five professions, currently comprises eight -Association of BC Forest Professionals (ABCFP), the Association of Professional Biology (APB), the College of Applied Biology (CAB), the Planning Institute of BC (PIBC), the Engineers and Geoscientists of BC (EGBC), the BC Institute of Agrologists (BCIA), the Chartered Professional Accountants of BC (CPABC) and the British Columbia Society of Landscape Architects (BCSLA) – as well as several supportive or allied organizations such as West Coast Environmental Law (WCEL), the Fraser Basin Council (FBC), SFU ACT, NRCan, and the BC Government itself.

The BCSLA was invited to join the working group in late 2015, after participants identified the need to include landscape architects in the professional adaptation dialogue. In January 2016, I was privileged to join the group and have some small role in getting the BCSLA to add its signature to the "Professional Leadership in a Changing Climate: Joint Statement", an early PAAWG initiative that had been publicly released some 18 months earlier. At the time of its initial release. West Coast Environmental Law called the Joint Statement unprecedented and wrote about its significance in an Environmental Law Alert blog which can be read at bit.ly/WCELblog.

The Joint Statement, prepared by the ABCFP, APB, CAB and PIBC, and now including the BCSLA's signature, can be found at www. cab-bc.org/file-download/joint-statementclimate-change.

Bi-monthly teleconferences and annual in-person workshops have allowed group members, who are located across the province, to share information about what each association is doing to address adaptation, where organizations' goals, objectives and challenges overlap, and what approaches would be useful in supporting inter-professional adaptation efforts. The group regularly discusses ongoing projects and opportunities to connect to those with shared interests in adaptation, often corresponding throughout the weeks between designated meetings. Participants share the ideas and opportunities that come out of PAAWG dialogue with their respective organizations' board, allowing each board to disseminate the information to their membership if they feel it is relevant. Each organization's board is made aware of what other professions are doing with respect to climate adaptation; each board can determine if its membership is being adequately supported and take the necessary steps if not.

One of PAAWG's current hot topics of discussion is BC's proposed Bill 49-2018: Professional Governance Act, legislation intended to create a Standardized Code of Ethics and Right to Practice for professions working in the area of natural resources. Professions currently identified as falling under the umbrella legislation include engineers, biologists and foresters, but not planners or landscape architects. While the engineers, biologists and foresters see this as reasonably positive legislation, PIBC and the BCSLA are investigating what, if anything, it will mean to their membership. To learn more, see: bit.ly/ProReliance; bit.ly/ProGvncAct.

Bev Windjack, BCSLA, AALA, CSLA, LEED®AP BD+C, ERPSC, works and lives in Victoria, BC, amid endangered Garry oak ecosystems and within walking distance of the Salish Sea. She is principle of LADR Landscape Architects, a small team of talented professionals with a passion for placemaking, stewardship and connecting people with nature. Like many prairie migrants, she has learned to appreciate rain, and lots of it, but is still adjusting to dark winter evenings - a byproduct of having no snow. She is an active member of the CSLA Committee on Climate Adaptation.

1 HARDENED SHORELINE IN GREATER VICTORIA. PHOTO 1 BEV WINDJACK 2 RAWPIXEL.COM/SHUTTERSTOCK.COM PAAWG's measurable efforts to date include, but are not limited to:

- initiating the Joint Statement;
- participation in SFU ACT's Professionals' Best Practices for Low Carbon Resilience project (see summary of Phase 1 at bit.ly/2FAnwAd);
- pursuing a NRCan grant both to help professions develop a common language around climate adaptation and to develop tools for inter-professional climate adaptation education (in association with Royal Roads University);
- presenting at each other's congresses to educate students and allied professionals about the importance and benefit of addressing adaptation collaboratively; and

• sharing research and extensive educational opportunities among member professions.

To this last point, all CSLA members can access EGBC's web portal and take advantage of their research and learning opportunities by simply going to 'EGBC portal' and making an account. And, while further evidence of ongoing collaborative support is not needed, representatives from three PAAWG organizations - WCEL, EGBC and FBC - graciously authored adaptation themed articles for the December 2018 issue of BCSLA's bi-monthly newsletter, Sitelines (see bit.ly/Sitelines).

In short, PAAWG is a thoughtful, focused, intelligent and meaningful working group that addresses adaptation through an interprofessional climate lens. BC is fortunate to have it, and we know it!





04/ **LACF GROWING SUPPORT FOR STUDENTS**

EDWARD VERSTEEG

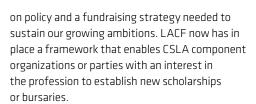
Ed Vertseeg APALA, CSLA, is an instructor in the landscape architecture program at Dalhousie University and a landscape architect practicing in Nova Scotia.

1 ALEXANDRA GALAN IS A MEMBER OF GONCALO & JOSEPH PARENTE ARE MEMBERS OF DALHOUSIE'S FIRST GRADUATING CLASS, 2018.

THE LANDSCAPE ARCHITECTURE CANADA FOUNDATION (LACF) works hard to advance landscape architecture in Canada through longestablished grant, bursary and special project funding programs. In 2019, LACF will award over \$30,000 to fund research projects and a further \$10,000 for special projects. We are also making a strong push to grow our direct support to students through a regional and national program of scholarships.

Last July, the LACF board voted to establish a new \$10,000 national scholarship named in honour of Frederick Gage Todd, to be awarded for the first time 2020. This scholarship competition, open to Canadian LA students, will provide an extrasignificant recognition based upon merit.

This year, the foundation will award over \$14,500 in scholarships to students in programs extending from coast to coast. In the past three years, LACF has grown the scholarship program from two to 13 awards including one for each of the seven accredited LA programs in Canada, Behind the scenes, the board has been hard at work



The CSLA community has been a cornerstone of support for the many projects funded by LACF over its 30-year history. Make an annual contribution of \$100 or more to become an LACF member and join the growing number of people who share in LACF's vision for universally rich, resilient and sustainable landscapes for the betterment of humankind.

> LACF.CA/Donate now

Individuals and organizations with an interest in the benefits of making major gifts should contact LACF treasurer Peter Kreuk > lacf@dkl.bc.ca.

Visit lacf.ca to learn more.



05/

50 ANSD'ENSEIGNEMENT EN ARCHITECTURE DE PAYSAGE

À LA FACULTÉ DE L'AMÉNAGEMENT DE L'UNIVERSITÉ DE MONTRÉAL : VERS DE NOUVELLES APPROCHES

NICOLE VALOIS

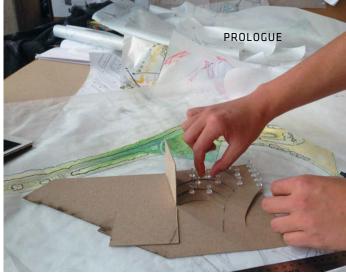
LE CONTEXTE DANS lequel furent créés la Faculté de l'aménagement de l'Université de Montréal et le programme en architecture de paysage en 1968 n'était pas tout à fait le même que celui d'aujourd'hui. C'était un temps où l'on pouvait créer des villes sans égards aux effets sur l'environnement. Un temps l'on exploitait sans fin les ressources naturelles pour créer des environnements adaptés aux nouveaux modes de vie moderne.

Ces souvenirs nous laissent aujourd'hui perplexes tant nous nous battons contre les modes d'exploitation que nous avons un jour valorisés. Nous cherchons un moyen de renverser la valeur et de parer aux bouleversements créés par l'augmentation des gaz à effet de serre généré par ce système.

Ralentir les conséquences des changements climatiques est devenu une préoccupation majeure pour tous ceux et celles qui ont à cœur tout système vivant et son milieu de vie. C'est aussi le devoir que s'impose un bon nombre d'enseignants en architecture de paysage de la Faculté de l'aménagement de Montréal, celui de pousser les étudiants à inventer, dans « l'agir », des solutions résilientes pour contrer les effets des changements climatiques.

Tel est le cas de l'atelier de maîtrise *Paysages de proximité* où les questions des changements climatiques « orientent le projet de manière importante ». Les étudiants sont invités à proposer concrètement des moyens de « limiter les facteurs contribuant au réchauffement et aux changements climatiques »¹. Également, l'échelle régionale traitée dans le quatrième atelier du baccalauréat est toute indiquée pour réfléchir aux changements climatiques puisque c'est à cette échelle « que sont prises les décisions les plus significatives pour l'avenir des paysages »². Traitées aussi dans les cours sur les végétaux, ces questions mènent à faire voir aux étudiants ce matériau de prédilection des architectes paysagistes comme étant utile pour la « gestion des eaux pluviales... [la] réduction des ilots de chaleur [la] restauration de sites perturbés ou contaminés »³. Les étudiants sont conscientisés aussi au « rôle que joue aujourd'hui la végétation pour inverser la tendance du changement climatique global.»⁴.

Ces approches menées par les enseignants en architecture de paysage rejoignent sans doute celles de nos collègues de la Faculté de l'aménagement et d'ailleurs au Canada et dans le monde. Les futurs architectes paysagistes et autres professionnels de l'aménagement font face à un grand défi. Nous avons espoir qu'ils sauront le relever, dans les limites de leurs champs de pratique, afin de réduire les effets néfastes sur la planète dus aux agissements du passé.



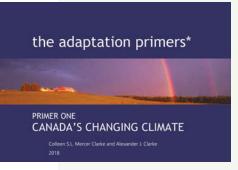


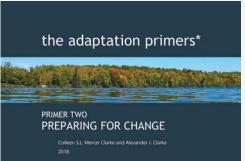


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- 3 plan du cours *Phytotechnologies : théorie et pratique*, de Danielle Dagenais).
- 4 plan du cours d'Écologie végétale : théorie et pratique, de Robert Kasisi).

Nicole Valois est professeure titulaire à l'École d'urbanisme et d'architecture de paysage de l'Université de Montréal et architecte paysagiste diplômée de l'École Nationale Supérieure d'Architecture de Paris La Villette et de l'Université de Montréal. Elle enseigne le patrimoine paysager et les ateliers urbains. Elle est présentement vice-présidente du Conseil du patrimoine de Montréal.





06/ THE ADAPTATION **PRIMERS**

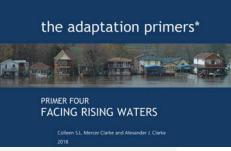
ALEXANDER CLARKE

Alexander Clarke is a researcher and educator who has been working in climate change adaptation policy and outreach for the past seven years, and in heritage planning and research for the past fifteen. Currently based in Ottawa, he's always seeking new opportunities and vantage points to get a new point of view on a subject.

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These Primers provide an introduction to the climate science, what it says for conditions in Canada and how professionals can integrate adaptation and mitigation measures into their practice.





ANTHROPOGENIC CLIMATE CHANGE is a

threat that humanity has created largely by accident, not design. Greenhouse gas emissions are a waste product, not a desired goal. For the most part, it's also a threat that has been created by hundreds of millions of people living their own lives, making small decisions that all contributed to the problem, just a little. And while that threat looms large, the most feasible solutions are going to work the same way; getting millions of people on-board to change their own practice and behaviour in ways that, rather than doing a little harm, make things a little better. For any individual, the needed changes to our lifestyle and practice are achievable, and collectively, they will make a difference.

For many professionals, the impending impacts of climate change may be clear, but the next question may not be as easy to answer; "So what can I do to help?" Adaptation and mitigation efforts are incredibly varied in nature, and new possibilities and alternatives are emerging rapidly. This means an already intimidatingly large body of knowledge is growing steadily. If you've come to the recognition that your practice needs to incorporate some measure of response, this can leave you with a learning curve that, from the base, looks more like a mountain. Where to start is unclear, and the top seems impossible to ever reach.

Like many things, however, as steep as that mountain may be, you can scale it one step at a time. And to help you with those first steps, the CSLA has produced a set of four Adaptation Primers for professional practice (www.csla-aapc.ca/primers). These Primers provide an introduction to the climate science, what it says for conditions in Canada and how professionals can integrate adaptation and mitigation measures into their practice. The goal is to provide those first steps, to introduce you to the known paths, and to show you how to climb that mountain.

The four Adaptation Primers will give you a solid grounding to build upon in your practice. Primer One provides a comprehensive introduction to the science behind climate change. Primer Two focuses on framing policy and planning approaches to adaptation. Primer Three gives an overview of building resilient, healthy communities. Primer Four is focused on adapting to the threats posed by rising waters. This separation, and the further chapter breakdowns within each volume, will let you break these concepts down and focus on the material you find most engaging and critical for your own practice. There's a lot of work that needs to get done in this pursuit. But with the Adaptation Primers, each of us should have the tools required to get it done.

www.csla-aapc.ca/primers





MTL Collection Winner of a 2018 Good Design Award

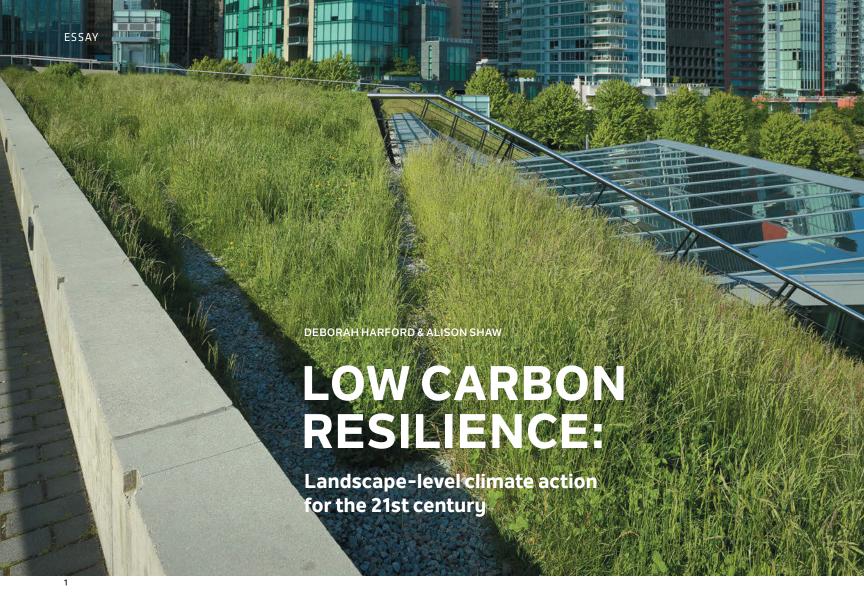
Design by Dikini



DESIGN DURABILITY

EXPERTISE





>FR_LP+ RÉSILIENCE ET SOBRIÉTÉ EN CARBONE : ACTION CLIMATIQUE AU NIVEAU DU PAYSAGE POUR LE XXIE SIÈCLE

Les scientifiques internationaux avertissent depuis des décennies que si nous ne réduisons pas fortement nos émissions, les impacts seront catastrophiques et ingérables; ces avertissements sont maintenant diffusés dans les pays et les communautés à travers la planète.

What Is It?

The recently released IPCC SR15 report is unequivocal: we are beginning to experience the impacts of climate change, and it will take "rapid, far reaching and unprecedented changes in all aspects of society" to keep these changes below a threshold of 1.5°C globally. International scientists have warned for decades that if we don't aggressively reduce our emissions, the impacts will be catastrophic and unmanageable; these warnings are now playing out in countries and communities across the planet.

The impacts, such as wildfires and floods, are already costing homeowners, businesses and our economy billions and contributing to food and water insecurity, health and property risks, business continuity and economic impacts. Historical standards are no longer adequate to inform the planning and development of our communities and economies. Even if we, as a global community, reduce our emissions

to zero immediately, these impacts will continue to be felt. We have committed to some level of global warming due to the long life of carbon dioxide and other greenhouse gases in the atmosphere. Sea level rise is locked in for centuries due to heat stored in the oceans and system inertia. The global disruption caused by climate change now and into the future requires unprecedented levels of response, including strongly targeted efforts to reduce both emissions and vulnerability to climate impacts at all levels of society.

It is paramount that we reduce emissions as fast as possible – if we continue at current levels, the impacts of climate change will accelerate to such catastrophic levels that there will be no possibility for us to adapt to them in a meaningful way. In Canada, our communities and economies contribute to emissions from industrial, energy, housing and transportation sources, and are exposed to increasingly frequent and severe climate change impacts.

PHOTO 1 @ISTOCK.COM/MAXVIS 2 @ISTOCK.COM/WOLV

Integrated Approaches

We must develop and mobilize practical approaches designed to accelerate low carbon, high resilience decision-making throughout all aspects of governance, business and community development. Both emissions reduction ("mitigation") and responses designed to build resilience to climate change impacts ("adaptation") seek to avoid the potential damages of climate change, and both aim to support sustainable development; yet since the two responses emerged in the 1980s, they have largely been pursued as separate streams of action. It is becoming increasingly clear that there are benefits to integrating them, and risks to proceeding in the current siloes. For instance, some adaptation responses to climate change-driven extreme heat and flood events, such as air conditioning and hard infrastructure planning, can be emissions-intensive. Likewise, designing energy-efficient infrastructure where it may be impacted in floodplains, or without taking future heat conditions into account, will nullify and possibly reverse the benefits.

Ensuring the two streams of action are coordinated and cross-evaluated will help to avoid risks and unintended consequences. This requires development of understanding of existing adaptation and mitigation processes and strategic integration of their various stages within all policy, planning and practice areas, both to ensure they do not counteract one another but also to begin to identify transformative approaches that achieve both.



As Cohen and Waddell's figure below indicates, finding sunergies and co-benefits between adaptation and mitigation by taking action that moves us into the top right quadrant (SAM) reduces the potential for conflict between these approaches and helps to advance climate-proofed, sustainable decision-making (Figure 1). If we are to take rapid and far-reaching action to curb the effects of climate change, we must develop this "SAM" approach in an integrated "Low Carbon Resilience" (LCR) lens to guide decision-making.

Differences in the temporal and spatial dimensions of mitigation (global/current) and adaptation (local/future) have been a barrier to this type of integration; so, too, have the different institutional mandates, agencies, funding sources, professional skills and tools associated with each approach. Emerging research and best practices are demonstrating ways that integrated climate action planning, using an LCR lens, can climate-proof business and governance decisions while saving time and resources. This integrated approach

has the potential to expand returns on investment, streamlining resources to achieve multiple goals while generating multiplier benefits and co-benefits related to economic, environmental, social, and health developments into the future.

> ...if we continue at current levels, the impacts of climate change will accelerate to such catastrophic levels that there will be no possibility for us to adapt to them in a meaningful way.

Adaptive Emissions

e.g. Expanded use of air conditioning; construction of sea walls

Emissions Increased

Unsustainability

e.g. Rapid deforestation for land use change (agriculture, mining, etc)

Vulnerability Increased

Vulnerability Reduced

e.g. Drought preparedness through demand side management; expanded application of recycling and conservation principles

Emissions Reduced

New Vulnerabilities

e.g. Switch from fossil fuels to expanded large hydro development

FIGURE 1: SUSTAINABILITY, ADAPTATION, MITIGATION (SAM) (COHEN AND WADDELL, 2009)

Why is it important?

Current institutional systems and decisionmaking processes have not yet been updated for the 21st century context, in which climate change is both a daily reality and a crisis that requires urgent action. A prescient opportunity exists in every sector and community across Canada, especially under significant forthcoming infrastructure investment, to streamline mitigation and adaptation efforts, ensuring integrated decision-making that increases cost effectiveness and long-term resilience and ratchets up environmental, social, health and economic benefits.

Professional decisions made today will determine which communities and projects achieve LCR. To this end, there is a significant need for professional practitioners to address integrated climate action in best practices. Due to their prominent roles in many aspects of the development and management of resources, ecosystems and communities, there is a pressing responsibility to advance professional ethics, awareness, practices and policies on LCR. It is encouraging to see that LCR-based measures are already emerging across diverse contexts and sectors, such as the recent launch of the International Federation of Landscape Architects' Global Accord on climate action, national advances from Canada's planners and guidelines from Engineers Canada suggesting that practitioners should consider project emissions and climate vulnerability. Integrated climate action measures are being considered for tools such as BC's Energy Step Code and in climate planning by the health and education sectors.

Climate change also poses significant risks to most professional reliance models. In order to maintain legitimacy, many sectors are recognizing the need to include climate change as part of training and practitioner models and in consulting services. Developing new standards and training that ensure LCR is embedded in all projects will help to climate-proof communities and businesses and ratchet up the potential for sustainable development.

How Can We Apply It?

LCR can be strategically applied at all levels of community development, from official community plans and regional growth strategies, to urban heat and stormwater management, to land and water use planning, to community-wide and building-level asset management.



3

How we manage and use land, water and natural places in urban, agricultural and resource sectors will play a prominent role in the development of transformative approaches. Consideration of how we protect and restore ecosystems is central to the LCR approach. The recent IPCC report identifies large-scale ecosystem restoration as one pathway to emissions reductions through carbon sequestration. Adaptation experts are increasingly turning to protection and restoration of natural assets such as parks, forests, foreshores and wetlands as ways to reduce flooding and extreme heat. This includes microlevel approaches such as raingardens, bio-swales, and the de-channelization and restoration of urban watersheds. Living shorelines and foreshore nourishment are emerging as important coastal resilience approaches.

Such local scale ecosystem protection and restoration can contribute to large scale regional ecosystem health; it also promotes co-benefits such as cultural and spiritual values, recreational and health benefits, and improved property values, and has lower operating and replacement costs than traditional grey infrastructure. In addition, it offers benefits for biodiversity through

increases in green corridors in urban areas, contributing to regional connectivity. "Green infrastructure" contributes to carbon sequestration and is less emissions-intensive than grey infrastructure; it also reduces the need for emissions-intensive processes such as storm-water pumping and filtration during floods and air conditioning during heatwaves.

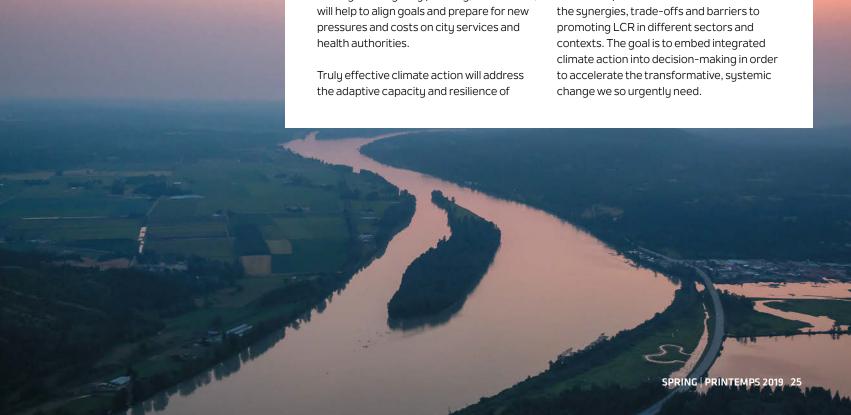
The storm-water management services provided by wetlands, watersheds, riparian areas and foreshores would be costly to replicate, yet have traditionally been undervalued. The financial and insurance sectors are in the initial stages of accounting for and developing approaches that acknowledge such services. For instance, the Municipal Natural Assets Initiative is spearheading green infrastructure accounting as a tool that acknowledges these services in the context of capital assets, and insurers are developing incentives to protect, rather than pave, ecosystems such as wetlands, recognizing the increased risks associated with zoning and building in riparian and floodplain areas.

Making the connection between ecosystem health and climate action is particularly timely given the rapidly unfolding

3 ©ISTOCK.COM/IANCHRISGRAHAM 4 ©ISTOCK.COM/EDB3_16 We have to show people why acting on climate is good for health, for security, for the economy, for the youth, for other species and even for world peace. biodiversity crisis and the extreme urgency to rein in the impact development and climate change are having on other species. Green spaces and connectivity are paramount to ensuring genetic diversity as well as the capacity for species to migrate and shift ranges as climate change pushes the boundaries of eco-zones. LCR provides a lens from which to integrate this thinking into urban planning as cities expand – especially as projections suggest that we will triple the presence of urban infrastructure globally by 2050.

All these approaches converge in the community context, where few resources yet exist to advance integrated climate action. Many municipalities are doing their best to tackle climate action imperatives but are operating in institutional and professional silos. The LCR approach offers ways to streamline and integrate climate action while saving time and money and making it a priority among staff rather than a competing demand. Communities can get ahead on climate action through increased collaboration across departments and disciplines and co-creation of climate solutions that can be mainstreamed throughout planning and operations. Integrating climate efforts with asset management, land-use planning, and strategic emergency planning, for instance, society's most vulnerable. Advancing equity and social justice in the development of climate solutions is imperative. Knowledge is most effective when it is developed with those who are, or will be, most affected, both by impacts and solutions, rather than through using data that is simply downloaded. Integrated climate solutions must include accountability on who benefits, both now and over time. Moreover, we need to accelerate learning about ways to work with other worldviews, including Indigenous knowledge. We have to show people why acting on climate is good for health, for security, for the economy, for the youth, for other species and even for world peace. To do this, we must engage faith communities, the youth and others who are not typically at the table to consider the importance of shifting toward LCR in our stories, mandates and decision-making.

In the 21st century, all policy, planning and decision-making, whether political or personal, have to be made through a low-carbon resilience lens. Identifying ways that reductions in both climate vulnerability and emissions can become integrated into decision-making in all orders of government, the private sector and civil society organizations is key. We are beginning this work with professionals and municipalities to better understand the synergies, trade-offs and barriers to promoting LCR in different sectors and contexts. The goal is to embed integrated climate action into decision-making in orde to accelerate the transformative, systemic change we so urgently need.





MARTHA SCHWARTZ

in conversation with Colleen Mercer Clarke

TAKING ACTION ON CLIMATE: BRINGING THE EARTH SYSTEMS BACK INTO BALANCE

Martha Schwartz. FASLA. Hon FRIBA. Hon RDI, is a landscape architect and artist with over 35 years experience on a wide variety of projects located around the world. Her firm Martha Schwartz Partners' approach to design integrates art and climate change adaptation and mitigation through integration of landscape-based technologies and ecology to address climate changes in the urban environment. Characterized by striking and highly colourful projects such as the Grand Canal Square in Dublin, Ireland, the firm's other work includes naturalistic projects such as Yorkville Park in Toronto and the Geraldton Tailings Landscape in Northwestern Ontario.

Colleen Mercer Clarke spoke recently with Martha about their shared passion for innovative approaches to planning and design for a changing climate.

>FR_LP+ AGIR SUR LE CLIMAT : RÉÉQUILIBRER LES SYSTÈMES TERRESTRES

Colleen Mercer Clarke s'est récemment entretenue avec Martha au sujet de leur passion commune pour les approches novatrices en matière de planification et de conception pour un climat en évolution.

COLLEEN MERCER CLARKE (CMC):

When did climate change become an issue for you – become your fight?

MARTHA SCHWARTZ (MS): It was in 2016. My sister sent me a YouTube video of a scientist named Professor Peter Wadhams at Cambridge University. He is a professor of Oceans Physics, he studies arctic ice. He made a very powerful presentation about how the permafrost was melting on the Eastern Siberian Arctic Shelf and the danger because the methane, which is 28 times more powerful a greenhouse gas than carbon dioxide, was being released and could create feedback loops. I was in shock. This was very serious and happening very fast. I felt very tasked about this - what could I DO? I called up Dr. Wadhams and introduced myself – I am a landscape architect, I would like to help - I felt so small and irrelevant and I needed to do something – to be part of something that was helpful and relevant. So that kind of started things.

CMC: How did that evolve into your work on climate adaptation?

MS: I started working with Edith Katz still working with her - on issues related to geo-engineering initiatives that may help us - not so much save the earth as save the humans. We dove into the whole topic - reading and researching and sharing links. We decided to go after a \$100-million MacArthur Foundation grant - working with the Landscape Architecture Foundation (LAF, www.lafoundation.org). Edith and I crafted the mission - to run a four-year campaign to communicate climate change to regular people in a way they could understand it. This is what landscape architects can do – we can be climate communicators. To generate trust. To explain the ecology in plain-speak and through visual communication. We put together an amazing team - 20 or more scientists headed by David Axelrod – to make the stories about what the world could be - positive or negative. We didn't win, but we learned a lot!

CMC: So, what came next?

MS: Well, for the last two years I have continued to involve myself in learning

what scientists are discovering, what they are thinking, what the time frame is for action, for impact. How scientists think we can bring the earth's systems back into balance. Because it's very clear that we may not be able to reverse this process using the conventional thinking – renewable energy, carbon taxes. It might take 50 to 100 years for cultures to really evolve into another energy culture and most of the commitments made by countries in the Paris Accord are not being met.

CMC: Is there one issue, one concern related to climate change that challenges you, that really touches your heart?

MS: What gets to me is not having a world that is habitable for my children. That gets to me. It breaks my heart. I feel that I have failed them. It really, truly does. I at least want to try — to make it right for them and for other people's children. I am a humanist. I believe that we can do good things.

CMC: Why do you think landscape architects could be leaders in this major, worldwide collective endeavour – one of the largest since the Second World War – to reduce emissions, to prepare for disasters, to plan for the future?

MS: That's a really good question. It has taken me a long time to even articulate why we would be naturals to do this. But I have gradually become more and more aware of what it is we can do. Our ability to communicate is paramount. Our job is to imagine things that aren't there, that aren't real, that haven't been created yet. It's our ability to communicate - to convince people that what we are doing will be beneficial, will solve their problems, will enhance the environment. We illustrate, we make models. We get people to trust us, to feel comfortable with our knowledge, our vision. The spaces that we activate are social. We integrate a lot of complex information and knowledge. We deal with politics, economics, how natural systems work. Our ideas can be fun, they can tell a story. We can respond to different cultures so they feel comfortable. Our work is often greater than the sum of its parts.

CMC: What is the relationship between landscape architecture and science?

MS: I have always been interested in science. I actually did a double major at art school that included a full pre-med program. I continue to be interested in science, but I am also a humanist. I think that what we do as artists is the flower of humanity. And that this inventiveness, this creativity, is a gift of both the artist and the scientist.

We should have more training in science as a profession, we are rooted in ecology. If you are studying ecosystems - and now, we must expand to earth systems this must be understood through science. If you understand the ecology of your landscape, you understand science. You don't need to be a scientist - you can be an educated, non-specialist. We now live in a world where there exists the profession of "Science Communicators" where the science is broken down for us. Our job is to understand, to leverage our own voice, to attach this knowledge to other parts, and to communicate what is relevant to others. But we also need to challenge ourselves. How do we find the right people to build teams and organizations and approaches that allow us to collaborate on all the needed pieces? We do this as landscape architects. We do it all the time.

CMC: How can landscape architects advocate for change?

MS: I think that we all have to take into account the urgency of the situation, because if we don't, we will miss the boat. I believe landscape architecture should be leading the built environment professions in terms of addressing and educating others about climate change. In order to best leverage ourselves, as we are a small profession, we all need to be connected. Our connections help us know more. More brains are better than one brain. We have to get the message out - that we must live within the boundaries of what the earth can support – this is a really important message. We have to educate.

CMC: How are you addressing this in your own work, your teaching?

MS: Climate change has not, unfortunately, become a big topic in the school where I teach. It is not being met head-on. There are interesting places, like MIT, where urban design, architecture, science and technology are coming together in design and research. We must use our drive, ambition and skill sets to find solutions. Solutions are needed.

"Everyone talks about technology and forgets about ecology, because ecology is not SEXY nor is it a commodity."

So I think climate change is the basic problem to be solved. For three years, in my own classes at Harvard, I have made climate change a core element of my teaching. I am really interested in moving the profession beyond resilience and adaptation to think about mitigation. We need to bump up in scale and understand what we can do to go to the causes of climate change. As humans, we can only adapt to so much, but if we do not address the fundamental causes, we simply will cease to exist. When you take a hard look at the fundamental challenge for climate change – reduction of greenhouse gas emissions – the scale for action changes dramatically. While planting street trees is a great thing to do, by itself it won't offset the carbon dioxide that a city emits. To make a big change in that number, we have to think bigger – ideas that I have been working with my students is to remove 30 to 50 per cent of the roads, or half of every street - as transportation modes change, such as to AVs, and in this "found" space within the public realm of a city, we could plant linear urban forests.

Forests in the city provide so many co-benefits such as stormwater management, shading houses and reducing energy needs, increasing human amenities, reducing emissions, cleaning air and water, and providing new ecosystems for plants and animals. In four Boston-area townships the class hypothetically planted four million trees and then developed and assessed the metrics that proved the benefits the forests brought. I am really interested in ideas that are a combination of ecology and technology. Everyone talks about technology and forgets about ecology, because ecology is not SEXY nor is it a commodity. But it is a fundamental truth that we have ignored the importance and relevance of functioning ecology, and this is at our peril. There is no way that technology can recreate Earth Systems. We cannot yet model up cloud behaviour.

In another project, we did a studio on North Adams, the smallest and poorest city in Western Massachusetts. But it has the largest art museum in the state. What might it look like in 2050 with changes in precipitation, drought, altered agriculture, migration? Taking a look at what MIGHT be possible – re-imagining the community to include integration of natural systems, and creative responses to climate change that could grow new economies.

Working with Edith Katz next term we are going to run a seminar about new technologies, such as geo-engineering, related institutions and scientists – to actually map out where all this highly controversial but extremely interesting work is happening. I am using these studios to teach students. But I am using them to teach me to. I am really energized. It's been very exciting.

CMC: Why do you think, while continuing to reduce emissions, society needs to look at other measures to limit global warming?

MS: We are in a revolution right now – the post-industrial revolution. The big-ticket task in front of us is to figure out how to draw down carbon dioxide from the atmosphere. The scientists know this.

There are so many different ideas that are coming out. Some don't work, but some are becoming more real. That is the geo-engineering part of things. But we have 10 years left to reduce global warming. We need new ideas and new technologies to help us solve that problem. To shift the world to a new reality. When you think about all the changes happening in society, about how our lives will change with robotics, with medicine, bioengineering, with new approaches to transportation. It is amazing what is being invented today. It's like a continuing science fiction story.

So it is not only okay to be speculative, we MUST be looking into a future that is extremely uncertain. Because it's not business as usual anymore. We need to explore the possible. The things that have yet to be thought of or created.

CMC: Have you ever wished you lived in a different time?

MS: The beauty of today's world is that you don't have to know everything. What an amazing world we do live in. You can look up what you need on the internet. You have immediate access to knowledge. And every time you look for something, it's really fluid, because there is another path to even more information, to things you had not even been considering. I love that we are learning so much. But it's a double-edged sword. In addition to getting smarter, we haven't evolved enough. We are still quite primitive in many ways – we are, after all, animals. We still do stupid, unethical things. We invent stuff before we have figured out what we are going to do with it. This is the scary part.

Look at the situation we are in now. We invented machinery, and built a world dependent on oil, but that isn't working out for us so well. We wouldn't be here – meaning that people are wealthier, live better and longer lives – without the industrial age, but we didn't figure out the problems fast enough. Even now when we know we have to fix this, people are still resistant to change, to weaning off oil. Climate change will affect everyone, and living on Mars is not a credible solution, at least not for me and for billions of others.

CMC: If you had a single message for young landscape architects what would it he?

MS: When you feel that you are doing something positive, given where we are, it makes you feel so much better. We must become activists and it only takes one person to start something. Just beginning something can take you places you may not have envisioned, but it's those first steps that are important to take.

CMC: What is your vision of the future?

MS: We are in a fast-forward evolutionary moment. Everything is going to change so quickly. I think that we will make it. I think that we will figure it out. I have a lot more hope now than I did last month. But all of us have to work collectively to do as much as we can. We need to think about how landscape architects can broaden their professional scope, open their minds. But we have to do it both as individuals as well as collectively, to reach out to learn from others, and take emerging ideas even further. It's up to everyone to take on responsibility. In 1966 we took on the obligation of being the stewards of the landscape. In 2018, we must become the stewards of the earth systems. We must think bigger, broader and more boldly.

"When you feel that you are doing something positive, given where we are, it makes you feel so much better. We must become activists and it only takes one person to start something."



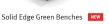


STREETLIFE is a design driven label for the outdoor concept. The Collection consists of the following categories: Benches, Picnic Sets, Tree Planters, Tree Grilles & Guards, Bicycle Parking, Bollards, Shades, Parklets, Bridges & Decking. Go to www.streetlifeamerica.com for our complete collection, more information and your requests.













Cliffhanger Park Benches



How the Urban Ecosystem Contributes to Mitigating Climate Change in Canada's Largest City

The Same

JANE WELSH

>FR_LP+ DÉMONTÉ, BRANCHÉ ET DIVERSIFIÉ

surprisingly, For A dynamically growing city of 2.9 million, Toronto has a robust and extensive natural ecosystem. In Robert Burley's book, An Enduring Wilderness, the evolving and haunting beauty of Toronto's natural spaces in the ravines and waterfront that make up 17 per cent of Toronto's land base and the heart of Toronto's natural ecosystem are documented through a series of photographs and essays. These, together with an extensive system of parks and open spaces, tableland forests, street trees, back yards and even green roofs give Toronto its identity as a city within a park.

This system adds immeasurable beauty and liveability to the city, contributes to the health and wellbeing of residents, cleans the air and consumes and moves stormwater. The urban ecosystem and all its component parts contribute in a critical way to mitigating climate change through carbon sequestration and reduction of GHG emissions.

Landscape architects in both the public and private sectors have a significant role to play in ensuring that the natural ecosystem in Toronto was and is protected, restored and enhanced through strategic planning and foresight, regulations and policy, master plans, stewardship and sensitive design.

1 CITY SKYLINE WITH FOREST 2 CROTHERS WOODS TRAIL MANAGEMENT STRATEGY IMPLEMENTATION 3 ANALYSIS OF VEGETATION (WALLACE MCHARG ROBERTS 6 TODD, 1976)
4, 5 RESTORATION OF KIMBARK COLDSTREAM RAVINE SLOPE BEFORE (2005) AND AFTER (2011)
PHOTOS 1 CITY OF TORONTO 2 MATT FORSYTHE 3 WALLACE MCHARG ROBERTS 6 TODD 4,5 RUTHANNE HENRY, OALA

"The urban ecosystem and all its component parts contribute in a critical way to mitigating climate change through carbon sequestration and reduction of GHG emissions."

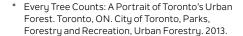


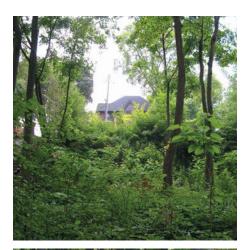
Carbon Sequestration And Reducing Ghg Emissions

Toronto's natural ecosystem – forests, woodlands, street trees, wetlands, meadows and gardens all contribute to climate mitigation through carbon sequestration and storage of greenhouse gases. The ravine system is about 11,000 hectares, an urban forest of 10.2 million trees.

The recent report Ecosystem Service Values of the City of Toronto Ravine System (Green Analytics, 2018) estimates that ravine forests sequester 48,382 CO₂e (tonnes) annually. [Note: CO₃e means carbon dioxide equivalent, which describes different greenhouse gases in a common unit; the term signifies the amount of CO, that would have the equivalent global warming impact.] It also estimates that ravine wetlands, meadows and successional areas sequester an additional 4,941 CO₃e annually. The total amount sequestered for all land cover types is estimated to be 14,542 tonnes of carbon each year for an estimated value of \$2.4 million annually.

While ecosystem values for the entire urban natural system have not been measured, Toronto's 2013 study "Every Tree Counts"* indicated that Toronto's 10.2 million trees store an estimated 1.1 million metric tonnes of carbon and remove about 46,700 metric tonnes of carbon per year. The urban forest also reduces energy use from heating and cooling of residential buildings by shading buildings, providing evaporative cooling and blocking winter winds. This is estimated to reduce energy use by 41,200 MWH, which reduces the amount of carbon released by fossilfuel-based power plants, representing a reduction of 17,000 metric tonnes of carbon emissions for a value of \$10.2 million per year (City of Toronto Urban Forestry 2013). The reports estimate that about .6 million (6 per cent of urban forest) are street trees, 3.5 million (34 per cent) are trees in City parks and natural areas, and about 6.1 million (60 per cent) are growing on private property.







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Land cover type	Area (ha)	Carbon sequestration Rate (tonnes)	CO ₂ e (tonnes)	Social value (\$ per tonne)	Estimated Value (\$ Millions)
Forest	4,431	13,194	48,382	\$44.67	\$2.16
Wetlands	209	711	2,606	\$44.67	\$0.12
Meadow	748	374	1,371	\$44.67	\$0.06
Successional	526	263	964	\$44.67	\$0.04
Total	5,914	14,542	53,324	\$44.67	\$2.38

FIGURE 1: CARBON SEQUESTRATION, ANNUAL VALUES BY LAND COVER TYPE IN TORONTO'S RAVINE SYSTEM (GREEN ANALYTICS, 2018)

Unit	Heating	Cooling	Total Energy Savings (Heating & Cooling)	Total \$ Savings (Heating & Cooling)
Million British Thermal Units (and equivalent \$ value)	749,900 MBTU (\$6.5 million)	n/a	749,000 MBTU	\$6,502,000
Megawatt-hour (and equivalent \$ value)	6,400 MWH (\$0.5 million)	34,800 (\$2.7 million)	41,200 MWH	\$3,208,000
Metric tonnes of carbon avoided (and equivalent \$ value)	12,500 metric tonnes (\$12,500)	4,500 (\$127,200)	17,000 metric tonnes	\$483,600

FIGURE 2: ANNUAL ENERGY SAVINGS RESULTING FROM TREES NEAR SPACE-CONDITIONED BUILDINGS (CITY OF TORONTO, EVERY TREE COUNTS, 2013)

Green Roofs

There are approximately 700 green roofs in Toronto, and this number grows by about 100 new green roofs a year under requirements of the Green Roof Bylaw for new development and voluntary green roofs incented through the Eco Roof Incentive program. Green roofs, which consist of growing medium and vegetation, contribute to climate change mitigation through carbon storage, energy efficiency and reduced urban heat island impact.

A green roof can sequester $0.4 \, \mathrm{kg} \, \mathrm{CO_2}$ e per $\mathrm{m^2}$ (City of Toronto, Transform TO, 2017) and are estimated to reduce greenhouse gas emissions by an average of 50.4 tonnes annually. They also can reduce the energy required (primarily for air conditioning) by an average 3,094,770 KW hours per year (City of Toronto, Eco-roof report to Planning and Growth Management Committee, 2016).

Carbon storage and sequestration by tree size class

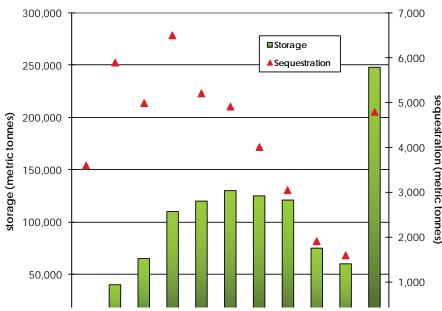


FIGURE 3: CARBON STORAGE AND SEQUESTRATION BY TREE SIZE CLASS



Green roofs are also known to reduce urban heat island effect (a term that refers to when concrete and non-porous surfaces lock in heat in urban areas). Widespread implementation of green roofs can reduce local ambient air temperature 1.5 to 2°C, and the surface temperature of a green roof can be 4 to 5°C cooler than the surrounding area (MacIvor et al, 2016).

Strategic Foresight

The existence of Toronto's natural ecosystem is the result of a number of factors, but most importantly the 1943 Master Plan for the City of Toronto and

6 GREEN ROOF ON TORONTO CITY HALL **7** COMMUNITY PLANTING WITH TORONTO NATURAL ENVIRONMENT AND COMMUNITY ENGAGMENT, MARIE CURTIS PARK **PHOTOS 6** CITY OF TORONTO **7** MATT FORSYTHE



its Environs (City of Toronto, Enduring Wilderness 2017), which laid out an inner green belt and the need for conservation of the Niagara escarpment and Oak Ridges Moraine, as well as Metropolitan Toronto's Planning Board's 1954 recommendations to establish a 2,700 hectare park system based on the major river valleys. At the time, 40 per cent of the of the system was vulnerable to urban development and Metro Council authorized creation of an acquisition fund and directed preparation of an Official Plan to address the river valleys and Toronto Island. In 1954, Parks Commissioner Tommy Thompson stated, with foresight, that the tempo of modern living and density of our population make it essential that nature be preserved in those areas where it still exists. The focus on

understanding and protecting the natural ecosystem was also carefully addressed in the 1976 report Environmental Resources of the Toronto Central Waterfront, prepared by landscape architects Anne Whiston Spirn and Narendra Juneja (Wallace McHarg Roberts & Todd) to "ensure that environment concern be given at least as much due as social, political and economic concerns" (WMRT report 1976).

Landscape Architects At The Forefront

Landscape architects have been at the forefront of protecting, enhancing and restoring Toronto's natural ecosystem, leading or co-leading development and implementation of regulations, policies, strategies, master plans, stewardship programs and sensitive designs.

Toronto's Ravine Strategy, which laid out a series of strategic actions (to guide future ravine management to achieve a healthy, accessible and vibrant ravine system under the themes of protect, invest, connect, partner and celebrate), was co-led by CSLA member Garth Armour and Jane Welsh. Garth spent most of his municipal career enhancing and restoring the natural systems in the ravines – through leading sensitive design and construction of trails and master planning initiatives as supervisor of the Natural Environment and Community Programs group in the Urban Forestry Renewal section of Parks, Forestry and Recreation.



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Toronto Urban Forest Canopy

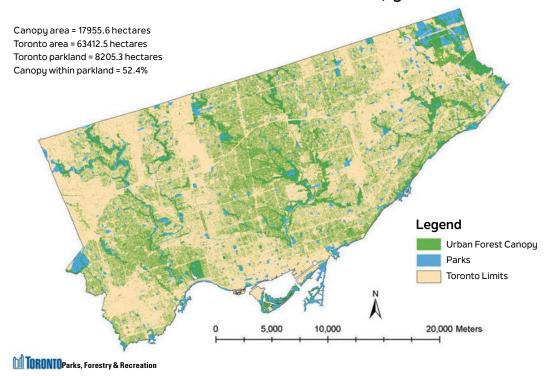


FIGURE 4: TORONTO'S URBAN FOREST CANOPY IMAGE CITY OF TORONTO

The Natural Environment and Community group, consisting of landscape architects, foresters and planners, designs and implements complex ecological restoration projects using an ecosystem approach and works with local stewardship groups to foster engagement and implement these projects. The work includes the Crothers Woods Trail Management Strategy, which won the 2011 CSLA regional honour for landscape management for its sensitive design for recreational use while preserving and restoring the site's ecology (the Planning Partnership, 2007) and the Lower Don Trail Access, Environment + Art Master Plan (DTAH 2013), which won the 2014 CSLA Regional Honour and Toronto's Urban Design Award of Merit 2015.

The first Ravine Protection Bylaw for the newly amalgamated City of Toronto was co-led by a landscape architect, and landscape architect Norman DeFrage, Supervisor Ravine and Natural Features Protection, ensured its implementation. Norman, described in an ASLA Landscape Architecture magazine article (December 2015) as Toronto's "Ravine Keeper," was also responsible for the restoration of many of the city's ravine forests.

Landscape architects in the Capital Projects section of the Parks, Forestry and Recreation division are also responsible for ensuring sensitive trail design and restoration in the City's ravines and green spaces, as per the Natural Environment Trail Strategy (LEES +Associates).

Expansion of the natural ecosystem in an urban area such as Toronto can be difficult and requires many tools to be successful in integrating nature - plants, shrubs trees and wetlands into the built form as well as ensuring its long term health. The Green Streets Technical Guidelines, completed by landscape architectural firm Schollen & Co. provides thorough technical guidelines for greening Toronto streets and rights of way.

Landscape architects have also led and co-led development of Toronto's Green Roof Bylaw, which has resulted in installation of over 700 green roofs in Toronto, and the new Biodiversity Strategy, which will ensure a robust and healthy natural ecosystem.

For a city of 2.9 million people, Toronto has a surprising quantity of natural areas that, together with its parks and open spaces, tableland forests, street trees, back yards and green roofs, contribute in a critical way to mitigating climate change through carbon sequestration and reduction of GHG emissions. As Toronto continues to grow, it is even more important that the quality and quantity of its urban ecosystem increases in order to mitigate future weather. The role of landscape architects in both the public and private sectors is crucial to ensuring that the natural ecosystem in Toronto is not just protected, but restored and enhanced through planning, regulations and policy, master plans, stewardship and most importantly sensitive design.



CLIMATE ATLAS Listening to the landscapes of the OF CANADA

landscapes of the future

IAN MAURO

>FR_LP+ ATLAS CLIMATIQUE DU CANADA: À L'ÉCOUTE DES PAYSAGES **DU FUTUR**

En avril 2018, notre équipe du Prairie Climate Centre, basée à l'Université de Winnipeg, a lancé l'Atlas climatique du Canada, qui est un outil de communication sur les changements climatiques de la prochaine génération entièrement interactif.

We hear about climate change a lot these days, but are we actually listening?

A cacophony of climate sounds – coastal erosion tumbling into the sea, glaciers cracking and calving, forest fires raging with intensity, and the sirens of emergency response – yet somehow this equates to silence for a vast majority. The floods, heat waves and hurricanes are now so frequent that, ironically, like crickets, the news of the climate crisis strangely yet steadily moves from the fore to the background of our senses and indeed our daily lives.

And, the world breaks another series of extreme heat and weather records.

The science – or at least the way it's communicated – doesn't help. We hear that the globe has warmed 1°C since industrialization and we're about to warm another if we don't accept a carbon tax and rein in our emissions. Many people will, for good reason, ask: "What do these numbers actually mean, and why should I care?" The data is meaningless for most, there's no story, it's unrelatable, and there's no way

for people to engage except by possibly wallowing in despair. Chirp, chirp, chirp, there go those damn crickets again.

We've decided to turn things on their head, ideally to help us all listen a little differently.

In April 2018, our team at the Prairie Climate Centre, based at the University of Winnipeg, launched the Climate Atlas of Canada (https://climateatlas.ca), which is a next generation and fully interactive climate change communication tool. The concept is simple: localize the data, make it meaningful and accessible and tell good stories. If you go to the website, you can visualize data for nearly 2,000 towns, cities and regions across Canada, and learn about climate change by topics such as cities, science, agriculture, forestry and planning. These topics include relevant maps, text and video documentaries from coast-to-coast to coast that contextualize the human dimension of climate change. It's an ambitious initiative that's trying to break through the silence.

So, what does the Climate Atlas of Canada say about the landscape of the future?

Well, if you click around the maps, you'll see that there's lots of changes projected, most notably the map turns deep red when looking at the number of +30°C days anticipated in the future, especially if we continue to voraciously emit greenhouse gases. The Prairies, Southern Ontario and parts of interior British Columbia will be on the forefront of extreme heat in this scenario. In a similar – high emission future - the loss of -30°C days across many parts of the Canadian North is truly astounding. Precipitation will change – depending on the time period, emission scenario and geography - but we're likely to see many parts of the country have an increase in both floods and droughts. And, for sure, the growing season and plant hardiness zones are going to change country-wide.



The Climate Atlas provides landscape architects and planners with a powerful and dynamic tool to envision, adapt and create landscapes of the future.

The Climate Atlas suggests we listen to the possible landscapes of the future.

We often say that "you can't adapt, unless you know what you're adapting to," and the Climate Atlas helps individuals, communities, governments, businesses and the professionals that support them begin to answer this question. Since the launch of the Atlas, we've been contacted by numerous landscape architects and planners saying "this is the tool we've been waiting for," and that has been music to our ears. Through our conversations, with organizations such as the Canadian Society of Landscape Architects (CSLA) and Canadian Institute of Planners (CIP) we've learned many things and have created new partnerships.

It's clear that landscape architects and planners are on the front lines of climate change.

Since landscape architects and planners are often designing communities and ecosystems that are meant to last decades or even centuries, they obviously have to have a long-term perspective, and associated data that backs this up. In the past, landscape architects and planners have used the "Canadian Climate Normals" to understand the climatic and microclimatic conditions affecting places and spaces. But, with our rapidly changing climate, the "normals" are no longer relevant. That is why we are working collaboratively with CSLA and CIP to develop tools for planners and designers and why we launched a planning topic on the Climate Atlas web site. The Climate Atlas provides landscape architects and planners with a powerful and dynamic tool to envision, adapt and create landscapes of the future.

Yes, another guidebook, but one we think is perhaps quite useful.

Addressing the risks associated with climate change is a daunting challenge, but it's also an opportunity to create new collaborations and build innovative solutions that can make resilience part of all aspects of Canadian life. On World Town Planning Day (November 8, 2018), the Prairie Climate Centre, CSLA and CIP launched a "guidebook" for the Atlas so that planning and design professionals have the climate information they need to design resilient natural and built environments. The guidebook provides an overview of the interactive features of the Atlas, including variables, maps, videos and graphs. Importantly, it also describes the basics of how to use these data to make practical and informed decisions. We've been carrying out workshops, we're making more videos and we're mobilizing this knowledge in various ways.

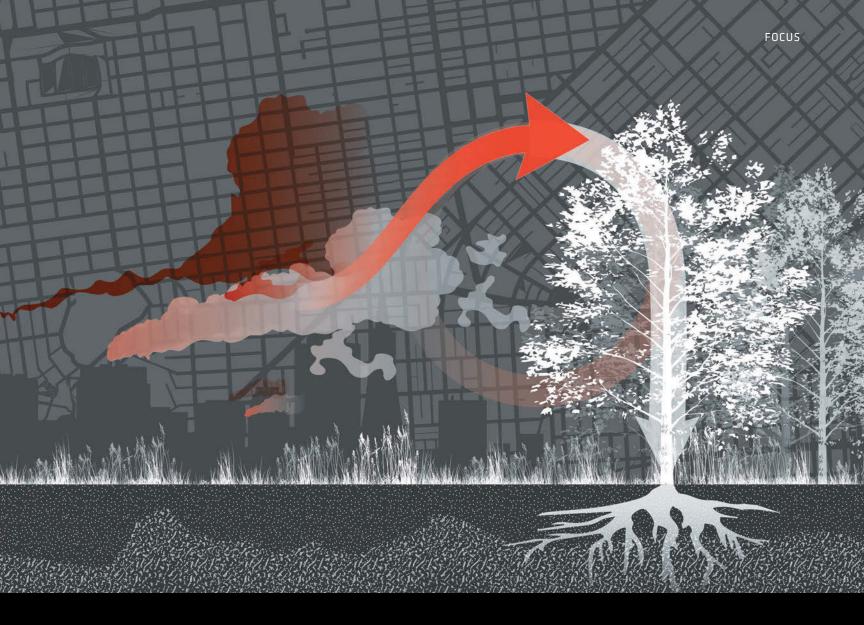
Listening to the land: Solutions on the wind

While the Atlas is in part designed for public education, it's also an advanced decision support tool, and suggests that we must radically reduce our use of fossil fuels while also preparing for the anticipated changes to our social and ecological systems. But, perhaps most remarkable, it showcases stories from the landscape of communities already finding solutions in their own backyards. From community wind and solar projects to landscape level interventions to protect communities from increased sea level and storm surges, people are working together to rise to the challenge of climate change. They're listening to the land and the message is abundantly clear: we have no other option but to act and act now.

A message of hope: Collaborations and the future of landscapes

The only thing we can be certain of is that "climate change is going to change everything." Around Canada and the world, cultural and ecological landscapes will be dramatically affected, and our spaces and places will have altered structure, function, and meaning. The trick is, we have to stay in tune with the land and ourselves — building collaborations based on science, professional skill, and community knowledge — which will give us the opportunity to listen anew and realign ourselves with the natural world and a livable future.





PAMELA CONRAD

LO!CARBON-CALCULATING

>FR_LP+ HALTE AU CARBONE!

Imagine a world where every person asks themselves not only, "What can I do to offset my carbon impacts?" but, more importantly, "What can I do to help solve climate change?" AT THE 2018 GLOBAL Climate Action Summit in San Francisco, one keynote speaker stated, "If you want to help out with climate change, you need only ask yourself two questions: 1) What kind of climate action is needed? and 2) what am I good at?" The recent Intergovernmental Panel on Climate Change (IPCC) report clearly identifies the actions needed to reduce our emissions and extract more greenhouse gases from the atmosphere in order to prevent the catastrophic 1.5 degree global temperature increase from happening by 2030. So, on to the second question — what are you good at?

One country leading the way in carbon emission reduction is the tiny country of Bhutan. With less than 800,000 inhabitants nestled in the eastern Himalaya mountain range, this small country (about the size of the state of Maryland) prioritizes a low carbon lifestyle – not an easy task for a developing country. Not only do they produce close to 100 per cent of their electricity from renewable hydropower resources, they also sequester (or extract) three times more carbon than they emit. The Bhutanese priorities are protecting the natural environment and supporting the health and happiness of their people, and it shows.

ALL IMAGES PAMELA CONRAD

As landscape architects, we have the unique ability to create spaces that bring people together, provide joy through community and biophilia, and, like Bhutan, can sequester more carbon than we emit. If we can better understand our projects' impacts – both in terms of carbon footprint reduction and increasing sequestration, landscape architects could set an example, like Bhutan, for other professions to follow. Can our projects sequester more carbon than they generate and contribute to solving the global carbon dilemma?

A few years ago, overwhelmed and exhausted by the news of the effects of climate change, I asked myself what I could do to help. Of course, as individuals we can make personal changes, but as I stared at the walls of my office, at CMG Landscape Architecture in San Francisco, covered by drawings of green sequestration machines, I started to wonder whether these projects could be the way to make the greatest positive change? Taking it a step further and beyond the walls of our office, what about all of the landscape architecture projects in the country? And in the world?

So, I did what anyone else would do and went online to find a magical tool to answer all of my questions. Unfortunately, for first time, an internet search didn't provide the instant gratification that I had become so accustomed to. You can download carbon calculating tools for architecture, but they can't handle the organic nuances specific to landscape materials. So, combining frustration with the determination of a

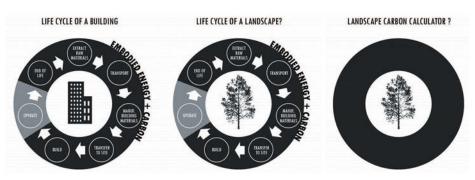


FIGURE 1 LANDSCAPE CARBON CALCULATOR

Missouri farm girl, I realized I was just going to have to make the damn thing.

Creating The Tool

So that's what I did. I began to develop a carbon calculator specific to landscape architecture. This tool factors the carbon sources from our work, the ongoing emissions or "costs" and the carbon sequestration rate over time that will ultimately calculate your project's Landscape Carbon Footprint. In the first beta version, I ran a handful of our projects at CMG through the calculator to see what we could learn from them. Although at first reluctant to share this new-found information developed, mind you, by a landscape architect, the results were too eye-opening not to share with others. I quickly found myself sharing at the 2017 World Design Summit in Montreal and the 2017/2018 ASLA Annual Conferences in Los Angeles and Philadelphia. And gratefully, I was awarded a 2018 Fellowship for Innovation and Leadership through the Landscape Architecture Foundation to further advance my research.

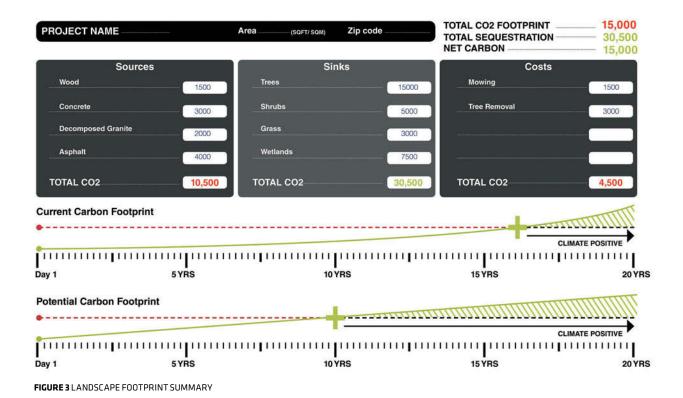
Through this grant, I solicited the help of an environmental consultant. Atelier Ten, to verify the metrics, confirm the findings and align this tool with industry standards. In the second beta version, the source embodied carbon values are confirmed and based on the values in the ATHENA Impact Estimator for Buildings. The carbon sink categories, where carbon is stored in trees and plants, have been expanded with increased region and plant classification specificity and are based US Forest Service data. I re-ran previously developed case study projects through the calculator to see what we could learn in addition to extracting new data to better understand what our impacts are as a global profession. Fortunately, only minor variations were present between versions and the findings can now be shared with greater certainty.

Initially I ran a variety of built projects through the tool – a garden, a park, a plaza and a streetscape – to better understand the carbon footprint variations between project types. Across the board were a number of changes that could have been made on those projects to significantly reduce the carbon footprint and increase sequestration. All without significantly changing the design or reducing the quality of the project.

LANDSCAPE CARBON CALCULATOR



FIGURE 2 LANDSCAPE CARBON FOOTPRINT



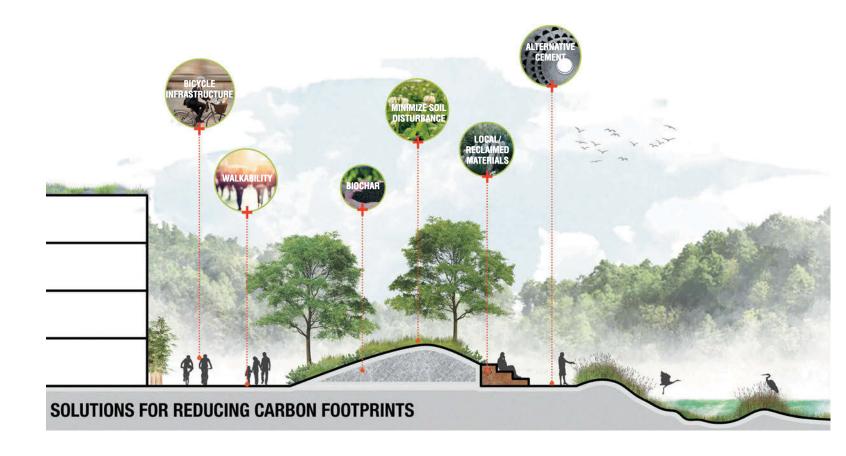
As landscape architects, we have the unique ability to create spaces that bring people together...

Design strategies to reduce landscape carbon footprints include:

- Reduce quantities of highly processed materials such as plastics, steel and concrete that have high embodied carbon values.
- Use more natural elements that have less embodied carbon – if wood, use reclaimed, or sustainably harvested.
- Use materials with recycled content where possible such as steel or aluminum.
- Use the maximum amount of cementitious substitutions (slag, flyash, silica fume) in concrete.
- Get creative to reduce materials in an attempt to "do more with less" – e.g., limit piping by using natural swales and permeable paving.
- Re-use wood from trees that are at end
 of life in site or building elements. Some
 20 per cent of the carbon sequestered
 from trees remains in the soil, but if
 the tree is mulched, 80 per cent of the
 carbon will decompose and be released
 back into the atmosphere. If the wood
 cannot be milled and re-used, consider
 collaborating with a Biochar facility to
 ensure the carbon in the wood is not
 released.
- Keep your site's carbon in the soil by minimizing excessive grading. More information is available through understanding regenerative farming practices.
- Request Environmental Produce
 Declarations (EPDs) for products that
 you specify. Product manufacturers
 need to provide the embodied carbon
 of their products so we can incorporate
 this into the overall project carbon
 footprint. The preferred format is the
 Environmental Product Declaration
 (EPD), a standardized report that uses
 the technique of life-cycle assessment
 (LCA) to quantitatively measure the
 environmental impacts of materials or
 products.

Design strategies to increase sequestration include:

 Plant as many trees and woody plants as you can – incorporate forests at any scale, even tiny ones can have a great impact. Areas with year-round growing seasons sequester significantly more than those with seasons where trees and plants go dormant, so those regions serve as great resources to sequester.



- Create and protect other carbon sinks.
 Coastal wetlands, such as mangroves,
 tidal marshes, and seagrasses can
 sequester up to five times the amount
 than tropical rain forests.
- Consider bamboo. Because it is a grass, the plant can store carbon in the soil for thousands of years.
- Incorporate green roofs that can sequester carbon and also reduce the energy needs in the floor below by 50 per cent.
- Select woody shrubs or no-mow varieties of grasses. Lawns are typically carbon emitters due to fertilizers used and intense maintenance.³
- On urban projects, "greening" is a challenge. Consider vertical vines/ gardens or rooftops.

Strategies For Different Project Stages

It is also worth noting that different carbon analysis strategies would be applied at different stages in the project to align with project opportunities and constraints. If your project is in the early stages, you will have the opportunity to design for and set goals to achieve a low carbon footprint, a high sequestration, and get to carbon

neutral in the shortest time possible. Typically, designing a project with a 30-40 per cent hardscape to 60-70 per cent softscape ratio will allow you to offset your footprint and sequester additional carbon within a 30-year duration.

Whereas if your project is already in the middle stages and the design framework cannot be changed in a substantial way, the best approach is to calculate the carbon footprint as drawn in order to target specific strategies to reduce the footprint through material replacement and planting area increases. And if your project is under construction, or already built, opportunity does exist to improve the carbon impacts through submittal substitutions or by providing an operations and maintenance manual that limits the use of fertilizers and gas-powered maintenance equipment.

By incorporating these strategies over the lifespan of the projects, from the case studies we begin to see that our sites could, on average, have 30 per cent smaller carbon footprints, double the sequestration, and achieve carbon neutrality in half of the time. If we, as a global profession of 75,000 landscape architects, are to make similar changes in all of the projects that we are estimated to build by 2050 – the projected year the Earth will hit the two-degree tipping point – we could make a significant positive contribution to preventing this catastrophic milestone from happening.

If we were to make these changes starting in 2020, the positive carbon removal potential of landscape architecture site design would equal .24 gigatons (GT) after subtracting our carbon footprints. This would place landscape architecture into the top 80 solutions listed in Paul Hawken's *Drawdown*, a recently published book that describes solutions to reduce greenhouse gas atmospheric concentrations on an annual basis. That number is specific to site design (exclusive of architecture), which conservatively includes a 20 per cent contingency to account for shipping, construction and site work. If we were to factor in other contributions that landscape architects make, including designing green roofs and more walkable/bikeable cities, our professional contributions would equal .62 GT and rank our contributions in the top 40 solutions.



...it is also the opportunity for us to unite as one...to ally in a collective goal to make the greatest contribution possible to the challenge of our lifetime.

To enable our profession to make this contribution, I will be making this resource available online in 2019. With this tool to measure, track and improve our carbon footprints, we will now for the first time be able to set goals for ourselves as a global profession which could also be incorporated into LEED or SITES. With this information on the horizon, it is also the opportunity for us to unite as one, regardless of organization or affiliation, to

ally in a collective goal to make the greatest contribution possible to the challenge of our lifetime. I welcome you to join me along with the rest of the environmental stewards of the earth to step up to what could be the greatest opportunity for the profession of landscape architecture in history.

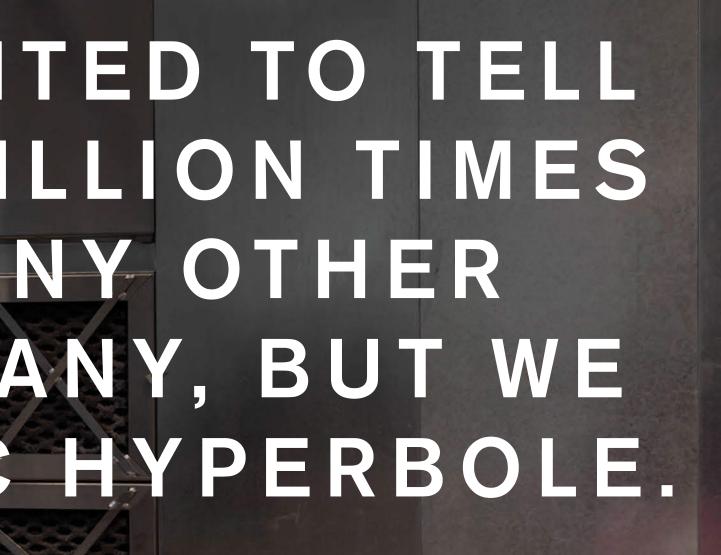
To receive notification of the calculator launch this June, please send an email to ClimatePositiveDesign@gmail.com.





CSLA Congress + BCSLA - CSLA Showcase 2019 in Vancouver, BC 2019 May 7-8, Booth 7 & 8





greentheorydesign.com

DANIEL LEEMING

THERE WILL
BE SOME
CHANGES IN THE
NEIGHBOURHOOD:

Disruptors and drivers of the next two decades



>FR_LP+ IL VAY AVOIR DU CHANGEMENT La génération actuelle et celles qui suivront sont confrontées à des changements de plus en plus difficiles à suivre.

MOST OF US understand that we live in an era of great change but most of us are not ready for the extent and comprehensiveness of that change. This and future generations face accelerating changes that will be difficult to keep up with and adapt to. Many people are going to realize that they have run out of choices; as a result, in many cases the first reaction will be denial and the endorsement of "push-back" policies until change has left them behind.

Change is not optional but inevitable, and the rate of change is increasing. This article will examine some of the disruptors and drivers of change that will affect not only how we design and build our cities but also the means by which we conduct our everyday lives.

Glass Half Full

There are many different perspectives on our current situation and any speculation about the critical issues to be faced in the next 20 to 30 years must be grounded in sound research and balanced and rational thinking. The glass half-full perspective, as set out in Steven Pinker's book *Enlightenment Now*, raises a number of key statistical considerations including:

- In general, people are living longer lives,
- On average we are healthier and better off than ever before,
- There is a pessimistic tendency to see only the worst imaginable outcome,

such as "immigration has disastrous results" and "crime and terrorism are everywhere."

These fears raise their own risks as they are easily manipulated by authoritarian leadership to further their own goals and to support reactionary ideologies. The consequences often involve massive pushbacks to what are rational and humanitarian goals. We are already witnessing this in Canada, the United States, throughout Europe and in much of the rest of the world.

Trends And Disruptors

Public Health and Built Form

The relationship between public health and our built and natural environments is of greater significance than most acknowledge. The May 2016 study on Neighbourhood Walkability with Change in Obesity and Diabetes was published in the Journal of the American Medical Association.

PHOTOS 1 NOAA, 2017 2 JOURNAL DE MONTRÉAL



Change is not optional but inevitable, and the rate of change is increasing.



The study was conducted by a Canadian research team over 12 years and examined 9,000 neighbourhoods with three million people. It found that obesity rates remained stable in walkable neighbourhoods. Obesity and diabetes rates averaged 10 per cent higher and rising in neighbourhoods that are less walkable and more car dependent.

One of the consequences of obesity is the increased risk of Type 2 diabetes. Currently 3.4 million Canadians have diabetes. It is the leading cause of vision loss, kidney failure, limb amputations and cardiovascular disease. Diabetes will cost the Canadian healthcare system \$16.9 billion a year by 2020. Opportunities to increase active transportation (human-powered mobility and exercise) through "complete street" design, destination points within five minute walk of home such as transit, schools, shops/ services and parks provides necessary exercise that is a significant component in obesity and diabetes reduction.

As Dr. Booth, a report author, stated: "The best designed communities make it easier for people to walk and helps to protect them against obesity and diabetes. Neighbourhoods that force people to drive everywhere are worst off in terms of obesity and diabetes." Scientific research on health and well-being can be used to support and encourage urban design that is substantive, that enhances quality of life and that can help to leverage change in areas that are locked into outdated suburban models while also underlining the importance of daily exercise.

Public Health and Climate Change

The prestigious journal *Lancet's* report "Health and climate change: policy response to protect public health" (June, 2015), brought together an important body of medical research. It was prepared by a team of more than 45 medical and scientific researchers from around the globe.

Among the findings were:

- The effects of climate change on 9 billion people (est. global population by 2040) threaten to undermine the last 50 years of global health gains.
- · Threats to population by climate change include: changes in air pollution; spread of disease; food insecurity and undernutrition; displacement of population groups; and decline in mental health.

The report's recommendations included creating transition cities to support lifestyles that are healthy to individuals and the planet, including developing energy efficient building stock and developing low-cost active transportation and access to green spaces. Here again, we see some directions based on scientific evidence that identifies potential disruptors as well as opportunities to reduce some of the harmful effects through interventions based in built form.

The Lancet Countdown report on climate change released in 2017 echoed and expanded on the earlier report and warned that climate change was happening far more quickly than previously report. This warning was again given in the 2018 report, released at the end of November (available at bit.ly/LnctCntdn).



Obesity and diabetes rates averaged 10 per cent higher and rising in neighbourhoods that are less walkable and more car dependent.

-American Medical Association

The need to deal with the mental health effects of climate change and not just the physical effects is also crucial. According to the World Health Organization, depression is now the leading cause of ill health globally. Landscape architects can help to address the effects of depression and "eco-anxiety," as well as the greenhouse gas emissions related to climate change, through giving more consideration to the psychology of the environments that they design as it relates to reduction of stress and anxiety. This can be done through ensuring uplifting public spaces, enhanced streetscapes with increased shade and decreased heat production, and inclusion of aspects that reduce rather than enhance the stress placed on the senses. This is a good time for landscape architecture and psychology to work together more closely.

The Impact of Climate Change

Climate change is having direct effects in Canada and globally. These include:

 Rising temperatures and increased severe weather incidents.

The Game Changer

On October 7, 2018, the United Nations International Panel on Climate Change. comprising over 90 scientists in 40

· Threats to agriculture and food production.

- Increased disease and other public health problems (for example, diseases such as Lyme, malaria and West Nile are moving north with warming climates).
- In 2018, the small island nation of Tonga, devastated by increasingly severe weather and rising sea levels, applied to the UN for climate change refugee status (ironically, Tonga is carbon "net zero" while 10 per cent of the world's wealthiest countries produce 48 per cent of global carbon release).
- In August 2018, the same week as the thickest and oldest coastal ice shelf broke off in Greenland, the US EPA rolled back rules on coal-fired emissions.
- · If we are going to "decarbonize" our economy to low carbon energy sources it will mean that we need to double the supply and infrastructure of our electrical grid.

countries, released its findings. They concluded:

- Climate change is occurring faster than previously thought and there is much less time to react than had been estimated previously,
- A further increase of .5 degree by 2040 will be devastating (the climate had already warmed by 1 degree since the industrial revolution and is now the warmest it has been in over 1 million years. Just a year ago it was thought that an increase of 2 degrees by 2050 was highly problematic, and this underlines the intensity and rate of change in our climate).
- Damage by 2040 will result in \$54 trillion cost and will cost 1.2 per cent of the US GDP.
- Canada will need to cut its carbon emissions in half within 10-12 years (while this is technically feasible it would require turning the collective world financial priorities around in an extremely short period of time and in the current political climate of the world's leading economy this is highly unlikely).

PHOTOS 3 CHAD MCDERMOTT/SHUTTERSTOCK.COM **4** FOTOKOSTIC/SHUTTERSTOCK.COM **5** MATT SHEA, 2017

The magnitude of this dilemma was emphasized when the US Global Climate Change Research Program, a team of 13 federal agencies with 300 leading scientists, released the Fourth National Climate assessment in 2018. It included dire warning s on climate change, very similar to the UN IPCC report. The US report was supposed to be released in December, but the Trump administration chose to release it at the end of November, the day after Thanksgiving, when Americans were distracted by the holiday weekend.

Conclusions

We must continue to support innovation, diversity and conservation. At the same time we must also prepare for:

- Entrenched and powerful "pushback",
- Employment disruptions and the need for training and support services for those in carbon-based activities,
- The need for clear messaging and education explaining the basis of, necessity for and benefits of change, and
- Collaboration between all professions, public agencies, and private interests.

The acceleration of change makes it difficult for many people to adapt to or even accept the changes that are coming. Denial of grim events is the norm and it is human nature to resist change. It is not enough to just plan for economic, environmental, social and built form resilience. We must ensure that:

- We get the facts right and are credible.
- We prepare for the consequences of challenging people's ideologies.
- We remember that we are dealing with people, including our colleagues, who are in denial and who are distressed by future possibilities.
- We understand that things can happen very quickly and we must be swift, adaptable and realistic with our plans.
- We provide thoughtful design for energy efficient communities (both new and redeveloped), engaging public places, and increase access to natural features while ensuring it is cost effective and thereby provide a clear choice over outdated and problematic development patterns.

With all the recent and conclusive evidence of the effects of climate change and the short time-frame in which we have to act we know that we have less than a generation to deliver serious change or lose our planet as we know it. Climate change is about economics. If we don't start to significantly reduce GHG emissions the problem will only increase and the costs to fix it will compound beyond manageable global means.

Many scientists concur that we are into the new era of "wetter, warmer and wilder" weather: this is the new normal. Resiliency plans to deal with this condition are complex, expensive and barely underway. The forecasts for the next two decades are alarming and present us with enormous problems. The only effective way to deal with this is to direct our immediate, collaborative and focussed attention to them and treat them as what they are: a call to save the ship and not just rearrange the deck chairs.



MARIE-PIERRE MCDONALD + HILDA SNOWBALL

THE FRAGILE RESILIENCE OF THE NORTH

>FR_LP+ LA FRAGILE RÉSILIENCE DU NORD

SINCE THE BEGINNING of the 20th century, due to the colonization and forced settlement of the Arctic communities, the Inuit have experienced a profound cultural transformation that affected the landscape of their territory and their knowledge of it. A century later, the Inuit are facing yet another profound transformation, this time caused by global warming.

Many scientific studies converge on the conclusion that the northern regions of the globe will be the most strongly affected by climate change, mainly in the form of accelerated warming during the 21st century. In fact, with an average temperature increase of 3.5°C since the beginning of the 20th century, the Arctic is the fastest warming place on Earth.¹ Climate change is already a clear and present danger for the region.

Warming obviously has a profound impact on the wildlife that inhabits the land. It has a particularly dramatic and ongoing effect on the various routes and calendars of most migrating animal species. As the territory they inhabit and the age at which they start their migration fluctuates wildly, their life and procreation cycles have changed significantly in a very short period of time, making survival and adaptability difficult and uncertain for many of them.

Warming has negatively impacted drinking water quality and quantity, permafrost stability, flood risks, coastal erosion, infrastructure and building design, community connectivity and general safety of the population.

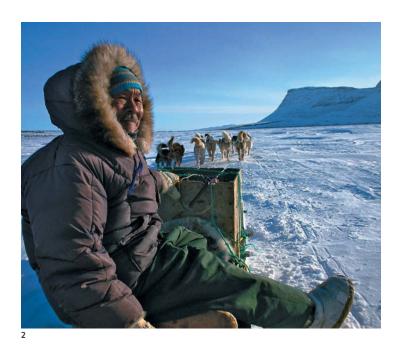
Climate change thus has big impacts both on the wildlife and the communities' infrastructures. But most important, it has had, and will continue to have, an ever greater impact on the Inuit culture and tradition.

PHOTOS 1 MARIE-PIERRE MCDONALD 2 ISABELLE_DUBOIS

Planning Tools and Adaptation Strategies

In 2015, during the UN Sustainable Development Summit, world leaders agreed to 17 goals for a better world by 2030, goals that would seek to end poverty, fight inequality and stop climate change. The following year, the Paris Agreement came into force in order to address the need to limit the rise of global temperatures.2

Unfortunately, these agreements came too late for the North; their goals and objectives would not be enough to remedy the many problems already experienced by its people. Besides, Nunavik leaders did not wait for these world agreements, as they set their own objectives way before them. Concrete actions were taken by developing planning tools and adaptation strategies, such as protected areas network plans and regional and local master plans. A lot of work, however, still needs to be done in order to preserve the cultural landscape of Nunavik.



Protected Areas Network

While harvesting methods and patterns have changed, the importance of wildlife for food security and for Inuit culture, language and identity have not. Country food, such as caribou, arctic char, ptarmigan, seal, walrus and beluga, among many other species, continues to be vital to the health and way of life of Nunavik Inuit.

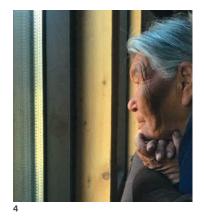
-Parnasimautik Consultation Report



Today, because of climate change, the Inuit have to travel further and further from their homes to practice their right of hunting and harvesting to feed their communities.

In response, the Inuit have developed programs to protect wildlife habitat, most notably by creating protected areas in order to enhance the practice of Inuit traditional activities on their land. The establishment of the parks in the Quebec-Labrador Peninsula, for example, has helped to protect vital caribou habitat in the face of a dramatic decrease of caribou populations in recent years. This was a key objective for the Inuit.

Parks, protected areas and land sheltered from development should continue to be identified for the conservation of valued ecosystems.



Elder's Knowledge

Elders have a rich knowledge of the land. Their expertise during consultations on land use planning for regional and local master plans is indispensable. Elders have knowledge of danger zones where landslides or ground settling may occur, of variable stream levels, of hunting and trapping areas that require protection, and of the locations of productive berry patches. This information is critical for the heritage-conscious regional planning and sustainable local planning.

-Nunavik Seniors' policy and action plan

Community Planning

The increases in temperature and changing precipitation patterns have had a significant impact on the development of communities and, consequently, their development plans.

But one of the most important climate issues that the Nunavik communities are facing right now is the alarmingly quick melting of the supposedly permanent underground layer of ice, known as permafrost. This melting causes very serious structural damage to the buildings, some of which have cracked and even moved, rendering them unsafe and, sometimes, unusable.

The Nunavik Permafrost and Natural Hazards Mapping Project initiated by the Center of Northern Studies has changed the community planning approach in order to address that problem now and in the future.

Public implication in the identification of natural hazards is also very important. Local residents are the ones that are most aware of natural hazards and potentially problematic areas in their territory. Thus, consultation and public participation are crucial in community planning and climate change adaptation.

Today, climate change adaptation is something that Nunavik communities have to consider at all stages of the community planning process in order to better guide development and planning decisions related to disaster and climate risk.

The Elders' knowledge and perspective about environmental changes have helped to forge a better understanding of climate change processes and its potential impacts. Some of these changes have been reported through stories passed down by elders.

In order to ensure the Elders' participation, Nunavik has recently adopted The *Nunavik Seniors' Policy and Action Plan* which promotes the active participation of elders in the planning processes.

Preserving Nunavik's Cultural Landscape

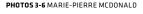
Preserving the cultural landscapes is important, not only from an historic point of view, but also in preventing the loss to climate change of a natural and cultural heritage.

Planning tools and policies have helped in preserving and managing Nunavik's cultural landscapes. Sadly, these efforts have not yet proven sufficient to tackle the challenge of accelerated northern warming. The permanent ice which is part of the Arctic landscape and a fundamental element of the collective identity of the Inuit is still rapidly melting and hard to control by local planning tools and policies.

Actions will have to be taken quickly at higher levels of authority, and international accords like the Paris Agreement will have to be taken much more seriously by the countries of the world if any benefits can be expected of them in time to save the North as we know it.

References

bit.ly/NorthClimateChange
 www.un.org/sustainabledevelopment/summit





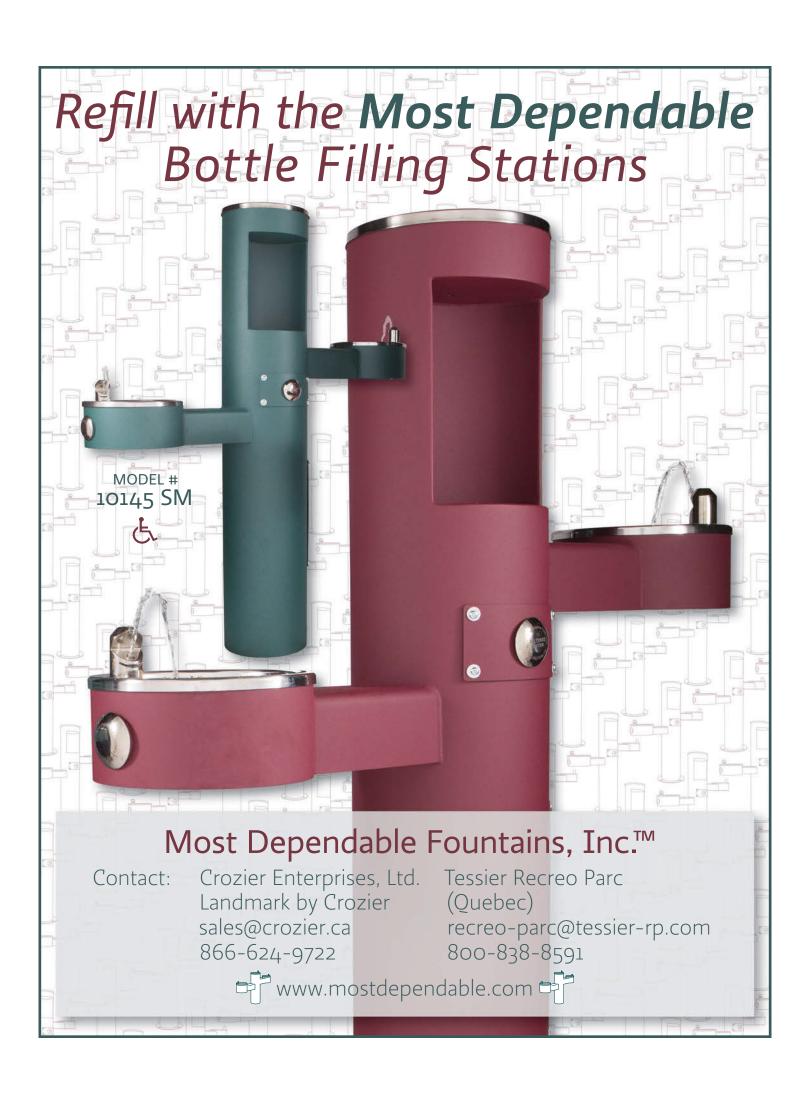




My favorite thing about trees? How much time have you got?

Steve Miller is a Bartlett Tree Experts champion. He, like all on his team, is the best in the business. An expert who champions the trees, landscapes and property investments of the customers in his care. He leaves no detail unexplored and no question unanswered.

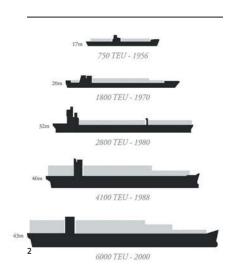






MARIANNE LAFONTAINE-CHICHA

TERRE D'EAU



1LE SYSTÈME MARITIME DES GRANDS LACS ET DU SAINT-LAURENT - ÉCONOMIE ET GLOBALISATION 2 ÉVOLUTION DE LA TAILLE DES PORTE-CONTENEURS EN CORRÉLATION AUX PROJETS DE DRAGAGE DE CAPITALISATION IMAGES MARIANNE LAFONTAINE-CHICHA

AVEC 97 POUR cent des ses exportations internationales réalisées par voie maritime, le transport maritime est au coeur même de l'économie canadienne. Situé à 1600 kilomètres de l'embouchure du fleuve Saint-Laurent vers l'océan Atlantique, le port de Montréal joue un rôle crucial dans le transport entre le chenal maritime et les Grands Lacs, permettant un accès au marché Ontarien et Américain.

À la fois infrastructure et écosystème d'une richesse incomparable, le Fleuve est soumis à des incertitudes climatiques et tensions politico-économiques variées. La canalisation, les barrages et le dragage de la rivière ont tous été réalisés pour bénéficier le secteur du transport maritime, avec peu de considérations envers les impacts sur les écosystèmes ainsi qu'une réutilisation limitée des matériaux de dragage. De

nombreux scénarios concernant les taux d'évaporation dans le bassin des Grands Lacs, indiquent que les niveaux d'eau y diminueront considérablement au cours des prochaines années, ce qui aura une incidence sur le zéro hydrographique du fleuve et la capacité autorisée des navires cargo. À ce titre, un nouveau projet de dragage de capitalisation devra être envisagé par les autorités dans les années à venir. Depuis 1851, dix projets de dragage ont été entrepris, modifiant de manière radicale le profil du fleuve et son hydrodynamique. Dans les secteurs les plus lourdement dragués, le chenal original est passé de 4.2 à 11.3 mètres de profondeur et de 45 à 230 mètres de largeur. On estime que 250 millions de mètres cubiques de matériau de dragage ont été excavés entre Montréal et Québec et ceux-ci ont principalement été relâchés en eau vive.



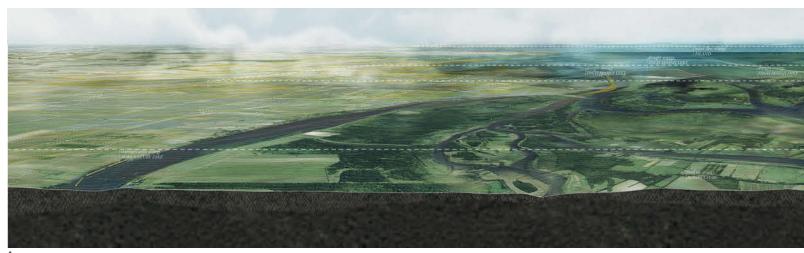
Il est indispensable que nous commencions à avoir une conversation dès aujourd'hui, afin de déterminer ce à quoi un projet de dragage de capitalisation du 21eme siècle pourrait ressembler. Ce projet de recherche cherche à visualiser comment nous pourrions actualiser nos considérations pour les résidus de dragage et réimaginer la relation qu'ils ont au sein du chenal de navigation et du paysage environnant dans son ensemble. Plutôt que d'être considérés comme un produit résiduaire, les matériaux de dragage constituent la principale ressource de ce projet, ce qui lui confère un sens aigu de localité.

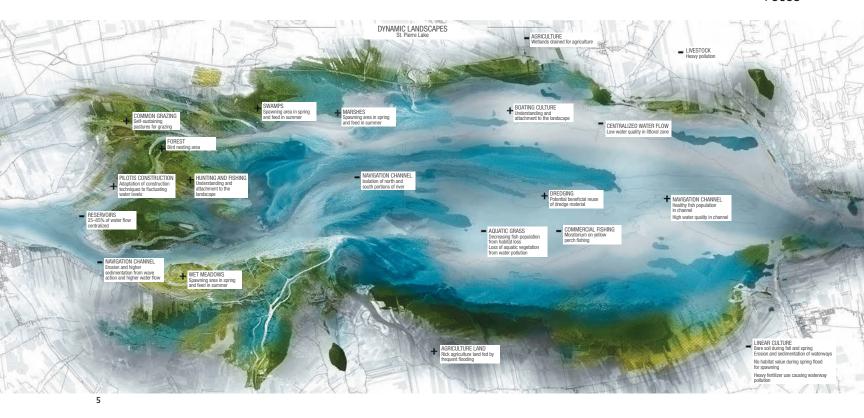
3 HAUT MARAIS - DIGUE DE RÉTENTION D'EAU POUR RÉDUIRE L'IMPACT DE LA SÉCHERESSE ET RETENIR L'EAU DANS LES ZONES ÉCOLOGIQUEMENT SENSIBLES 4 STRATÉGIES TOPOGRAPHIQUES - MANIPULATION TOPOGRAPHIQUE DES MATÉRIAUX DE DRAGAGE POUR REDIRIGER LE DÉBIT D'EAU ET RÉDUIRE L'IMPACT DE L'ÉROSION, DE L'EUTROPHISATION ET DE LA SÉCHERESSE SUR LE PAYSAGE 5 PAYSAGE DYNAMIQUE

IMAGES MARIANNE LAFONTAINE-CHICHA

Le lac Saint-Pierre, un lac fluvial du Saint-Laurent qui se porte peu au maintien d'une voie de navigation active à son coeur, a été utilisé comme site d'essai pour ce projet. Sa désignation de Réserve Biosphère UNESCO en faitt le site idéal pour étudier ces problématiques. Afin de s'éloigner de l'image abstraite et immatérielle du chenal de navigation, l'exploration conceptuelle s'est principalement faite en coupe, pour repenser la synergie entre le chenal, les terres adjacentes et les eaux environnantes. Les stratégies ont été élaborées au-dessus et en-dessous du niveau de l'eau, tirant parti de la fluctuation saisonnière des niveaux de l'eau afin de diriger, redistribuer et retenir l'eau.

Les manipulations physiques extrêmes causées par le dragage du chenal jumelées à une agriculture intensive sur les rives du fleuve ont entraîné une détérioration importante de la qualité et variété des écosystèmes au sein de la zone inondable. Trois zones présentant des problèmes variés liés à la gestion de l'eau ont été sélectionnées afin d'investiguer des pistes de solution passant par la réintroduction et la valorisation des matériaux de dragage. La





zone fluviale est typique du secteur entre Montréal et l'archipel de Sorel, où 40 pour cent des rivages sont sujet à érosion. L'érosion des rives situées à moins de 300 mètres du chenal de navigation serait directement liée à l'augmentation du débit d'eau et de l'action des vagues causée par le passage des navires. Chaque année, entre 1.5 et 5 mètres de terres sont perdus, compromettant les écosystèmes ainsi que les habitations situées le long du fleuve. Après la zone fluviale, arrive la zone de l'archipel, où le dérèglement du débit de l'eau cause l'eutrophisation du lac Saint-Pierre. Afin d'artificiellement maintenir un niveau d'eau supérieur au niveau moyen, le débit d'eau fut canalisé au centre du fleuve en réduisant l'accès de l'eau vers les chenaux secondaires à l'aide de barrages. En conséquent, les eaux des Grands Lacs sont conservées dans le chenal de navigation, laissant le rivage et les chenaux secondaires exposés aux eaux hautement polluées des affluents, entourés de terres agricoles. Alors que les barrages ralentissent l'écoulement de l'eau, l'eau passe beaucoup plus de temps dans les chenaux secondaires, ce qui provoque la sédimentation et l'eutrophisation.

Vers la fin de la zone de l'archipel se situe une aire de sédimentation importante, où se trouvent les zones les plus sensibles sur le plan écologique. Avec la baisse projetée des niveaux d'eau dans les Grands Lacs et le fleuve Saint-Laurent, ces zones humides dépendantes d'une certaine période d'exposition à l'eau seront menacées. Ces conditions sont également idéales à la propagation d'espèces envahissantes. Si les projections climatiques s'avèrent vraies, ce paysage deviendra une mer de phragmites avec un chenal de navigation en son centre. Considérant que cette zone contient 40 pour cent des terres humides du fleuve Saint-Laurent et constitue la plus grande héronnière en Amérique du Nord, il s'agirait d'une tragédie.

Si les projections climatiques s'avèrent vraies, ce paysage deviendra une mer de phragmites avec un chenal de navigation en son centre.





...un projet de grande envergure, émergent des interventions ciblées à potentiel économique, écologique et social.

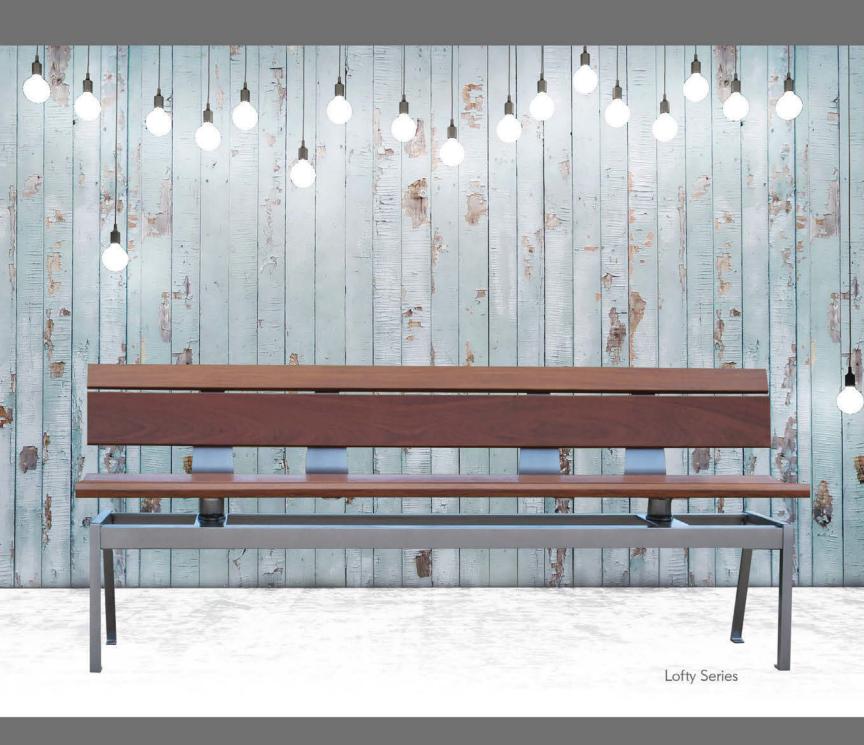


La valorisation des matériaux de dragages in situ, à travers divers travaux topographiques pourrait apporter des pistes de solution aux problèmes présents dans les trois zones sélectionnés. Par exemple, la création de brise-lames dans la zone fluviale à l'aide de matériaux dragués permettrait d'absorber le choc des vagues et de réduire l'impact de l'érosion sur la berge. Ceux-ci pourraient également accumuler les sédiments, évitant la sédimentation des zones à faible débit dans les chenaux secondaires. En créant des îles avec les matériaux dragués dans le lac, une eau de meilleure qualité et de meilleur débit pourrait être redirigée jusqu'au rivage, soit dans les zones où le débit d'eau est actuellement très faible.

Finalement, l'introduction de digues en aval de l'archipel permettrait la rétention d'eau dans les zones humides sujettes à la sécheresse. Ces interventions cibleraient spécifiquement les hauts marais, zones les plus exposées et menacées par les

6 DÉVERSOIR LABYRINTHE - PERMETTANT UNE MEILLEURE DISTRIBUTION ET VARIATION DU DÉBIT D'EAU 7 DIGUE AGRICOLE -ACCUMULATION DE SÉDIMENTS ET CRÉATION DE ZONES HUMIDES ENTRE LA ZONE D'AGRICULTURE INTENSIVE ET LA VOIE NAVIGABLE IMAGES MARIANNE LAFONTAINE-CHICHA phragmites. En accumulant aussi des sédiments, celles-ci augmenteraient progressivement la superficie des marais. Calibrées en fonction des niveaux d'eau en année sèche, elles pourraient être inondées au printemps, puis retiendraient de l'eau sur une période prolongée durant les mois d'été. Bien que leur noyau soit construit avec des résidus issus du projet de dragage de capitalisation, elles pourraient être nourries tous les deux ans avec le matériau de dragage résultant des opérations de maintenance récurrentes.

L'objectif d'un tel projet est double, puisqu'il s'agit à la fois de valoriser un matériau à potentiel élevé, disponible in situ en immense quantité, tout en s'agissant d'utiliser dit matériau à travers une série d'interventions préservant la diversité biologique d'un milieu exceptionnel en péril. Alors que le chenal de navigation peut être vu comme une infrastructure statique régie par un zéro hydrographique inflexible et des normes internationales, ce projet choisit de le considérer non pas dans sa linéarité, mais plutôt dans son transect et ses contiguïtés. Ainsi, d'un projet de grande envergure, émergent des interventions ciblées à potentiel économique, écologique et social.





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PROTECTING THE LAND THE WORK OF LAND TRUSTS



A SIGNIFICANT PATH to low carbon resilience is the protection and enhancement of natural systems. Our connection to nature is essential to our well-being. Stewardship activities by land trusts sequester carbon through planting trees and restoring tallgrass habitats and the potential to do more requires support through increased partnerships, expertise and funding.

According to the Ontario Land Trust Alliance (OLTA, olta.ca), which represents Ontario land trusts, more than 34,000 hectares is presently being protected by land trusts in Ontario through ownership or conservation easement. Protected areas include significant natural lands and sensitive wildlife habitat, important agricultural lands and cultural heritage features. OLTA supports land trusts with education, training and access to funding. In addition, OLTA requires all land trusts to adopt the Canadian Land Trust Standards and Practices.

OLTA's Climate Action Working Group, formed in early 2018, aims to support land trusts in increasing capacity to respond to climate change, for example adapting to shifting climate zones and species migration. Workshops to identify solutions for the 95 member organizations begin in 2019. A University of Waterloo study of land trusts to survey their climate change adaptation strategies revealed barriers faced by land trusts include the lack of knowledge and ability to cover costs for planning and implementing measures for adaptation.

As one of several local land trusts, the Northumberland Land Trust, located at the eastern perimeter of the Greater Toronto Area (GTA) (NLT, est. 2004, nltrust.ca), is a charitable organization committed to preserving the natural, historical and cultural heritage of Northumberland County. NLT is governed by a volunteer Board of Directors representing a cross section of the community including legal and environmental experts, public health professionals, educators, farmers and business people. Cognizant of the capacity of both the organization and its volunteers, partnerships with like-minded organizations are encouraged and proactively pursued. For example, as part of outreach programming a free speaker series for the public is organized by representatives from three organizations, including two land trusts. The events provide opportunity to attract new supporters and volunteers. Eventually, staff will be needed to support and sustain land trust activities and administrative models exist among the various sized land trusts throughout the country.

> NCC and its partners have contributed to the conservation of 1.1 million hectares of ecologically sensitive lands across Canada

NLT has six properties (total 194 hectares, in four municipalities) including one conservation easement (71 hectares). Although most lands are accessible by the public with permission of NLT, one of the properties is staffed and operated as an outdoor education centre by the local public school board and is visited by more than 3500 students each year.

NLT also partners with the Nature Conservancy of Canada (NCC, natureconservancy.ca). Since 1962, NCC and its partners have contributed to the conservation of 1.1 million hectares of ecologically sensitive lands across Canada including 81,000 hectares acres in Ontario. Financial assistance programs for land trusts are administered by the NCC with funding from Environment and Climate Change Canada.

One partnership between NLT and NCC focuses on the Rice Lake Plains, located primarily southeast of Peterborough and part of the Oak Ridges Moraine. The Moraine is a significant and extensive natural feature in southern Ontario and is composed of prairie habitat and related ecosystems. The Rice Lake Plains is about 40,500 hectares in size, but is highly fragmented today. In a global context, NCC identifies these habitats as rare and oak savannas being some of the most endangered ecological communities in North America. Less than one per cent of the original tallgrass prairie habitat remains intact in Canada and the US. The Alderville Black Oak Savanna (aldervillesavanna. ca), about 55 hectares, is the largest single remaining parcel of its kind in central east Ontario. Early pioneers such as Susanna Moodie (Roughing It in the Bush, 1852) and her sister Catherine Parr Traill sketched and wrote about living here.

In 2002, NCC initiated a partnership known as the Rice Lake Plains Joint Initiative (RLPJI). Led by NCC, a memorandum of understanding (2007) was prepared between partners including Alderville First Nation, County of Northumberland, Ganaraska Region Conservation Authority, Lower Trent Region Conservation

Authority, NCC, NLT, and Ontario Parks. With a focus on restoration, education and research the partner organizations work together towards achieving long-term objectives to: preserve and enhance the natural features of the Rice Lake Plains; increase awareness and understanding by the general public; undertake scientific research and share expertise; improve information to municipal and provincial planning processes; look to established local sites such as the Alderville Black Oak Savanna as example models for partner activities in site restoration; and, increase opportunities for site securement within the Rice Lake Plains. Initially funded by the Oak Ridges Moraine Foundation, recent funders include the Trillium Foundation and Friends of the Greenbelt Foundation. There is provision for other parties to participate, including Tallgrass Ontario, Willow Beach Field Naturalists and Fleming College.

near Presqui'lle Provincial Park at Brighton, ON. Major funding from the Government of Canada was secured through the Natural Areas Conservation Program.

In addition, Northumberland County is currently identifying Natural Heritage Systems (Ontario Provincial Policy Statement 2014 s. 2.1.3), a network of interconnected natural features and areas, to accompany their Official Plan. The county is undertaking this study in collaboration with local municipalities and conservation authorities and is conducting public meetings with the community. The process recognizes that natural systems - which include linkages to support natural processes - do not correspond to political boundaries.

As a landscape architect, advocate for resilient and sustainable communities, and head of a local land trust I anticipate there will be many important discussions ahead.



Northumberland Land Trust and NCC have partnered on other projects including land acquisitions. Most recently, in October 2018, NLT made a donation towards the purchase by the NCC and Ducks Unlimited Canada of a large tract of coastal wetland

1 BUTTERFLY MILKWEED, BUTTERFLY COUNT, RICE LAKE PLAINS, ON 2 PEARL CRESCENT, BUTTERFLY COUNT, RICE LAKE PLAINS, ON 3,4 HAZEL BIRD NATURE RESERVE, RICE LAKE PLAINS, ON PHOTOS 1 NCC 2 NCC 3,4 CHELSEA MARCANTONIO



RYAN HENNESSEY

GREEN INTERFACES:

A theory of parks-oriented development for northern communities

CLIMATE CHANGE IS already challenging northern development. Issues directly stemming from climate change include longer spring and autumn seasons, changing hydrology, thawing permafrost, increased forest fire risk and increased erosion risks along rivers and streams. For many, given the challenges of facilitating community development on behalf of cash-strapped communities, the influence of climate change is somewhat moot. It's already hard to meet community development needs, and given the long timelines associated with climate change it's just one more thing to worry about (and perhaps not even that big a thing if we do everything we're already doing well).

As I demonstrated in a recent piece in *Energy Policy*, discussing blending energy and climate change adaptation through existing policy mechanisms in the energy sector, it doesn't need to be that way. Climate action can be incorporated into extant policy to foster progress without a significant price tag. In the case of municipal infrastructure improvements in the northern and rural communities across Canada, this opportunity is tangibly linked to the development of municipal parks.

Parks-Oriented Development

Parks-oriented development is an informal urban design paradigm that suggests, in a similar manner to transit-oriented

development, that where we situate our infrastructure is important to its feasibility. Parks can provide an important interface with conventional (grey) infrastructure and a basis for ensuring green infrastructure is deployed in a meaningful way. Green infrastructure, in turn, can facilitate improvements in local resilience (adaptation), or reduced carbon emissions in the form of reduced fossil fuel use or fixed carbon if the natural asset is a carbon sink (mitigation) – that is, low carbon resilience

Parks-oriented development provides a largely unexplored paradigm for deploying green infrastructure in northern and rural municipalities. This is not because northern municipalities need large parks, nor is it because development density is sufficient that parks are important to the siting of green infrastructure (as they are in urban deployments). It's because parks offer the opportunity and permanence necessary to ensure natural assets exist with sufficient proximity to provide environmental services to the communitu. In short, proximity is a fundamental barrier to hybrid infrastructure systems in northern communities.



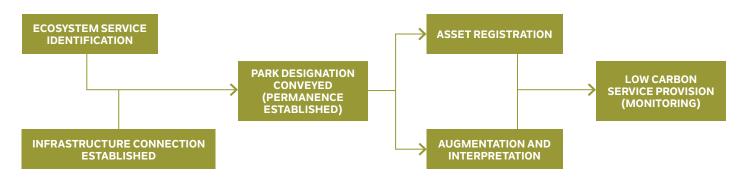


FIGURE 1 CRITICAL PATH TO LOW CARBON RESILIENCE, R. HENNESSEY

Experiences from Watson Lake

The "issue" of established parks, natural assets and their proximity to grey infrastructure can be illustrated through recent work for the Town of Watson Lake, home to approximately 1,500 people and located in the southeast corner of the Yukon. The town has currently designated two large parks within municipal limits, Wue Lake and Lucku Lake, and maintains six playgrounds and a skateboard park. In addition, improved park connectivity has been identified by the town as a community priority to support economic development and provide health benefits to residents. With this in mind. I undertook an assessment of natural assets in collaboration with the town, and with the support of a team from Associated Engineering/Christine Callihoo consulting.

In addition to the established parks, the report identified a number of natural assets, including two large wetlands on the periphery of the community, and a large abandoned quarry providing fire protection services. However, while Wye Lake, located in the heart of the community, could provide ecosystem services in support of water management (i.e., green infrastructure), neither Lucky Lake nor any of the playgrounds can. They are simply too small or in the wrong spot to be relevant. The noted wetlands and quarry, on the other hand, do provide environmental services – but are zoned "Holding" in the official bylaw. The Holding designation provides no protection and, given their proximity to the town's central business district, the wetlands are vulnerable to development proposals. The question is then, why should the municipality incorporate these assets into their asset registry, and how should they go about doing it?

The Role of Parks in Leveraging Natural Assets

The wetlands provide natural storm water retention and water management services that are already in use and could be improved upon. The environmental services provided, therefore, already offset the cost to maintain or improve grey infrastructure to provide the same service. Similarly, the abandoned quarry, while not aesthetic or even close to the community, provides a low-maintenance fire break and (anecdotally) is already considered a part of the municipality's fire defence.

A Parks and Recreation designation in all three instances simply creates the certainty to integrate the environmental services provided by the natural assets into the infrastructure network of the community. This certainty then provides the rationale from which to improve the amenity value provided by them in keeping with official policy (See Figure 1: Critical Path to LCR). Such amenities include improved access to ecosystem services, physical and mental health benefits and the parks infrastructure (e.g., signage) necessary for the public to perceive these areas as valuable places and not wasted spaces. The value of the parks, in turn, improves their social license and rationalizes the decision by Council to integrate the natural assets into their asset registry and explicitly rely on green infrastructure for service provision. A contribution to low carbon resilience follows.

Over the next year, I will be working with the CSLA to explore the concept of parks-oriented development and its role in improving the deployment of green infrastructure in Canada's north. The intent of the study is to confirm the issue of proximity as it relates

to environmental service provision, consider the implications of increased park designations in municipalities and discuss low-cost improvements to refine green infrastructure service offerings and establishing existing features as natural assets.



Parks-oriented development provides a largely unexplored paradigm for deploying green infrastructure in northern and rural municipalities.

1 FIREBREAK QUARRY 2 WEST WETLAND, WATSON LAKE 3 LUCKY LAKE PHOTOS GOVERNMENT OF YUKON

CLIMATE ATLAS:

Putting climate adaptation into practice

JEFF FRANK, JIM THOMAS + MARK BAUCHE



DESIGNING FOR ADAPTATION requires planning and design professionals to understand the scope and consequences of future climate "normals" and apply that knowledge in their work. The Canadian Society of Landscape Architects Committee on Climate Adaptation (CoCA) is partnering with the Climate Atlas of Canada to develop resources for landscape architects and planners.

This collaboration between climate scientists, landscape architects and planners represents a convergence of skills, and an opportunity for transdisciplinary knowledge sharing for the benefit professionals and society.

To test the practical application of the Atlas to site planning and design, the Climate Atlas and HTFC Planning & Design co-hosted a workshop on November 27, 2018, at the Canadian Museum for Human Rights in Winnipeg.

The workshop included representatives of the CoCA, practicing landscape architects from HTFC, members of the Climate Atlas team, as well as facility managers, academic staff, and students from two client groups: Seven Oaks School Division and the Canadian Mennonite University. These client representatives were chosen because both institutions are particularly forward-looking and have completed, or are in the process of developing, projects typical of landscape architecture practice in Canada: a greenfield site development (schoolyard) and preplanning for an institutional facilities master plan, respectively.

After an introduction from Dr. Ian Mauro of the Climate Atlas, CoCA representative Jeff Frank provided an overview of climatic considerations traditionally incorporated into site planning and design. Using the clients' project sites, he explained how climatic factors affect design thinking and that much of our decision-making is based on our prior experience with climate.

Climatologist Ryan Smith then toured participants through the Climate Atlas and guidebook, demonstrating how future climate is projected to change; the range of variables that are modeled; and the level of certainty, timeline, and possible ranges of these changes.

Smith identified what he believes to be the two variables most influential to planning and design in Winnipeg: hotter, longer summers and greater variability in seasonal precipitation. Participants were asked to consider possible impacts of these variables on site development. Many challenges and opportunities were identified including:

- Impacts on playfields from drought and intense rainfall;
- · Benefits of naturalization, outdoor learning and resiliency;
- Opportunities for students and staff to use outdoor spaces as a result of projected warmer temperatures in spring and fall;
- Challenges for site operations and maintenance as a result of projected variability in the timing and quantities of precipitation; and
- Challenges for planting design, using species tolerant of a wider range of growing conditions.

Participants were then asked to consider the level of consequences and likelihood of identified challenges through a Risk Assessment Lens. This process identified aspects of site design, operation and maintenance that need to be given priority to adapt to change and mitigate risks.

Workshop participants were excited to learn about the Atlas, the relationship of climate and design, and the process of Risk Assessment. The design professionals and client representatives are now likely to refer to the Climate Atlas for future decision—making. One client observed that the Atlas helps by providing a third party expert to show the future in an objective way without "sounding hysterical."

PHOTO 1 JIM THOMAS

...the two variables most influential to planning and design in Winnipeg: hotter, longer summers and greater variability in seasonal precipitation.

An important lesson from the workshop is: while climate change is often depicted by average trends (e.g., increased mean temperature), it is variability in future conditions that may be most challenging for the design of resilient and adaptive sites.

The workshop was documented with video for inclusion in a planning topic within the Atlas. This topic is being developed to serve as an online tool kit to inform landscape architects and planners.

This workshop was just an initial step, and similar workshops are being considered for other regions. The CoCA and the Climate Atlas of Canada will continue to work together to develop and evolve practical tools for the planning and design professions.



Jeff Frank and **Jim Thomas** are Senior Advisors, and **Mark Bauche** is an Associate with HTFC Planning and Design in Winnipeg. They recognize that climate adaptation and resilience are essential to the work of LAs and are collaborating with the Canadian Climate Atlas Team to develop tools for planners and designers. Jeff and Jim are also members of the CSLA's Committee on Climate Adaptation.





materials for the impactful multi-media exhibit, Anthropocene, that opened in September 2018 at the National Art Gallery of Canada and the Art Gallery of Ontario. They travelled to various countries on each continent with the exception of Antarctica, to document the devastating effects of human activity on our landscapes.

Human impact on the Earth has been so vast and destructive that a new geological epoch, Anthropocene, has been declared. Humans have pushed the planet outside of its natural limits. Throughout the exhibit, we are exposed to a powerful series of photographs, augmented reality installations and film clips that give a sense of scale and significance to the impact that we have on our planet.

Although we are told through news reports, films and studies of the damage our environment suffers due to human activity, the Anthropocene exhibit brings a sense of scale to the viewer that we don't normally get to experience. These three artists have created an experience with the intent of connecting us directly with the devastation. Throughout the space, we see photographs of a Kenyan landfill, a marble quarry in Italy, the

1 CLEARCUT #5, VANCOUVER ISLAND, BRITISH COLUMBIA, CANADA 2017 2 CERRO DOMINADOR SOLAR PROJECT #1, ATACAMA DESERT, CHILE 2017 3 SAW MILLS #1, LAGOS, NIGERIA, 2016 4 HIGHWAY #8, SANTA ANA FREEWAY, LOS ANGELES, CA, 2017 5 SALT PAN #18, LITTLE RANN OF KUTCH, GUJARAT, INDIA 2016 PHOTOS ©EDWARD BURTYNSKY, 2017 COURTESY OF THE ARTIST AND NICHOLAS METIVIER GALLERY, TORONTO.







Santa Ana freeway in Los Angeles and an old growth forests clear-cut on Vancouver Island. Films are played throughout the exhibit of bleached coral reefs, elephant tusk burning and the world's largest excavator, Bagger 293.

It is evident that human activity has led to a major geologic symptom - increased atmospheric carbon dioxide (CO2) and, in turn, climate change.

One of the photographs associated, in part, with the increase of CO² emissions is the Santa Ana freeway in Los Angeles. The photograph shows an endless sea of suburban homes, sporadic neighbourhood trees, with a six-lane highway dividing the canvas. This photograph is a representation of the urban sprawl that contributes to increased levels of CO² emissions. We understand that designing highways constitutes more paved surfaces, which in

photographs and a film in which an old growth forest was in the process of being clear-cut in British Columbia. Not only does the act of clear-cutting release CO² emissions, it also eliminates the forests ability to absorb greenhouse gases in the future.

Throughout the exhibit, I spent a great deal of time reflecting on how we could have done better and considered the role design can have in improving our carbon footprint. Every professional has a different skillset that varies in scope, but we all have the opportunity to ensure that we are making an effort to work with the earth's natural systems, not against them.

The Anthropocene exhibit is meant to connect the viewer with the destruction in a raw and honest way. We often hear about the impacts through news, reports and studies but we rarely get an objective, visual perspective on the damage. This exhibit is designed to force the viewer to consider their actions and how their everyday choices can be damaging ecosystems and natural environments on a global scale. Humans are so small to be leaving such a large impact on our landscape. It's through the installations, photographs and films that we are seeing the consequences of our choices. This exhibit is something everyone should see, whether you're a landscape architect or not. We all have a role to play in how we treat our planet, no matter our profession.

Human impact on the Earth has been so vast and destructive that a new geological epoch, Anthropocene, has been declared.





turn increases the rate and temperature of water runoff. Designing highways that cut through our cities limit walkability and disconnect our communities. This image of the Santa Ana freeway is all too familiar. Many of our cities in North America could be inserted in this photo. Our future cities should strive to consider building cities that are built for people not for cars.

As much as humans are contributing to the increase of CO² emissions, we are also destroying our natural tool for fighting climate change. Anthropocene demonstrates this with a series of

As landscape architects, we need to ensure that our designs reduce CO² and other greenhouse gases. Though these efforts may seem minimal, it's important to remember that the Anthropocene is human activity that is dominating and defining the environment. LAs need to provide a holistic approach to the protection, conservation and enhancement of our landscapes. Our involvement can support the landscape by protecting ecosystems and biodiversity, creating dense walkable communities, specifying locally sourced materials and planting native vegetation. We constantly strive to leave spaces better than we found them.

We all have a role to play in how we treat our planet, no matter our profession.

THE LAND TERRE DESIGN RESEARCH NETWORK

Landscape Architecture Research and Climate Change

MARCELLA EATON + HEATHER BRAIDEN

with input from Kaja McDonald, Jamie Redford + Taya Kehler



LANDSCAPE ARCHITECTURE

RESEARCH in Canada is as diverse as the country's topography. The landscape is a complex cultural and environmental entity in a constant state of flux. Resource extraction and site contamination have impacted our varied regional and urban contexts. Our historical use of the land, along with population and climate fluctuations. including urban growth, influence how we evaluate the health and well-being of the nation and its users, then design for the future. These problems occur, at different scales, across the country and there is a wealth of knowledge held in separate institutions. Until now, research in landscape architecture has happened in isolated islands across the country.

The Land | Terre Design Research Network (LTD Research Network) is a new forum for Canadian landscape research that works to unite researchers with a common interest in the landscape to appraise and generate methodologies related to common research questions. The LTD Research Network aims to overcome the challenge of relying on communication networks in the United States and Europe by providing an opportunity to engage researchers with interest in what is unique about the Canadian landscape and the collective problems we face.

Researchers in landscape architecture address complex cultural and environmental issues that bridge social, cultural, scientific, political and economic knowledge.

Collaboration is crucial. Academics and practitioners arrive at the discipline with backgrounds ranging from arts and philosophy to pure and technical science. The approaches to such a multifaceted discipline vary widely as well, and climate change is central to all work in landscape architecture.

The impacts of climate change on the land and our built environments are undeniable and increasing. Research in landscape architecture resides at the interface of these two worlds – the natural and the built – to develop knowledge and shape resiliency strategies. Scholars investigate climate change by modelling coastal areas, creating approaches to flood mitigation and drought, partnering with community groups in forming programs to reduce carbon emissions, and examining how residents in northern regions address the impacts of rising temperatures. Landscape architecture research contributes to our knowledge of the effects of climate change by collaborating with scientists and the public in understanding the interdependence of environmental processes.

The LTD Research Network seeks to assemble critical mass, build on established methodologies, and draw attention to pressing research questions to advance and mobilize knowledge founded in landscape architecture research in Canada. A three-day colloquium held from October 25 to 27, 2018, at the University of Manitoba, brought together a core group seven researchers to introduce the new national research network. Researchers from east to west included Heather Braiden (Dalhousie U.), Nicole Valois (U. Montréal), Alissa North (U. Toronto), Karen Landman (U. Guelph), Marcella Eaton (U. Manitoba), Enrica Dall'Ara (U. Calgary), and Susan Herrington (U. British Columbia). Generously funded by a Social Sciences and Humanities Research Council Connections Grant, a Landscape Architecture Canada Foundation research grant and contributions from participating academic institutions, this initial LTD Research Network event invited experts and assembled critical scholarship. The event and the Network intend to build research relationships across each of the seven academic institutions, allied disciplines, professions and the public. The sessions promoted mentor-mentee opportunities. Graduate students, under the mentorship of their supervisors, were central to the colloquium.

1LTD RESEARCH NETWORK COLLOQUIUM, U.
MANITOBA, SPEAKER HOPE PARNHAM, DV8
CONSULTING; KEES LOKMAN, UBC 2 LTD RESEARCH
NETWORK COLLOQUIUM, U. MANITOBA, SPEAKER
NICOLE VALOIS, UNIVERSITÉ DE MONTRÉAL
PHOTOS MOJTABA HASSANZADEH



Each of the three days invited discussion on building the LTD Research Network and addressing research questions in three focal areas: 1) Indigenous matters; 2) urban, rural and industrial heritage; and 3) climate change.

On the topic of climate change, the colloquium examined cross-disciplinary research strategies and how landscape architects can lead climate change research that considers both environmental and human health. The discussion addressed how to bridge the gap between research and professional practice with land-based solutions. The focus was on communication tools and how to widely disseminate this critical area of research.

The student research assistants Kaja McDonald, MLA candidate (U. Guelph), Jamie Reford, MLA candidate (U. Toronto), and Taya Kehler, B. Tech in Landscape Architecture candidate (Dalhousie U.), summarized the session on Climate Change, noting: "Canada's diverse landscape with three surrounding oceans are, and will continue to experience various effects of climate change, providing opportunities for research collaboration across the country... Coastal erosion, storms, fires, permafrost melting (methane release), etc. will have an impact across the country."

Noting that the two invited researchers on climate change reside on opposite coasts, the research assistants report:

- Kees Lokman, Assistant Professor at SALA, UBC, presented his research work on river deltas and coastal areas surrounding Vancouver. Lokman demonstrated how visual modelling can be used to communicate design challenges and solutions of climate change to develop adaptive strategies. Climate change can be viewed as a catalyst for change in design and how we think about landscape architecture and our roles in the field.
- Hope Parnham, Landscape Architect,
 Urban Planner, and Principal of DV8
 Consulting, presented her work on
 coastal erosion on Prince Edward Island
 (PEI). Parnham argued that the story of
 PEI coastline lays with the people and
 residents of PEI. She found research
 opportunities within the personal
 accounts and public experience/response
 across Canada and proposes new
 approaches to defining the responsibility
 of coastline protection strategies,
 including community-led construction
 and maintenance.

The research assistants note:

- Landscape Architects play an essential role in designing climate interventions and reimagining flood infrastructure along Canada's coastlines, where hard edges and traditionally engineered solutions begin to fail;
- In the field of research around climate change, there's a need to frame the "risk"

- as an "opportunity" and move towards language and attitudes that support proactive (versus reactive) research on the topic to counteract feelings of immobilization around the issue;
- As Landscape Architects, we need to pilot projects to envision other strategies for infrastructure in a changing climate;
- There is a need to establish steering committees that bring together different players that are all looking at the same issue, including interdisciplinary research networks: and
- There is a narrative around how we value social layers and perspectives emerging in climate change research – what are the human stories versus just the economic values or "the numbers."

This student summary begins to illustrate how important it is for academics and professionals to work together and engage in interdisciplinary questions and proposed methods to the complex and very serious issue of climate change in Canada. The Land Terre Design Research Network will continue to address research in climate change and provide a platform for scholars, professionals, and members of industry to discuss pressing issues, the role of design in climate change adaptation, and inroads to research and practice. The Network aims to hold annual meetings, and future plans include developing professional and industry partnerships to advance all three themes.

Again, we would like to thank the Canadian Government and LACF for their generous contributions. For more information on the LTD Research Network and the Colloquium, please see landterre.ca.

Heather Braiden is an Assistant Professor at Dalhousie University and Program Coordinator of the Bachelor of Technology in Landscape Architecture. Her doctoral research explores Montréal's mid-to-late-nineteenth century cultural landscapes, as recorded by engineers during major bridge construction.

Marcella Eaton, Associate Professor in the Department of Landscape Architecture at the University of Manitoba, collaborated with Alan Tate on Great City Parks (Routledge, 2001, 2015). Current research focuses on beauty, ethics, and regional design issues, and the interpretation of the Truth and Reconciliation Commission Principles into landscape architectural education.



THE ANNUAL NORTHWEST TERRITORIES Climate Change Conference, organized by the Northwest Territories Association of Communities and Ecology, was an opportunity for northerners from all across the Northwest Territories to gather and share experiences related to climate change. In these times of high distress and solastalgia — feeling homesick when still being at home, because of dramatic changes in our environment — it is important to express the anxiety we feel and share it with others.

The Northwest Territories Association of Communities and Ecology North's Climate Change Conference was about creating a sense of emergency, and enthusiasm in small communities for mitigating and adapting to the effects of climate change. Changes in northern landscapes, most often identified by indigenous populations, are the alarm bells of our current climate crisis.

The North: The Earth's Bellwether

Watt-Cloutier inspired the audience by story-telling her life's work: persistent organic pollutants bio-accumulating in the Inuit's diet and causing development defects, the ozone layer depletion increasing cataracts in their populations, and global warming and climate change causing major environmental shifts to the they live, hunt, and move in the North. The indigenous populations are the true guardians of the land and they are seeing drastic differences into the land cover. Worrisome.

A riveting opening by Dr. Courtney Howard, emergency doctor in Yellowknife, president of the Canadian Association of Physicians for the Environment, left the audience in a state of alertness and emergency. Her work was presented in the *Lancet* magazine, recognized as the most important in the medical field.

"The Lancet tells us that climate change is the biggest global health threat of the 21st century...and that tackling climate change could be the greatest global health opportunity of the 21st century."²

Dr. Courtney Howard, Emergency Doctor

Changes in the landscape are one of the precursors of climate change that will hit people at home. Melting permafrost in the Northwest Territories left the roads network with bumps and crevasses, and ice road seasons are being shortened and complicate food and fuel shipments to isolated communities. Fortunately, inspiring indigenous-led projects like Smartlce⁴ are combining smart design, ice sensing and Inuit knowledge to measure changes and enable resiliency in the face of climate change.

The NWT Climate Change Conference is an opportunity to touch base and acknowledge the urgency of climate change, but also to share lessons learned, success stories, and more importantly, to inspire one another. Inspiration is the strongest lever for action.



William Gagnon, B.Eng., LEED AP BD+C, LEED AP ND, Eco Canada EPt, LFA, is a building engineer (Concordia University 2017) completing studies in climate change mitigation and sustainable carbon management (Université du Québec à Chicoutimi 2018). He believes that hand-in-hand integration of the built and natural environments is key for climate change mitigation & adaptation. William is currently spearheading the work for Ecology North's new Northern Centre for Sustainability in Yellowknife, Northwest Territories, to become the first Living Building in the Circumpolar North. His team also won the first phase of Infrastructure Canada's Smart Cities Challenge, now competing for the big \$5M prize. Natural and built environments integration is an important design strategy in both projects.

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Indigenous populations are the first to raise the alarm on changing wildlife patterns. Unlike temperature and precipitations, changes in the behaviour of populations of caribou, bear, and fish is a strong red flag for the current climate crisis. Changing temperatures make for geographical shifts in population habitat, as suggested by the occurrence of the "pizzly," or the grolar bear, a hybrid between the grizzly and the polar bear in Sachs Harbour and Ulukhaktok, Northwest Territories.³

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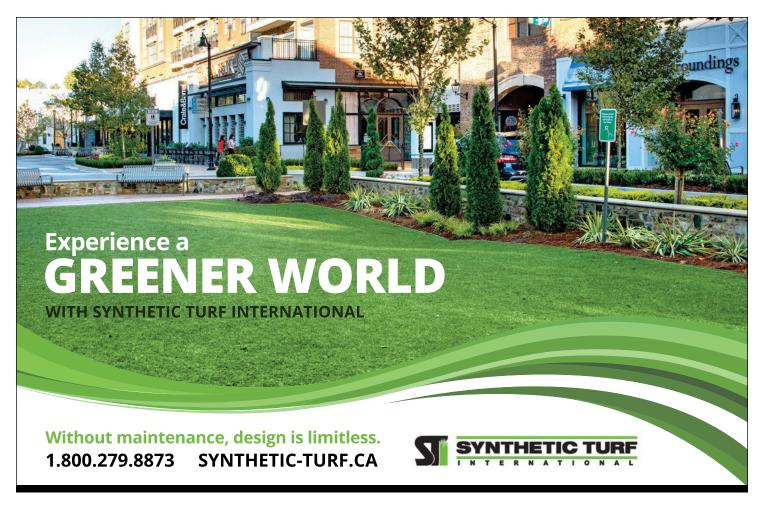
mix, match, shape and stack your way to the perfect seating arrangement.











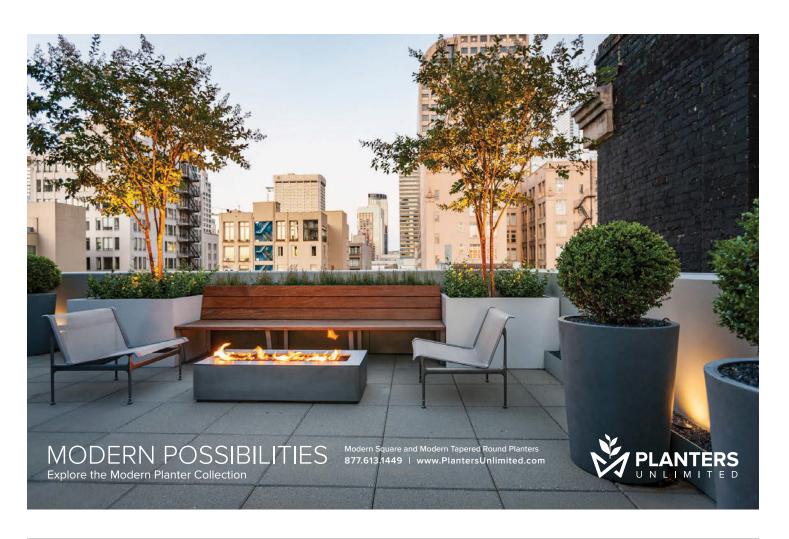


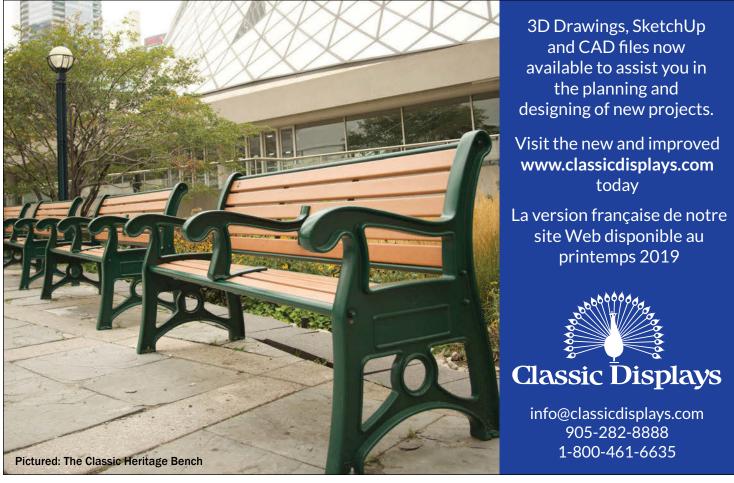




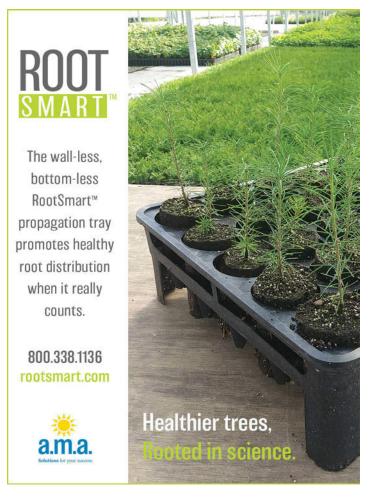




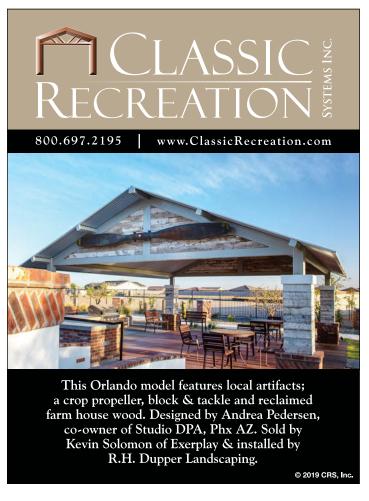


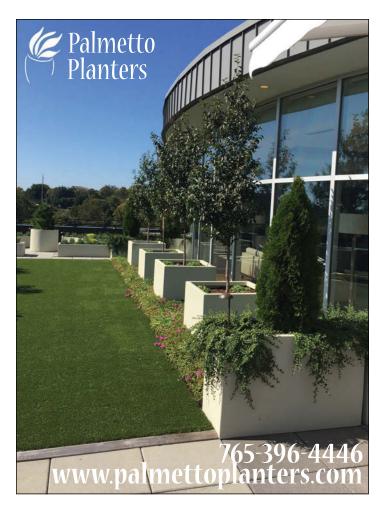






























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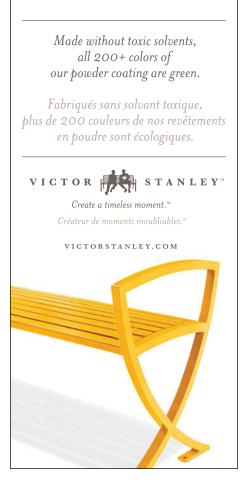
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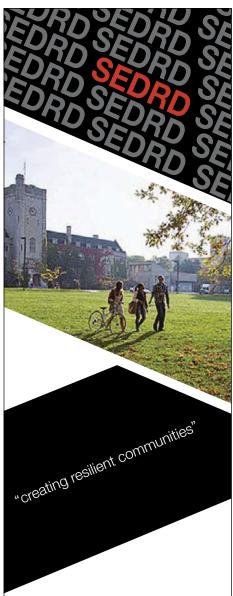
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LE TEMPS FILE

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Les dix prochaines années pourraient bien être la décennie la plus difficile, la plus créative et, espérons-le, la plus enrichissante de l'histoire de notre profession.

DIX ANS, ÇA peut sembler interminable.

Un avenir si flou qu'il en devient insaisissable, outre quelques suppositions farfelues. Dix ans, ça laisse BEAUCOUP de temps pour procrastiner, pour attendre d'être mieux informé, que les réponses aux problèmes complexes fassent surface. Ironiquement, on peut prétendre que cette période est trop courte pour changer profondément la société.

Aussi incompréhensible que cela puisse paraître, dix ans, c'est tout le temps dont nous disposons. Les scientifiques sont convaincus qu'il ne reste à la société qu'une décennie pour infléchir le rythme du réchauffement climatique, la montée du niveau des océans, le nombre et la force des tempêtes cataclysmiques et autres phénomènes météorologiques extrêmes. La bonne nouvelle, c'est qu'il nous reste encore dix ans. Nous pourrions les peupler de centaines de milliers de gestes personnels et institutionnels en vue de réduire les taux de gaz à effet de serre dans l'atmosphère. Seules les dix prochaines années compteront.

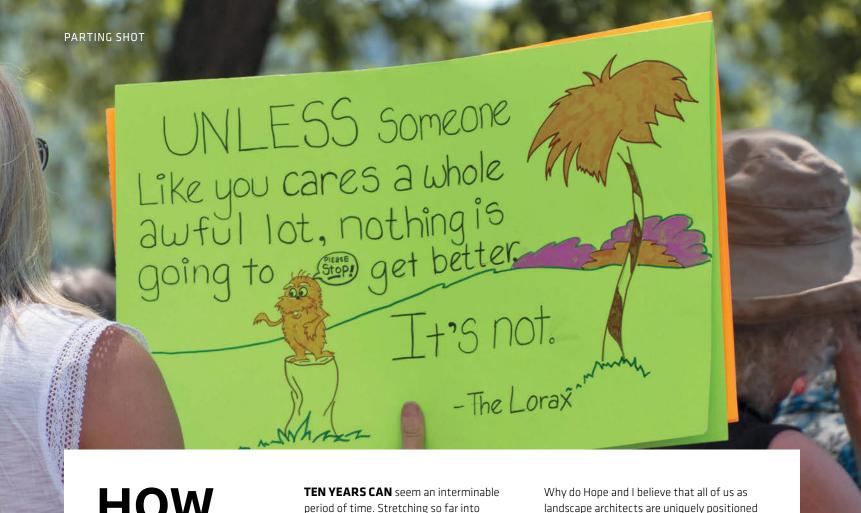
Nous pouvons le faire. Nous avons mis fin aux pluies acides. Nous avons éradiqué la variole. La polio a presque disparu. Le réchauffement climatique s'explique en grande partie par l'activité humaine. Pourquoi ne pourrions-nous pas le ralentir ou même l'inverser?

Parce que nous sommes les intendants du paysage. Nous sommes ceux qui, comme le Lorax du Dr. Seuss, « parlent pour les arbres », l'eau, la flore, la faune...et les humains. Le réchauffement climatique, c'est notre combat, parce que nous savons comment s'emboîtent les pièces de notre monde. Nous transformons le savoir en action. Nous comprenons l'importance de l'harmonie et de la justice sociales. Nous savons comment écosystèmes et communautés s'imbriquent et profitent les uns aux autres. Nous menons des initiatives complexes, chez nous comme dans le monde entier. Comme Martha Schwartz le dit dans son article, nous sommes de grands communicateurs. Nous interpellons; nous inspirons. Nous rendons l'improbable possible; nous rendons le possible pratique.

à ce problème?

Les dix prochaines années pourraient bien être la décennie la plus difficile, la plus créative et, espérons-le, la plus enrichissante de l'histoire de notre profession. Il n'y a pas d'effort trop petit ni de problème trop complexe ou trop vaste. Nous ne sommes peut-être pas nombreux, mais nous le sommes assez, au Canada comme dans les 76 associations nationales d'architectes paysagistes de l'IFLA.

Allez, au combat! Cette bataille vaut la peine d'être gagnée. Sans tarder.



HOW **TIME FLIES**

COLLEEN MERCER CLARKE

The next ten years may be the most challenging, creative and, hopefully, rewarding decade in the history of our profession.

an undetermined future as to be incomprehensible except for wildly out-there "what ifs." Ten years can give you LOTS of time to procrastinate. To wait 'til you are better informed; until answers to complex issues present themselves. And, ironically, it can be argued that ten years is yet too short a period to enact meaningful change in societal behaviour.

As incomprehensible as it may seem, ten vears is all the time we have. Scientists are convinced that only in the next short ten years can society make a meaningful difference in the pace and scope of warming globally temperatures, rising seas, devastating storms and extreme environmental conditions. The good news is that we have ten years. Time that could be filled with hundreds of thousands of individual and institutional actions to reduce the greenhouse gas concentrations in the earth's atmosphere. We have ten years, but only the NEXT ten years will matter.

We can do this. We stopped acid rain. We eradicated smallpox and we are almost done with polio. It was largely human activities that got us into global warming in the first place. Why could we not slow or potentially reverse the consequences.

landscape architects are uniquely positioned to take this on?

Because we are the stewards of the landscape. We are the ones, who like Dr. Suess's Lorax, "speak for the trees," and the water, and the flora, and the fauna - and the humans. Fighting global warming is our fight because we know how the pieces of our world connect. We mobilize what is known into what is done about it. We understand why social harmony and social justice are important. We know how ecosystems and communities fit together and benefit each other. We can and do lead on complex initiatives in our backyards and across our nations. We are, as Martha Schwartz said in her article, great communicators. We engage and inspire. We make the improbable, possible. We make the possible, practical.

The next ten years may be the most challenging, creative and, hopefully, rewarding decade in the history of our profession. There is no scale too small for our best effort, no problem too complex or too large in scale. There may not be a lot of us, but there are enough of us, here in Canada and across the 76 national associations of landscape architects in IFLA.

Gird your loins and head into battle. THIS is a fight worth winning. And it is worth winning, now.

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