

PRINTEMPS | SPRING 2016  
vol.18\_no.1 | 8.00\$

# LANDSCAPES PAYSAGES

LANDSCAPE  
ARCHITECTURE  
IN CANADA

L'ARCHITECTURE  
DE PAYSAGE  
AU CANADA

wet places  
milieux humides



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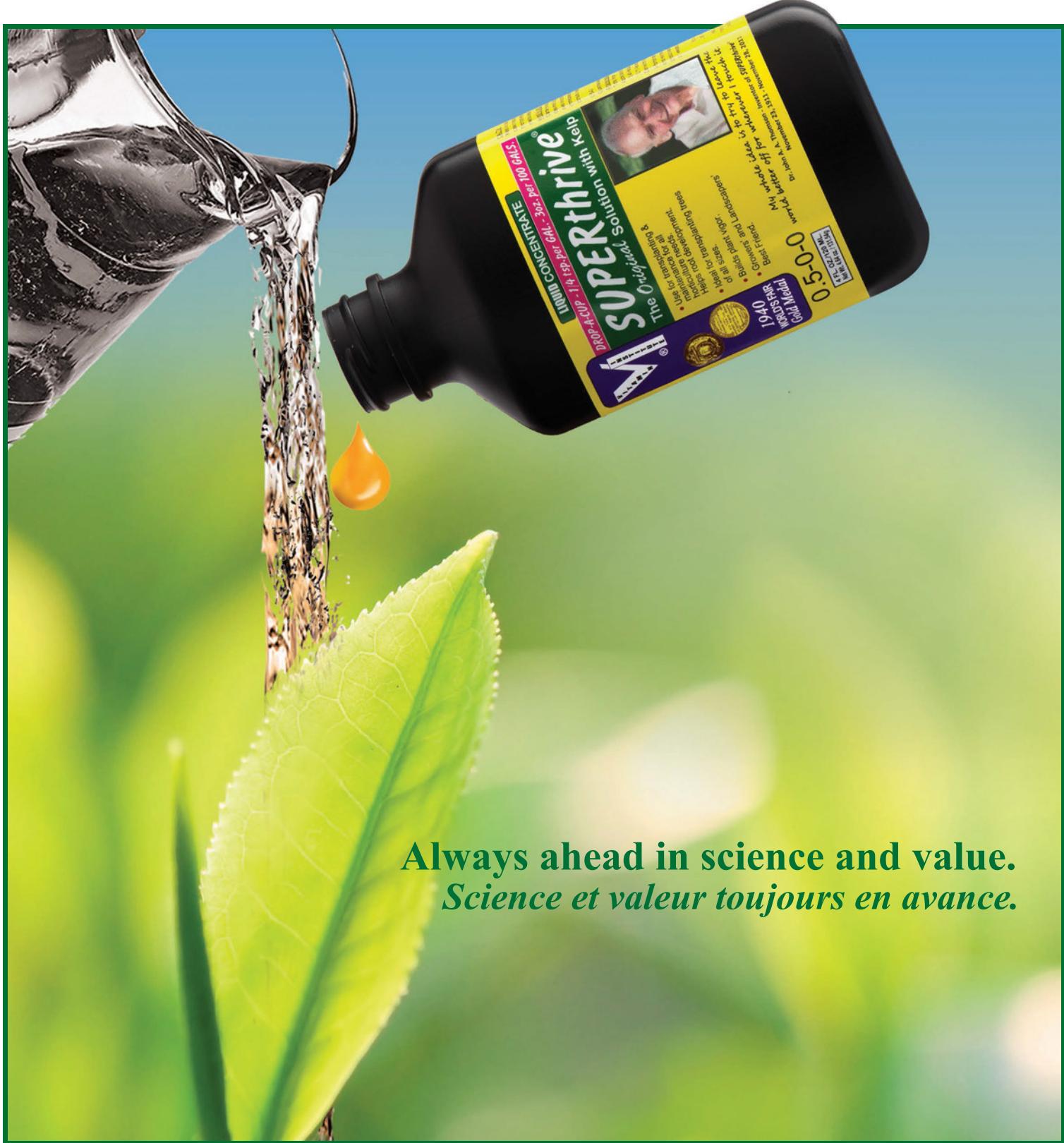
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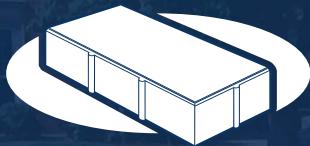
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## Published by | Publié par :

**NAYLOR** >

1630 Ness Avenue, Suite 300, Winnipeg, MB R3J 3X1  
Tel.: 204.947.0222 | Fax: 204.947.2047 | [www.naylor.com](http://www.naylor.com)

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## Layout & Design | Mise en page et conception graphique : Emma Law

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Return undeliverable Canadian addresses to: Naylor (Canada) Inc.,  
Distribution Dept., 1630 Ness Avenue, Suite 300, Winnipeg, MB R3J 3X1

Canadian Publication Agreement #40064978  
PUBLISHED FEBRUARY 2016/CSL-Q0116/2241

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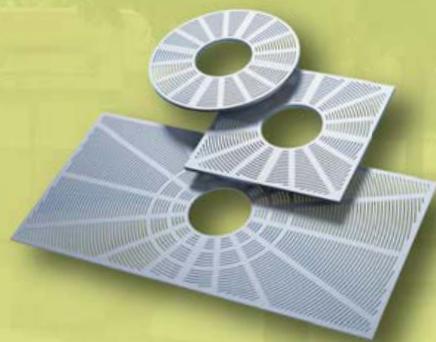


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**FR\_**

**PROCHAINES NUMÉROS :**

automne 16 | prix d'excellence

**date de tombée : 1<sup>er</sup> avril**

hiver 16 | Le temps

**date de tombée : 1<sup>er</sup> juin**

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. Pour connaître les normes rédactionnelles, écrivez à la rééditrice en chef Judy Lord.

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JEAN LANDRY: MOUNT ROYAL PARK, SEE | VOIR P 17  
« ABOUT OUR COVER »

PHOTO JEAN LANDRY



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TONY BOWRON +  
RICHARD WYMA

TONY BOWRON



RICHARD WYMA



TONY BOWRON

## BE WATER, MY FRIEND SOIS COMME L'EAU, MON AMI

EN\_

**WETLANDS ARE MORE** than simply lands that are wet. Wet landscapes are some of the most biologically productive and diverse ecosystems on the planet. They are also increasingly at risk; traditional protection and restoration are no longer sufficient.

How, then, are we to respond? Perhaps we begin with the words of Bruce Lee. "Be water, my friend. Adjust...be shapeless and formless like water." When nothing within you stays rigid, he says, "you will find a way around and through." As Bernie Amell explains so well in our opening essay, "Ecological design requires a contextually subtle balance among 'What is' (science), 'What is feasible' (engineering), 'What should be' (culture/politics) and 'What could be' (design creativity)."

Indeed, LAs and related professionals are reforming the art, science and practice of wetland conservation in Canada. We are embracing green infrastructure; we are restoring wetland systems, and we are considering multiple social and ecological objectives as we do so. We are reshaping shorelines, renewing ecosystems, embracing flood and drought...even building golf courses that require no irrigation.

We are, in short, finding ways "around and through."

FR\_

**ÉCOSYSTÈMES PARMI LES** plus diversifiés et les plus productifs de la planète, les terres humides sont de plus en plus à risque : la protection et la restauration traditionnelles ne suffisent plus.

Comment réagir? D'abord par la mise en application des conseils de Bruce Lee : « Sois comme l'eau, mon ami...Ajuste-toi, sois fluide comme l'eau. Lorsque rien en toi n'est rigide, tu peux contourner les obstacles. » Nos professions trouvent justement des façons de faire. Nous adoptons des infrastructures vertes, nous renouvelons les systèmes de terres humides. Nous remodelons les rives, nous renouvelons les écosystèmes, nous nous adaptons aux inondations et aux sécheresses...nous trouvons même des façons de concevoir des parcours de golf qui ne commandent pas d'irrigation.

Comme Bernie Amell l'a si bien expliqué dans son essai : « La conception écologique requiert un subtil équilibre contextuel entre "ce qui est" (sciences), "ce qui est faisable" (ingénierie), "ce qui devrait être" (culture/politique) et "ce qui pourrait être" (créativité conceptuelle). »

Dans le présent numéro de LANDSCAPES | PAYSAGES nous nous attardons à l'art, aux sciences et aux pratiques liés à la conservation des terres humides au Canada.

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# OUR WRITERS | NOS RÉDACTEURS

## wet places | milieux humides

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Thank you to all our  
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Merci à tous nos  
collaborateurs bénévoles !

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[judylord12@gmail.com](mailto:judylord12@gmail.com)



# REBOOTWHYTE FOR ISAAK

JONATHAN BEHNKE



**PHOTOS 1** CHRISTINA VARVIS  
**2** JONATHAN BEHNKE

**EN** **ON AUGUST 27,** 2012, Isaak Kornelsen was killed while cycling to work on Whyte Avenue in Edmonton, Alberta. Isaak was 21 years old, a star athlete at the University of Alberta, and an integral member of the community. His death shook the city, and a few days later over 500 cyclists gathered on the car-dominated street to ride together in Isaak's honour.

I am a former running teammate of Isaak's, and just two weeks after his tragic death, I returned to Guelph to resume my landscape architecture studies. My first studio assignment of the year was to design a parklet to create pedestrian space in an automobile-oriented environment. Whyte Avenue, the street that had just claimed Isaak's life, was a natural fit for a parklet. This street is an historic and cultural hub of Edmonton, which has made it the most popular pedestrian destination in the city. However, Whyte is a five-lane thoroughfare filled at all hours with cars, buses and large trucks.

I approached this assignment with two goals: to commemorate Isaak's life and to provoke thought on how to redesign Edmonton streets to be safe for all users. I designed the parklet using colours and forms to represent different aspects of Isaak's personality, and then spent two years raising funds and refining the design. The parklet was first built in August 2014.

The second goal came to fruition in August 2015, when a group of Whyte Avenue community members called RebootWhyte came together to call for change. They researched pedestrian and cyclist injuries on the street: 192 people had been injured or killed over the past ten years. The memorial parklet became the platform for RebootWhyte to announce their campaign: to have three kilometres of Whyte Avenue redesigned as a complete street, where people can travel safely regardless of age, ability or mode of transportation. RebootWhyte is now asking the province of Alberta to create a capital fund to help municipalities finance complete street projects.

## > [rebootwhyte.info](http://rebootwhyte.info)

It is not very often that a landscape architecture student sees a school assignment become part of a community's platform for positive change. Isaak was a remarkable person and it is an honour to help continue his legacy.

**JONATHAN BEHNKE** is a University of Guelph BLA graduate now working as a landscape and urban designer with Lanarc Consultants in Nanaimo, BC. He built the memorial parklet with the help of his wonderful family, and continues to set it up every August.

**jon.behnke@hotmail.com**



PAUL SANGHA LANDSCAPE ARCHITECTURE

## METAMORPHOUS HONOURED – AGAIN!

### YOU MAY RECOGNIZE the photo!

Yes, it is Metamorphous, the ground-changing Corten Seawall Sculpture by Paul Sangha Landscape Architecture, featured in our last issue. In November, 2015, the firm earned an Honor Award (Residential Design) from the American Society of Landscape Architects (ASLA). "We're desperate for a form that speaks to the 21st century rather than reruns of old ideas," said the ASLA Jury.

The 34 ASLA Professional Awards presented in 2015 were chosen from among 459 entries from the US and around the world. For details, visit the ASLA website.

At the same time, check out the firm's new publication, *The Landscape Architecture of Paul Sangha*. The book presents twelve residential projects which demonstrate the firm's expertise in orchestrating powerful landscapes. Go to LP+ for details.

**THE LANDSCAPE ARCHITECTURE  
OF PAUL SANGHA**

WRITTEN BY CAROLYN DUCHEZ  
ESSAY BY BYRON HAWES  
PHOTOGRAPHY BY INC LENOIX  
EDITED BY OSCAR RIBA GLEZA



Paul Sangha Landscape Architecture bridge landscape to the foreground of daily life—as rhythmic, recursive, aesthetic pleasure—by orchestrating the interplay of materials, textures, and forms. Drawing on an encyclopedic knowledge of materials and botanical species as well as a deep understanding of context, Metta and others, wrote by Paul Sangha

The Landscape Architecture of Paul Sangha presents twelve residential projects by the award-winning landscape architect. The award-winning project demonstrates the practice's expertise in orchestrating powerful landscapes. The book documents the inspiration, process, and poetry of Paul Sangha's designs. Coupled with text that vividly describes the details of each project, the book also includes a foreword by Carolyn Duchen, an essay by Byron Hawes, and a preface by Paul Sangha.

Written by Carolyn Duchen  
Essay by Byron Hawes  
Photography by Inc Lenoix  
Edited by Oscar Riba Gleza

Book Size: 12 x 12 in. 200 x 250 mm  
Book Format: Hardback  
Format: Hardback  
Publication Date: May 2015  
Language: English  
Subject: Architecture, Art & Design  
Edition: 1  
Author: Carolyn Duchen  
Illustrator: Inc Lenoix  
Photographer: Inc Lenoix  
Editor: Oscar Riba Gleza  
Publisher: Princeton Architectural Press  
ISBN: 978-1-61689-122-9  
Price: £20.00 / \$35.00  
Weight: 2.1 kg  
Dimensions: 25.0 x 20.0 x 3.0 cm  
Pages: 128 pp.  
Barcode: 9781616891229

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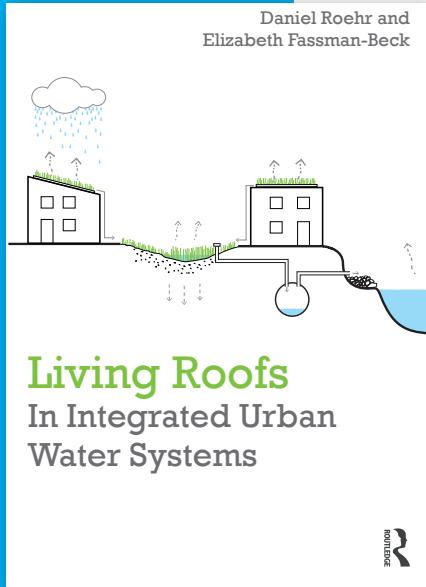
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2016 vol.18\_no.1 15

# BOOKS LIVRES



## book info:

**Living Roofs in Integrated Urban Water Systems**  
**Daniel Roehr +**  
**Elizabeth Fassman-Beck**  
**Routledge**  
**(February 24, 2015)**  
**English, 192 pages,**  
**hardcover 9.8 x 6.9 x 1.1"**  
**ISBN-10: 0415535530**  
**ISBN-13: 978-0415535533**

READ BY SCOTT TORRANCE  
+ KIRSTIN NEWFIELD

## LIVING ROOFS IN INTEGRATED URBAN WATER SYSTEMS

*The collaboration between the authors, a civil engineer and a landscape architect/horticulturist...results in a well-rounded review...which respects the objectives of both disciplines.*

**LIVING ROOFS IN** *Integrated Urban Water Systems* provides a comprehensive review of living roof design from the perspective of a multidisciplinary design team. The collaboration between the authors, a civil engineer and a landscape architect/horticulturist, is evident in the content and results in a well-rounded review of living roofs which respects the objectives of both disciplines.

Integrated design and collaboration between the landscape architecture and civil engineering disciplines has often been a weakness of urban site design. This book reflects the modern reality that these disciplines must work in unison, merging elements of the design process that would be in the traditional realm of the civil engineer with those of the landscape architect to develop an integrated, quantitative and performance-based approach.

*Living Roofs* does not necessarily provide a step-by-step guide to designing living roofs. Instead, it provides the reader with an in-depth review of the essentials. Each consideration is supported with diagrams, graphs and ample references that provide the reader with the opportunity to follow-up. Many of the design concepts include clear and detailed schematics, which allow the reader to visualize how the designs may appear in practice. The book would have benefited by the addition of colour photos and plans of actual projects.

(All diagrams and photos are black and white.) A detailed discussion in the second chapter is comprehensive, but also complicated and academic. *Living Roofs* is not for the casual reader, but that is one of the strengths of this book; it provides detailed, quantified and well-researched material.

In addition to the literature references throughout, the authors of *Living Roofs* conclude the book with a series of case studies highlighting how the concepts have been implemented in real-world applications. The authors recommend a holistic approach that integrates living roofs with other Low Impact Development strategies at grade.

The technical content within *Living Roofs* makes it best suited to an audience with a strong background in engineering, architecture or landscape architecture. While the attention given to engineering concepts may be of limited direct application to landscape architects, and vice-versa, the in-depth treatment provides insights into the complexity of living roof and storm water design and encourages all disciplines involved in the design of green infrastructure to appreciate the challenges faced by the entire design team.

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## 100 Conversations

Posted on November 22, 2015 by Peter Briggs

The contents of this blog arise from the 'conversations' I've had with people, whether in person or through various digital interactions.

I've been contemplating adding a level of intention to this, and have decided to embark upon: **100 Conversations**

My goal is to reach out to 100 people and start a conversation with the question: **At this point of your career, what problems do you want to solve?** (this question spins off from a recent post)

My goal within this is: I'd like to support someone in solving what's important to them... with a conversation.

I imagine that this will take many forms:

- Share knowledge, experience, stories and crazy ideas.
- Contribute to the building of professional networks.
- Expose ourselves to different ways of looking at things.
- Brainstorm, reinforce and develop ideas.

I want to offer each person an interested listener, who is focused on them... and who just might help them find something useful in chasing their goals?

### Experimental Method

I think it will be a flexible process, but some forethought is always good:

- **The Conversation**
  - Arrange to meet with someone for about an hour. Perhaps longer if the provided therapy/learning is mutually beneficial.
  - Prior to the meeting, I'd prepare them with the question of, "At this point of your career, what problems do you want to solve?"



# THE BUSINESS OF DESIGN: THE BLOG

**PETER BRIGGS' FIRM**, Corvus Design, is based in Alaska but his blog, The Business of Design, is about business issues that matter to LA firms anywhere. "We often don't seem to prioritize the 'business of design' within our professional growth – things such as mentoring, communication, profit strategies, setting expectations and more," said Briggs. His aim is to have "100 conversations"...to share, as he puts it, "what we learned after design school." He's exploring career challenges, and distilling what he's learned. "We aren't crazy or alone in what we experience," he says. "It's just that we haven't talked about it yet with someone else."

LP cannot do the blog justice in a short space, except to say that Briggs handles complex topics by sharing applied experience. This includes managing sleepless nights (we worry about unknowns, so let's minimize them), meeting expectations (we need to set *and* manage them), and when it comes to profit, engaging the whole team. For a taste, check out LP+. When clients demand the project "fast, cheap and good" – isn't that always the case? – and you can choose only two, take note of Briggs' observations.

>**LP+ 6 SIX WAYS TO SET UP EXPECTATIONS AS A PROJECT BEGINS**

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>**LP+ MORE MUSINGS | REFLECTIONS BY CAROL CRAIG**

## ABOUT OUR COVER

### PHOTOGRAPHER JEAN LANDRY

tells the story behind the image: "This wetland picture was taken during May, 2008, in a less popular section of iconic Mount Royal Park. Because of extreme contrasts, a technique called HDR (high-dynamic-range) imaging was utilized. This specific composite picture consists of seven individual ones blended together to create a more detailed image with less contrast. The technique involves taking a sufficient number of pictures with apertures ranging from low (-3) to high (+3) so most details are captured, and then using specialized software to blend them as naturally as possible." It takes an acute eye, Landry says, but using HDR is a pleasure. If you try it, pay close attention to the blending. Otherwise, "you will achieve odd results which are not at all natural."

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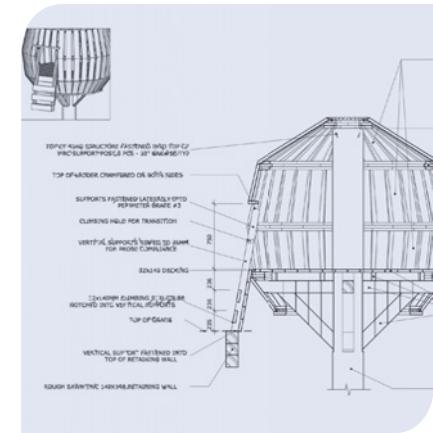
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**Wetlands are where the web of life is finely woven with particular richness.**

NORTH GLENMORE WETLAND, ALBERTA, 2015: 98 DIFFERENT BIRD SPECIES HAVE BEEN IDENTIFIED HERE. THE WETLAND WAS BUILT FROM SCRATCH 5 YEARS AGO. | TERRES HUMIDES DE GLENMORE NORD, ALBERTA, 2015 : 98 ESPÈCES Y ONT ÉTÉ IDENTIFIÉES. LES TERRES HUMIDES ONT ÉTÉ CRÉÉES DE TOUTE PIÈCE IL Y A CINQ ANS.

PHOTO BERNIE AMELL

BERNIE AMELL

# BETWEEN-NESS

**FR\_>LP+**

UNE RICHESSE PARTICULIÈRE

EN\_

**SO JUST WHAT** is a wetland, after all? Depending on where you live, a wetland could be a cattail slough, a peat bog, a white cedar swamp, a salt marsh or a sedge fen. Perhaps it is as relevant to ask what a wetland isn't: a neatly edged golf course water feature or a stormwater "lake."

## TO ACCEPT THE UNTAMED

The obvious condition, that there is water or wet soil in a wetland, at least seasonally, could as easily be said of any shoreline and of many artificial water features. There is another quality to a healthy wetland that is ecologically and aesthetically distinct. Serving as the place between upland and aquatic terrain, wetlands are where the web of life is finely woven with particular richness. This "between-ness" characteristic is readily apparent to most animal species, so that in a given bioregion the majority of animals rely on wetlands for some aspect of their lives. So, too, do most people find wetlands fascinating, if they are able to accept to some degree the untamed wildness that is their essence. More of that emerging acceptance later...

What is an ecological web but a set of relationships among entities, basic elements and flows? There are profound implications for ecological design in this understanding. Aspiring to restore or create a wetland, we should seek first to understand in their essence the flows of minerals, organics, water and energy that exist in a healthy, resilient wetland. How do hydraulic flows and floods interact over centuries and millennia of sediment transport and deposition processes to create the bones of the landscape? How do the rooting and senescence of wetland and riparian plants respond to the basic soil structure then eventually transform it? How do animals use and alter this soil and vegetation matrix? What are the essential weaving points (nodes or niches) in this landscape that define it and give it resilience? How does this whole complex web alter the rate of flow of carbon, nutrients and fine sediments to streams, lakes or the sea? Can we effectively integrate human objectives, like water purification, with the essential natural characteristics of a wetland? Clearly, this daunting degree of complexity evades the scope of our own or any specific professional discipline.

## AN AESTHETIC WARY OF WILDNESS

We also face the challenge of a culture long immersed in an aesthetic that is wary, even hostile, to the forms of wildness.

How often in public meetings do you encounter an explicit statement like, "If I want to see a swamp, I will go out duck hunting! Don't give me that stuff at my back door!" Sometimes the objections are more diplomatic (and sometimes much less.) Nonetheless, the sense of beauty is largely culturally determined, doesn't change very quickly, and it is not appropriate in a free society to simply dismiss the aesthetic sensibilities of the general public.

## BETWEEN-NESS

My conviction is that the landscape architecture profession shares an important characteristic with wetlands, that of "between-ness." And, like wetlands, our special value arises from understanding our strengths and limitations within the web of other professionals, politicians, administrators and the public.

At our best, we can act as communication bridges and creative integrators among the disparate understandings and sensibilities of more specialist disciplines and of widely divergent publics. Only extreme hubris would lead us to determine design forms before we have fully listened to and comprehended the knowledge of biologists, hydrologists and water quality experts. However, our profession can bring forward design syntheses that more singular focused mindsets could not imagine. Ecological design requires a contextually subtle balance among "What is" (science), "What is feasible" (engineering), "What should be" (culture/politics) and "What could be" (design creativity). When done well, the resulting light-handed leadership is particularly valuable in gradually shifting the public perception of the place of wildness within our cities and towns. We should celebrate the role that our profession is serving in this emergence of a truly "new world" aesthetic.

In reality, we cannot fully recreate the subtlety of a long-established healthy wetland in the few years available to project construction and early management. As illustrated by the examples described in this journal however, we can design with sufficient understanding of the main processes, of the basic weave of the web, and of enduring cultural values, so that the landscape will be well launched toward the biodiversity, productivity, pattern and resilience that will emerge over decades.

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TONY BOWRON

# RETURNING THE TIDE

CHEVERIE  
COGMAGUN  
ST. CROIX  
WALTON  
SALMON RIVER  
MONITORING

1 TIDAL CHANNEL ELEVATION SURVEY TO IMPROVE RESTORATION DESIGN 2 CHÈVERIE AT LOW TIDE AT SUNSET | 1 LEVÉE DE L'ÉLÉVATION DU CHENAIL DE MARÉE POUR AMÉLIORER LA CONCEPTION DE LA RESTAURATION 2 LA MARÉE BASSE AU COUCHER DU SOLEIL DANS LA CRIQUE DE LA CHÈVERIE

PHOTOS TONY BOWRON



# 10 YEARS OF TIDAL WETLAND RESTORATION

2

“

**Restoration is not about putting the clock back. It's about starting the clock ticking again.”**

...ALAN WATSON FEATHERSTONE –  
FOUNDER & EXECUTIVE DIRECTOR OF TREES FOR LIFE

## >FR\_LP+

INVERSER LA VAGUE :  
10 ANS DE RESTAURATION

EN\_

**“OH, YOU'RE DOING** it for the fish and birds? Well, in that case..."

With these words, the Province agreed to fund Nova Scotia's first intentional salt marsh restoration project in 2005. Ten years and as many projects later, the Province, together with CBWES, has restored tidal flow, fish passage and wetland habitat conditions to over 225 hectares of degraded and lost coastal systems.

A decade ago, little was known about the ecology of these dynamic coastal systems: how they would respond to restoration efforts, and whether or not it was even possible to "start the clock ticking again." Now, it is tremendously gratifying to say with scientific certainty – we have the monitoring data to prove it – that it is possible to "return" the tides.

## **“IT'S THE HYDROLOGY, STUPID...”**

This was the key message given to us by salt marsh restoration experts in New England as we planned our first project. Since that time, regardless of the restoration activity itself – be it anything from culvert replacement to dike breaching to new construction – our goal has been to restore a more natural hydrological regime: to re-establish tidal wetland habitat conditions

similar to those which were in existence prior to the damaging alteration. Removing barriers and returning the tide, however, is not enough. These tidal wetlands must be in balance with present day conditions, be self-sustaining and possess the resiliency and capability to adapt to future eventualities.

When we focus the restoration on the primary variables driving ecosystem response – hydrology and marsh surface elevation – the other wetland components will respond rapidly. Through comprehensive, long-term ecological monitoring, we have tracked the positive changes to soils, salinity, vegetation, fish, birds and invertebrates. This applies not only to the work with tidally restrictive culverts at Cheverie Creek, or with breached agricultural or impoundment dikes on the Walton River, but also to more active restoration work, such as the design and construction of tidal channels and ponds at the St. Croix site.

## **CHEVERIE CREEK: SOMEONE HAS TO BE FIRST**

Our first salt marsh restoration in Nova Scotia was Cheverie Creek, a small tidal river with a causeway across its mouth. It was fitted with an undersized culvert that restricted tidal flow to less than 5 hectares of the former 43 hectare salt marsh and associated tidal river. Collaborative work to restore flow began in 2002, spearheaded by the Ecology Action Centre, the local community and Saint Mary's University.

In 2005, the Nova Scotia Department of Transportation replaced the old wooden box culvert with a significantly larger elliptical aluminum culvert. This increased tidal flow by 88 per cent, and provoked an 8-fold increase in the area flooded upstream. I had the privilege of being part of every stage of this development, and as we watched the rapid conversion of the vegetation community from fresh water and terrestrial-dominated to tidal wetland, I had to admit, I had never been so happy to see trees die.

## **WALTON RIVER: WHEN THE DIKES COME DOWN**

Our second salt marsh restoration project was smaller in size and complexity, but had the distinction of being the first intentional dike breach in the province. The design, such as it was, consisted of excavating five 150 to 200 metre breaches in the dike and back filling the parallel sections of the borrow pit.

Within the first year following earthworks, a 12 metre by 4 metre channel eroded within the central breach, reconnecting the re-activated creek network (including the remains of the borrow pit.) Sedimentation and vegetation colonization rates were so high that by three years post-restoration, the marsh surface elevation approached that of intact reference marshes and was nearly completely re-vegetated by halophytic vegetation.

The Walton project was followed four years later by other dike breaching projects



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with much greater restoration design. On the Cogmagun River, we worked on a failing fresh water impoundment similar to Walton's, while on the St. Croix River, the project involved agricultural dikes, aboiteaux and fallow fields. For both, the restoration designs were developed using a combination of historical imagery, ground-truthed LiDAR data and detailed flood modeling. Dike breaches and excavated tide channels were matched to individual delineated drainage basins, historical channels and/or ditches. By matching breaches and channels to remnant wetland features, we significantly reduced the size of breach necessary, thus considerably reducing construction time and costs while still ensuring full hydrological and ecological recovery.

#### **EXPANDING THE TOOL BOX**

Building on these experiences, four additional restrictive culvert replacement projects have been completed and three more initiated. Four were highway crossings; the remaining two included culverts and small bridges along sections of former rail lines turned public trail systems. At Antigonish Landing North, we also excavated an extensive tidal creek network with open water ponds in order to create fish and waterfowl habitat. These projects demonstrate that it is possible to restore tidal wetland ecosystems and that species recovery can occur rapidly. Re-establishment of wetland vegetation has been observed to occur within the first three years, with species assemblages approaching that of intact marshes by five years.

Given that the loss of coastal wetlands in the Bay of Fundy alone is in excess of 80 per cent and that tidal barriers are present on nearly 60 per cent of tidal systems, the benefits of each successful restoration project go far beyond the local ecology. Our ability to plan and design projects like Antigonish Landing has been significantly strengthened by the research carried out in collaboration with professors and students at Saint Mary's University over the decade, utilizing the project sites to study both salt marsh ecology and restoration design. Each restoration project included a one-year pre- and five-year post-restoration monitoring program. We collected data on a number of physical and biological indicators in order to document the nature, extent and direction of changes in hydrology, soil conditions and vegetation, and in fish and invertebrate populations, in response to the restoration activity. Each restoration site is paired with a healthy wetland (a reference marsh) and by comparing conditions at the two sites we are able to determine how well the restoration site is doing.

The most dramatic indicator of habitat change following restoration is the visible return of tidal flooding and the changes in vegetation community structure. Hydrological recovery is both immediate with the first incoming tide, and subtle with the re-activation and development of the hybrid creek network systems within each site. Given the agricultural history of many regions, the re-established creek systems following restoration tend to be a combination of historical channels and remnant agricultural ditches.

#### **ALLOWING FOR THE UNPREDICTABLE**

The monitoring allows us to measure project success: we succeed if conditions at the restoration site resemble those of the reference wetland. None-the-less, conditions at a recovering site may well differ from those at the reference site. This does not mean a failed project. We have learned that restoration objectives cannot be too prescriptive or inflexible; we must allow for the variability and unpredictability of nature. Tidal wetlands are dynamic and often disturbance-driven systems; a wetland's features and functions can change as it recovers and matures. In the Bay of Fundy, for example, just one storm can deposit centimeters of sediment, which can substantially change flood patterns, soil conditions and ultimately, the plant community.

Success depends primarily on understanding the morphodynamics of a system and the interactions of its key physical and biological processes. If, for example, marsh surface elevations are low and the sediment supply and deposition rates are insufficient to keep pace with the restored hydrology, then the project is unlikely to prosper. The continued inclusion of monitoring as part of each new project enables us to determine individual project success, increases our understanding of these habitats and improves our ability to design future restoration projects.

Our pilot projects have been successful in restoring natural hydrology: we often have productive wetland sites within two years of restoration. However, the reality is that many of these projects represent the so-called low hanging fruit. Future projects are likely to face greater demands, and be larger in geographical



scale and complexity. Climate change, sea level rise and an increase in the frequency and severity of storm events are likely to pose greater risks to intact coastal systems, recovering habitats and adjacent built infrastructure, than ever before. Whereas our projects were undertaken to restore wetland habitat, going forward, designing for climate change adaptation and coastal resilience is likely to become the primary driver of wetland restoration, with ecological/habitat benefits being secondary. The restoration work is increasing our understanding of the form and function of these systems and better preparing us for the future.

**tony.bowron@cbwes.com**

**3** SALMON RIVER SALT MARSH IN FALL **4** VITAL MEMBER OF FIELD TEAM AT WALTON, 7 YEARS POST RESTORATION **5** FIELD CREW COMPARING VEGETATION SURVEY NOTES **6** NEW CHEVERIE CULVERT IN 2009, 4 YEARS POST RESTORATION **7** SURFACE ELEVATION AND SEDIMENT DEPOSITION MONITORING AT COGMAGUN 4 YEARS POST RESTORATION **8** NEW TIDAL CHANNEL AT COGMAGUN 2009 **9** COGMAGUN 2013: SALT MARSH VEGETATION EMERGES AT HIGH TIDE **10** COGMAGUN SUNSET, 4 YEARS POST RESTORATION | **3** COULEURS D'AUTOMNE DANS LE MARAIS SALANT DE LA RIVIÈRE SALMON **4** MEMBRE INDISPENSABLE DE L'ÉQUIPE À WALTON, SEPT ANS APRÈS LA RESTAURATION **5** ÉQUIPE D'EXPLORATION COMPARANT LES RELEVÉS DE LA VÉGÉTATION **6** LE NOUVEAU CANAL DE LA CHÈVRERIE EN 2009, QUATRE ANS APRÈS LA RESTAURATION **7** RELEVÉ DE L'ÉLEVATION DE LA SURFACE ET DU DÉPÔT DES SÉDIMENTS **8** EXCAVATION DU NOUVEAU CHENAIL DE MARÉE À COGMAGUN EN 2009 **9** LA VÉGÉTATION DU MARAIS SALANT ÉMERGE À MARÉE HAUTE SUR COGMAGUN EN 2013 **10** COGMAGUN QUATRE ANS APRÈS LA RÉNOVATION. **PHOTOS TONY BOWRON**

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8



9



10



# FOREST LAKES COUNTRY CLUB

NOVA SCOTIA, CANADA

1. CURRENT ENTRANCE (SECONDARY)
2. THE LODGE
3. EAGLE VIEW DRIVE
4. EQUESTRIAN AREA
5. CONDOMINIUMS / TOWNHOUSES
6. BOAT HOUSE / SKATING / SOCIAL AREA / PICNIC
7. DEER VIEW PASS
8. HIGHLAND DRIVE
9. TRAIL NETWORK
10. NICKLAUS DESIGN GOLF COURSE
11. FARMERS MARKET / COMMERCIAL AREAS
12. FAMILY ENTERTAINMENT CENTRE
13. VILLAGE CENTRE / COMMERCIAL & PEDESTRIAN AREA
14. TENNIS COURTS
15. HOTEL & SPA
16. PETROL STATION
17. MAIN ENTRANCE
18. FUTURE MOTORWAY INTERCHANGE
19. DRIVING RANGE
20. GOLF CLUB HOUSE



ENGEL VOLKERS  
RESORTS



1



2

MARGOT YOUNG

# A QUESTION OF BALANCE

DESIGNING A GOLF COURSE THAT IRRIGATES ITSELF – AND CONSERVES ITS WETLAND SETTING

## FR\_RESUMÉ

### UNE QUESTION D'ÉQUILIBRE

Au centre de villégiature Forest Lakes de Nouvelle-Écosse, l'eau de pluie sera récoltée pour répondre aux besoins des habitants et irriguer le golf. La démarche avait notamment pour objet de préserver les écoulements d'eau irrigant plusieurs complexes de terres humides importants sur le plan écologique.

## EN\_

**IF WE ARE** to truly conserve wetlands in the long term, much more is required than simply delineating the wetland and establishing a preservation zone around it. Wetlands are intimately interconnected with the hydrology of their landscape. Conservation, therefore, requires a design response that is built upon ensuring the continuation of surface and subsurface water flows as land is developed.

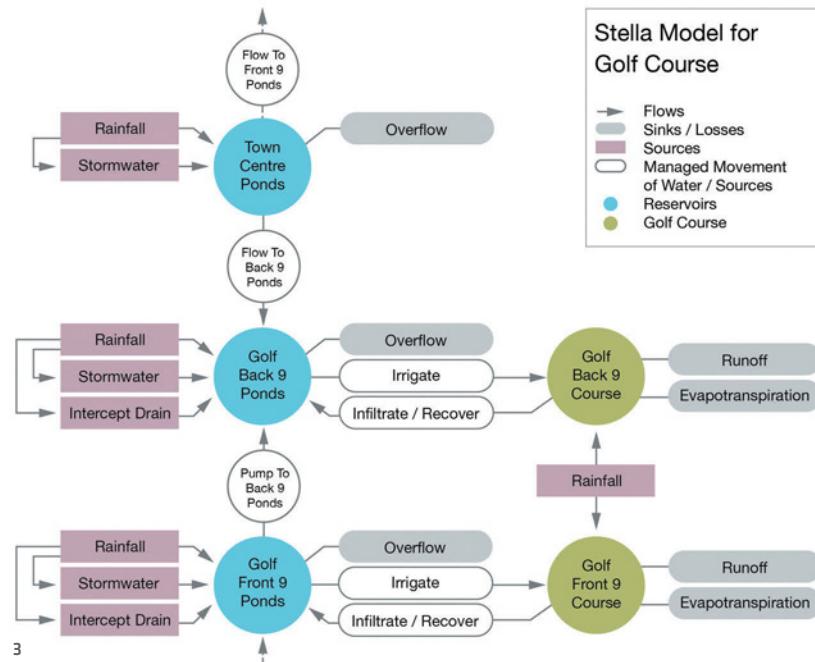
Forest Lakes Country Club is a master planned community proposed for West Hants, Nova Scotia. At build-out the project will encompass 2000 acres [809 hectares] and include up to 2700 dwellings, a town centre and a Nicklaus Design golf course. Geologically, the project is located

on the flat tops of old mountains, and straddles the primary watershed divide in the province. In this hilltop location, there is no upstream flow to provide water for human consumption and golf course irrigation, limited downstream/off-site flow to allow for the dilution of treated sewage and other site runoff, and significant groundwater interaction/sensitivity. The landscape vernacular is an array of small hills (gravel and clay drumlins) set within a matrix of low lands and wetlands.

The challenge at Forest Lakes was two-fold: to both find and develop a water supply for human use and golf course irrigation and, simultaneously,

**1+2** FOREST LAKES COUNTRY CLUB: A MASTER PLANNED RESIDENTIAL RESORT COMMUNITY SET IN 1,700+ ACRES OF PRISTINE WOODLANDS + ENCOMPASSING A GOLF COURSE (ARTIST'S IMPRESSION OF HOLE 13) **3** STELLA WATER FLOWS

**Wetlands are intimately inter-connected with the hydrology of their landscape. | Les terres humides sont intimement connectées à l'hydrologie du paysage.**



to maintain the natural water flows necessary to conserve the extensive wetland complexes.

#### THE NATURAL SYSTEM

The project master plan contains many elements that serve to redirect water as land is developed, including potable water and sewer systems, trenches, road beds, ditches, and cut off and foundation drains. These elements are generally designed without considering the influence they exert on the ecological function of the local hydrologic regime that includes wetlands.

A water balance is an effective tool to understand the mass balance of all water flows and storages, including the location, quantity, and timing of the flows. This modelling does not simply match pre- and post-development flows in streams, but matches, as much as possible, all water storages and flows on the site. The tool was developed by EDM Environmental Design and Management Limited, a planning, landscape architecture and engineering firm in Halifax, Nova Scotia.

The water balance is established first to allow designers to understand the natural system, including stream flow, ground water, runoff, rainfall and evapotranspiration. It can then be used to simulate proposed changes; as development proceeds, planners incorporate information about required sanitary sewer and water supply systems, storm water systems, irrigation use, and so on. For small sites, spreadsheet models can be used; more involved sites require specialized software. The water balance for Forest Lakes was created in Stella (ISEE Systems, Inc.), a widely used language for dynamic simulation models, which allowed the landscape architects, modellers and engineers to test a variety of design approaches.

Once created, the pre-development water balance for the project revealed an interesting phenomena, not uncommon in Canada. There was a sufficient quantity and quality of rain water falling on the roofs and the golf course to satisfy the human use and golf irrigation needs.

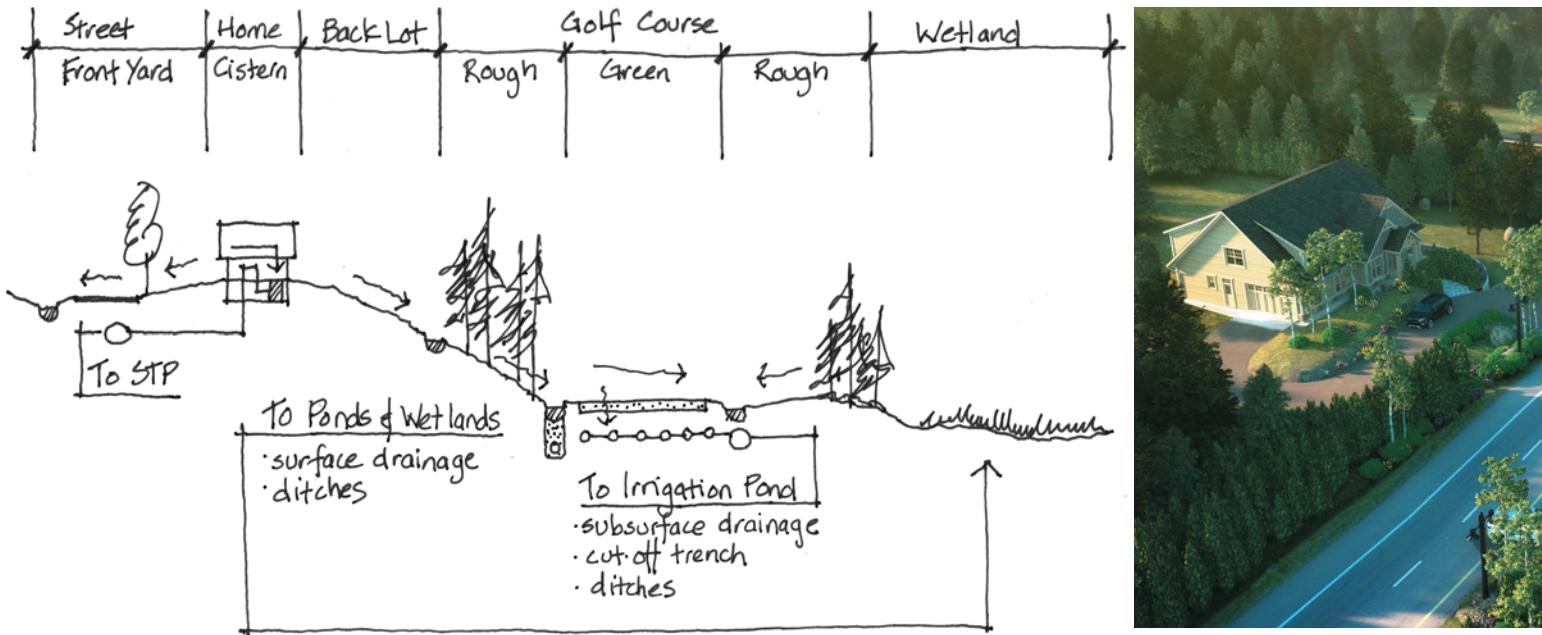
The problem was the timing of the rain. Instinctively we know this; there is enough rain to grow grass in Canada, but to grow perfect turf, we need to control the timing and quantity of the rainfall.

#### DESIGNING A TIGHT WATER CYCLE

As scenario modelling progressed, several design principles emerged. Firstly, designs with a tight water cycle, where the water was harvested, used, treated and then returned in close proximity performed best. Extensive pipe networks for potable water and sewage that cross multiple sub-watersheds became very difficult to balance, suggesting that large central water supply and sewage treatment plants are often at odds with conserving local hydrological balances.

**1+2 FOREST LAKES COUNTRY CLUB : UN CENTRE DE VILLÉGIATURE RÉSIDENTIEL SERTI AU MILIEU DE PLUS DE 1700 ACRES DE FORÊT VIERGE ET ENGLOBANT UN GOLF (ILLUSTRATION DU TROU 13).**

**3 ÉCOULEMENT D'EAU DANS LE MODÈLE STELLA.**  
**PHOTOS 1+2 TERRA FIRMA DEVELOPMENT CORPORATION, WWW.TFDC.CA 3 ENVIRONMENTAL DESIGN AND MANAGEMENT (EDM)**



Secondly, effective water harvesting and flow conservation quickly became dominant site grading criteria. These issues would significantly influence the layout and overall look and feel of the project. Each sub-watershed required a unique design expression to achieve the water balance.

#### **EXCHANGING STORMWATER RUNOFF FOR SEWAGE FLOWS**

Phase 1D is comprised of single family homes on a small drumlin hill overlooking several large, functionally significant wetlands and the golf course. In this phase, roof water from all of the homes is harvested and stored in cisterns for potable water use. Once used in the home, sanitary sewage is collected in vacuum sewers in the streets and directed to a small sewage treatment plant that treats and then discharges the effluent to one of the wetlands. The sewage treatment plant serves homes that are located in three sub-catchments on the hill, and without water balancing, the wetland that

receives the treated effluent would be hydrologically overloaded. To balance the flows, stormwater runoff from lots and streets that would otherwise be tributary to the wetland receiving the effluent, is redirected out of the sub-catchment to a stormwater pond and to the other wetlands that have been deprived of flow. In this way, the flow of rainwater -> cistern/human use -> sewage that is imported from outside the sub-catchment is balanced with rainwater -> lot/street runoff -> storm water that is exported from the sub-catchment.

To conserve the wetlands, the timing and distribution of the receiving water flow is as important as the balancing the quantity of flow. The sewage treatment plant discharges its flow to the wetland via a sand trench that runs along the side of the wetland. The sand trench polishes the flow and mimics the natural timing and location of ground water flow; the trench also accommodates a community trail. The stormwater ponds slow down the stormwater runoff, provide some

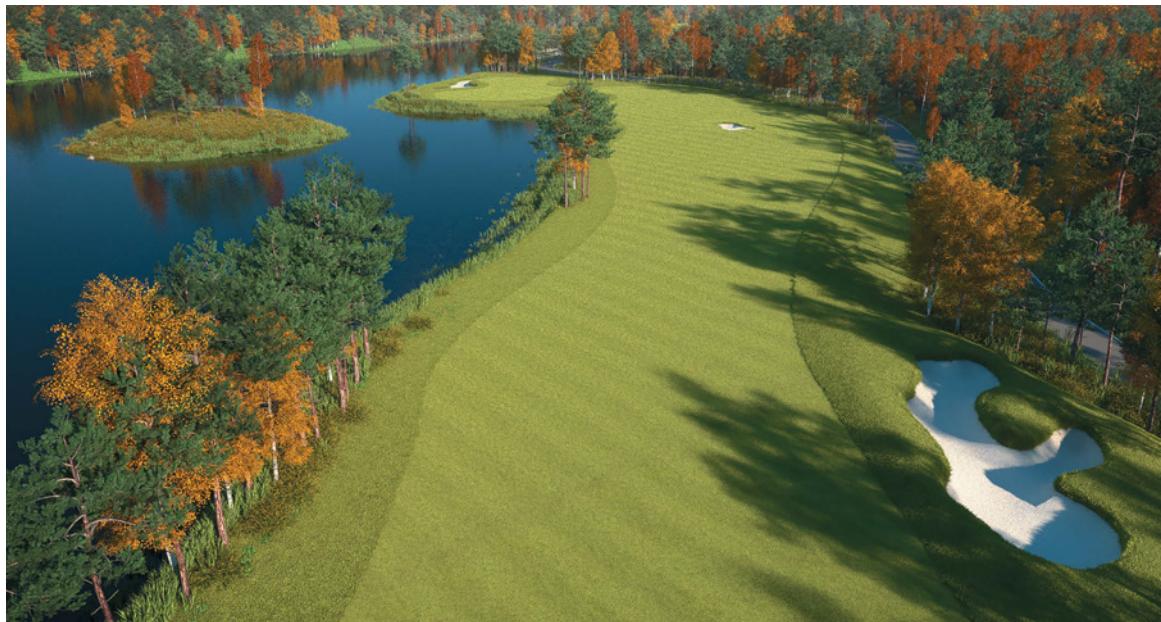
treatment, and have multiple outlets to drainages that match the location and the timing of the predevelopment flow to their wetlands.

Other flows that are commonly redirected to protect structures, such as foundation drains, are redirected back to their natural path as quickly as possible, rather than diverting them at distance. This approach, which limits the flow interruption to the hydrologic regime, requires significantly more culverts and ditches than would otherwise be needed.

#### **WATER HARVESTED FOR GOLF IRRIGATION**

The Nicklaus Design golf course presented an enormous challenge because of the volume of water required to irrigate the course. The key was to incorporate all flows that were naturally tributary to the golf course. These flows constitute the "sustainable harvest." Rainwater falling on the course, sub-surface flows, surface and ground water from adjacent uphill areas – all of these natural tributaries were

**Each sub-watershed required a unique design expression to achieve the water balance.** | Chaque élément du bassin hydrologique a nécessité une expression conceptuelle unique pour atteindre l'équilibre.



harvested. Rather than using sub-surface drainage tile and cut-off trenches to direct water away from the course, for example, these systems were re-configured to direct water, via a series of ponds, to the main irrigation pond. A diagram of the Stella model for the golf course is illustrated. (See p. 27.)

To achieve this comprehensive water collection and irrigation system, the course had to be located and designed to slope towards the irrigation pond, or to allow water to be effectively piped towards the pond. Precise grading would allow the maximum amount of water to be harvested when it rained and then held in ponds and used for course irrigation as required.

Storing sufficient quantities of water was a second key design challenge. The harvesting system needed to capture and store water from large rainfall events since the course would have to be able to withstand drought. The aesthetics of ponds where water levels fluctuate significantly was also a concern. The

scenario modelling and water balance tool allowed us to divert water to the golf course ponds from areas in the community where there was rapid runoff, such as the town centre and its streets, to immediately fill the irrigation ponds. This would keep pond levels more stable and make irrigation water readily available for the golf course. To maintain the wetland and stream habitats from which this runoff water was diverted, the system, via a series of secondary ponds, would substitute back water collected from the course. In this way, the ponds became important tools for maintaining the site water balance.

#### CALIBRATING TO LOCAL CONDITIONS

Calibrating the model to local conditions is essential to the effective use of the water balance tool. At Forest Lakes, a sample hole is proposed, which will allow planners to monitor the sub-surface flow and update the model. EDM developed the model after many successful (and some unsuccessful) restoration projects,

led them to understand that the most important elements in landscape conservation are the soils and hydrology, and of those two, for wetlands, the hydrology is paramount.

**Margo Young:** [my@edm.ca](mailto:my@edm.ca)

**FOR FULL PROJECT CREDITS > LP+**

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**4 GOLF CASE: CROSS SECTION** **5 HOUSING IS DESIGNED TO COMPLEMENT THE PICTURESQUE SURROUNDS: ROOF WATER WILL BE STORED IN CISTERNS FOR POTABLE WATER USE** **6 THE FIRST NICKLAUS DESIGN GOLF COURSE IN ATLANTIC CANADA: FOR COMPREHENSIVE WATER COLLECTION, THE COURSE SLOPES TOWARDS THE IRRIGATION POND** **4 VUE TRANSVERSALE DU GOLF** **5 LES HABITATIONS SONT CONÇUES POUR S'AGENCER AVEC LE CADRE PITTORESQUE: L'EAU DE PLUIE SERA STOCKÉE DANS DES CISTERNES AFIN D'ÊTRE BUE.** **6 LE PREMIER GOLF DE NICKLAUS DESIGN DES MARITIMES: LE TERRAIN EST INCLINÉ POUR QUE L'EAU S'ÉCOULE DANS L'ÉTANG D'IRRIGATION.**

**PHOTOS 4 EDM** **5 + 6 TERRA FIRMA DEVELOPMENT CORPORATION**

CHRIS PENNER

# A ROLE FOR THE APPLIED ECOLOGIST

1

## >FR\_RESUMÉ

**UN RÔLE POUR L'ÉCOLOGIE APPLIQUÉE**  
 Trois ans à peine après la première pelletée de terre dans ce qui était autrefois un champ de blé, la zone humide de Royalwood avait tout l'air d'une zone humide en santé. Le succès environnemental de Royalwood a changé la donne dans l'industrie de l'habitation de Winnipeg, en grande partie grâce à l'expertise en biologie appliquée de Scatliff+Miller+Murray.

EN\_

**ABOUT A DECADE** ago, I brought a colleague out to see a wetland in Royalwood, a new Winnipeg sub-division for which Scatliff+Miller+Murray was the lead landscape architect. It was a perfect fall day. The cattail and bulrush beds were surrounded by native prairie grasses swaying in the uplands. It was fantastic, my friend said, that the developer could build around the prairie remnant and preserve the wetland.

It was probably the highest compliment I could have received! In actuality, the wetland is not a holdover from the past. I am an applied ecologist working with seasoned biologists, landscape architects and engineers and together we constructed and revegetated the three hectare naturalized stormwater retention basin (NSRB) in 2003, on what was once a wheat field.

This was a new concept in Winnipeg at the time. Essentially, the NSRB design is a rethink of the conventional storm water retention basin (SRB). As it turned out, this project was a game-changer in Winnipeg's housing industry and a major environmental success story.

## NATURALIZATION IS NOT A NEW IDEA

But before I get ahead of myself... naturalization was not a new idea. However, at that time, large naturalization efforts in urban centres hadn't gained acceptance as a practical landscape option. The final products failed to achieve the intended results, or even the intended look.

This changed at Royalwood. S+M+M contacted the applied biological expertise they needed. The ecologists used language, performance specifications, site preparation and planting methodology which no one in the architecture industry at the time had heard of. They set up for large, field-scale operations, providing actual quantifiable revegetation performance standards, a step-wise schedule of major tasks and a date for final commissioning. They could tell the firm and the client what the wetland would look like. And they based all of this on field-proven techniques, scientific research and sound agronomic practices.

Fast forward three years after the shovels hit the ground: Royalwood looked

like a wetland should. It had been less expensive to construct by hundreds of thousands of dollars than a conventional SRB. The shoreline erosion, which had been a concern with city engineers, did not materialize. There was much less algae: 300 times less in mid-to-late summer than a comparable conventional pond analogue. The water leaving the subdivision was, and still is, measurably cleaner than water leaving subdivisions with the older SRB design. In recent tests, water leaving Royalwood had around 13 times less dissolved phosphorous in mid-to-late summer than the conventional pond. The water is generally cleaner than the nearby river that accepts the water. As an added perk, shoreline property values are higher here than beside older SRBs.

## ECOLOGICALLY SPEAKING

The difference in water quality is, in large part, a function of a robust and properly designed wetland plant community. In short, the wetland and its native grassed uplands behave more like a system, while a conventional SRB acts more like an ecological dead end.

An eye-lash fringe of cattails along the shoreline does not a functional wetland-system make. Here, there were no weeds, just a stable native grass/forb planting from the shoreline to freeboard. This condition did not change over time. The plantings are sustainable, requiring only



minor and infrequent maintenance. Even better, the wetland plant community created a more interesting environment for residents.

#### **DEFINING SUCCESS**

Often, attempts at naturalization fail. S+M+M realized very early on that when it came to wetlands revegetation, the firm was feeling its way in the dark. Only by bringing in the biological experts who used established science-based protocol would they be able to do justice to the naturalization concept. Royalwood marked the first time a Winnipeg project made the transition from concept to successful execution. It served as a benchmark that virtually redefined successful native revegetation.

A decade later, based on the long list of successful, low maintenance NSRB projects and their widespread popularity with developers, the City made the NSRB design the new 'standard convention'. And at S+M+M, our environmental team has grown our business by sub-consulting to other landscape architects and engineers. Both professions play a critical role in advocating for better performance standards and in employing proven revegetation practices.

As a revegetation biologist, my personal goal has always been to make a positive change environmentally, and I have therefore been fortunate to be working with LAs and engineers who have opened

**...Royalwood was a game-changer in Winnipeg's housing industry and a major environmental success story. | ...Le succès environnemental de Royalwood a changé la donne dans l'industrie de l'habitation de Winnipeg.**

the doors to innovation. Today, I can walk beside many a constructed wetland, with its expansive vegetated plateaus, cattail islands and natural-looking coves and channels, then continue through a lush landscape of planted prairie grasses, thinking about the next change on the horizon.

**cpenner@scatliff.ca**



2

**1** ROYALWOOD WETLAND: THE 3 HECTARE NSRB CREATED IN 2003 ON WHAT WAS ONCE A WHEAT FIELD **2** WATER LEVEL IN FALL IN THE DEEP MARSH ZONE | **1** ROYALWOOD WETLAND A REVÉGÉTALISÉ LE BASSIN DE RÉTENTION CRÉÉ EN 2003 LÀ OÙ S'ÉTALEAIT AUTREFOIS UN CHAMP DE BLÉ. **2** LE NIVEAU D'EAU DANS LA ZONE DE MARAIS PROFOND EN AUTOMNE. **PHOTOS SCATLIFF + MILLER + MURRAY**

MICHEL ROUSSEAU, AAPQ, FCSLA

# WET DESIGN MEI DESIGN

## >EN\_LP+ WET DESIGN

FR\_

### DRÔLE DE TITRE

pour un article. D'avantage une association de mots qu'une nouvelle expression, mais ceci résume bien une nouvelle façon de faire qui s'offre à l'architecture paysagère. Il s'agit de considérer la présence d'eau dans le design d'une ville. Avec le réchauffement climatique, tous les pays se sentent concernés par l'eau à plus d'un point de vue : le rehaussement du niveau des mers, les tempêtes tropicales, les réserves d'eau douce, les sécheresses... Le Canada est un pays marqué par l'eau. La glace a façonné l'est du pays. L'Ontario et le Québec possèdent les plus grandes réserves d'eau douce. Les villes situées dans la vallée du St-Laurent évoluent dans un climat tempéré où les précipitations sont nombreuses. Pour la région de Montréal seulement, on compte plus de 1 000 mm de précipitations (combinaison de pluie-neige) annuellement. Et pourtant, rares sont ceux qui se soucient de la gestion de l'eau en milieu urbain. En ville, la pluie est une contrainte que les professionnels continuent de vouloir évacuer. De plus en plus d'architectes paysagistes et d'ingénieurs adoptent une approche durable de la gestion de

l'eau de pluie. Au lieu d'évacuer toute l'eau de pluie dans les conduites, on la redirige vers des aires de biorétention. Approche différente, belle amélioration, mais même résultat en fin de compte, on évacue l'eau.

Refrain connu, l'eau est source de vie. Vraiment? Pourquoi s'en débarrasser alors? Parce qu'elle constitue une contrainte au développement, elle limite le nombre de mètres carrés de terrain constructible! Élus, gestionnaires, professionnels, tout le monde pense comme des promoteurs immobiliers. Eau, source de vie... Pourquoi intégrer l'eau dans le design d'une ville? En fait, la question devrait être « Comment l'eau peut redonner vie aux villes »?

La protection et la restauration des milieux humides demeurent un sujet d'actualité. Plusieurs de ces milieux ont été perdus et ceux qui demeurent subissent une pression énorme. L'équipe que j'ai la chance de diriger travaille à mettre en valeur et restaurer de tels milieux. Nous avons appris avec les années à bien les caractériser avant d'intervenir de quelque manière que ce soit. Cette acquisition de connaissance nous a amenés à extirper l'essence même de ces milieux fragiles, mais riches, afin de la faire connaître aux citadins. Nous créons des milieux humides en zone urbaine, qu'ils soient marécage, marais ou étang. Nous intégrons ces paysages extraordinaires dans l'environnement quotidien des gens, nous les sensibilisons à l'importance de l'eau. L'eau peut être la solution à bien des maux, à bien des



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problèmes rencontrés en milieu urbain. Pour cet article, nous proposons de regarder plus en détail cette opportunité en fonction de certaines caractéristiques conceptuelles de l'eau : animation, temporalité et vie.

### ANIMATION

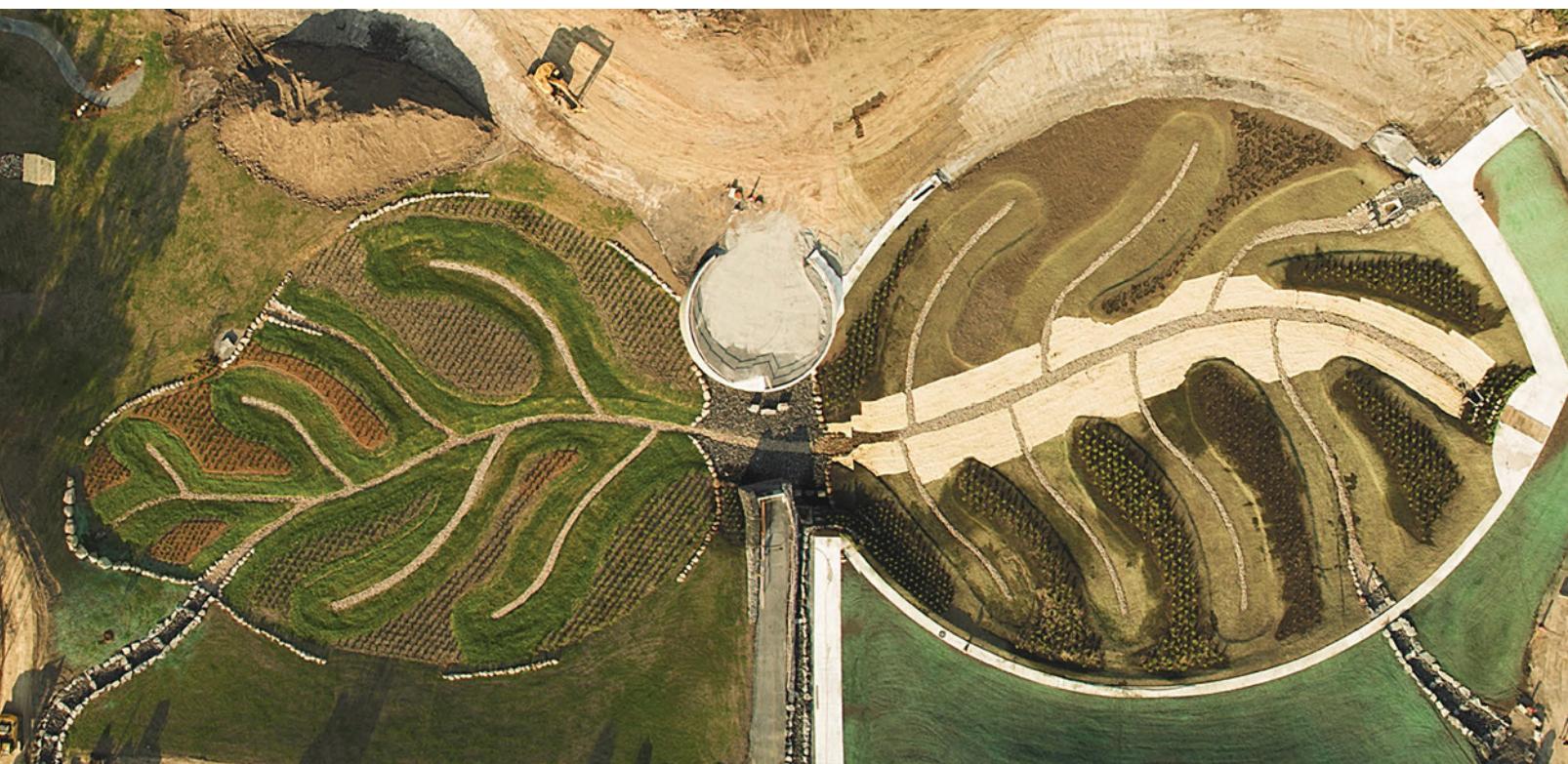
L'eau est toujours synonyme de mouvement. Elle fascine lorsqu'elle circule dans un ruisseau, tombe d'une cascade ou s'échoue sur la plage. Elle fascine même lorsqu'elle est parfaitement immobile. Le miroir qu'elle constitue dans un étang renvoie des images de tout ce qui est en mouvement autour. Une simple petite brise provoque des ondes à la surface de

**1+3** CRÉATION ARCHITECTURALE D'UN BASSIN DE RÉTENTION - PARC DES SEMIS, LONGUEUIL **2** CRÉATION D'UNE PLAGE URBAINE À MONTRÉAL - PLAGE DE L'EST - VUE NOCTURNE DE LA CRIQUE

PHOTOS MICHEL ROUSSEAU



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l'eau que tout le monde remarque. En milieu urbain, on peut exploiter l'aspect du mouvement de bien des façons. Les fontaines l'ont fait durant des siècles, elles ont animé, décoré et ébahie. La gestion durable de l'eau de pluie amène cette possibilité où la collecte et la gestion de l'eau en réseau, appelées réseau bleu, permettent l'aménagement à ciel ouvert de cette « contrainte » au développement. La récupération de l'eau de pluie peut se faire de manière architecturale ou artistique. Si l'aménagement d'un bâtiment ou d'une place publique est le reflet de notre culture sociétale, l'eau doit être une valeur qu'on exprime dans le façonnement de nos milieux de vie.

#### TEMPORALITÉ

L'eau nous provient de précipitations irrégulières, autant en termes de récurrence qu'en termes de quantité. Ce côté imprévisible et éphémère est une occasion incroyable à saisir pour créer des paysages changeants, des paysages qui se nourriront de cette dynamique. La dynamique des saisons est aussi un élément à considérer. Notre équipe aborde ses projets de manière événementielle où l'arrivée de l'eau de pluie est un spectacle qui se prépare. Tout en intégrant des éléments d'art pluvial dans nos aménagements, c'est tout le site d'un projet, d'un parc ou d'une rue qui s'anime avec la pluie. Cette actrice s'invite dans l'espace, prend place et interprète son rôle.

#### VIE

Au même titre que les milieux humides naturels, ceux créés en milieu urbain doivent être source de vie. Ils peuvent vivre selon l'animation que la pluie procure, mais avec une planification soignée, ils peuvent également constituer de petits écosystèmes viables et durables. En fonction du type de milieux humides naturels que l'on veut émuler, un choix de végétaux peut être fait pour créer une communauté. En gérant de manière intelligente et efficace l'eau de pluie, les végétaux croissent à une plus grande vitesse. Hormis la faune anthropique qui colonise à coup sûr ce type d'espace en ville, la faune ailée, l'herpétofaune et certains

...la question devrait être « Comment l'eau peut redonner vie aux villes ? | In fact, the question ought to be “how can water restore life to cities?”

petits mammifères viendront y faire un tour où s'y établir si les conditions sont propices. Sur le simple plan social, cette présence de la faune est bénéfique pour les enfants qui font face à un déficit nature documenté de plus en plus important.

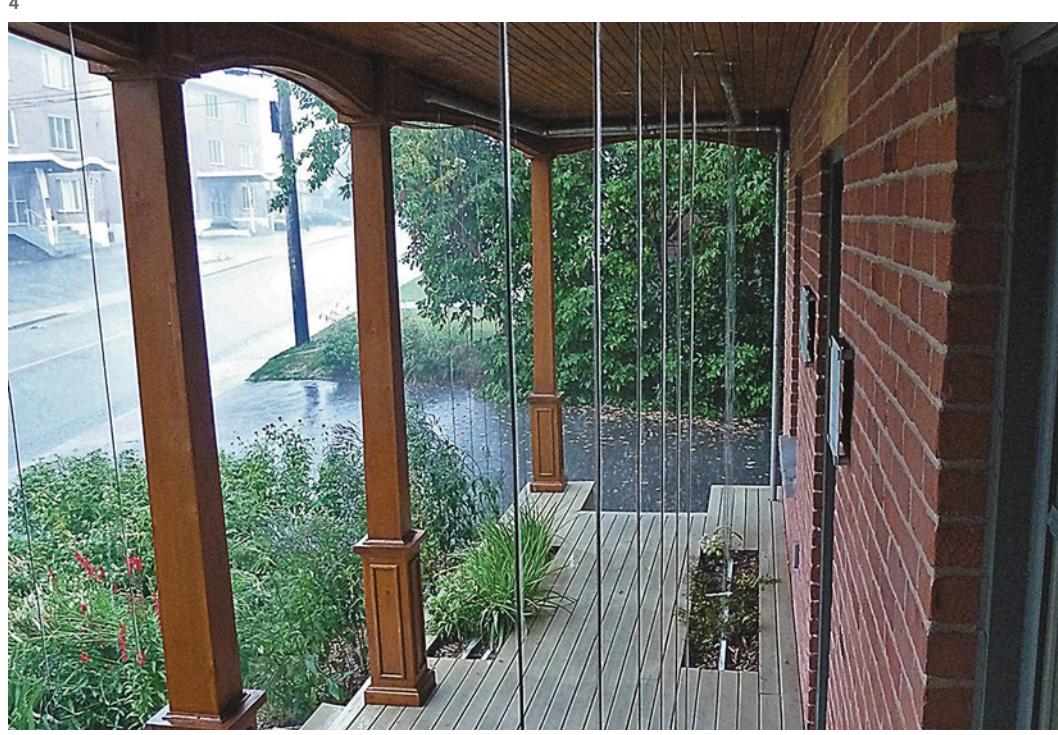
Il s'agit d'idées intéressantes, mais théoriques. Comment concrétiser ces opportunités de design? Notre équipe, qui y travaille régulièrement, vous propose un regard particulier sur certains projets qui ont exploré ces notions.

#### **INTÉGRATION À UN MARAIS EXISTANT - CENTRE COMMUNAUTAIRE SAINTE-DOROTHÉE, LAVAL**

Création d'un nouveau bâtiment public à proximité d'un milieu humide existant. Le marais s'alimente à partir de la friche environnante. Le nouveau bâtiment et son stationnement amènent une importante imperméabilisation des surfaces. Après avoir caractérisé le site, nous avons proposé une stratégie de gestion de pluie pour redonner la même quantité d'eau au marais en provenance des stationnements, mais filtrée par les plantes.

#### **QUE VIENNE LA PLUIE! - BUREAU DU GROUPE ROUSSEAU LEFEBVRE, LAVAL**

Figure 5 : L'aménagement ludique et événementiel de la façade d'un bâtiment commercial où l'eau de pluie est captée dans un ingénieux système de gouttières et de canalisations, descend le long de fils métalliques et alimente des bacs de plantation situés à même le pontage du balcon d'entrée. Ces bacs sont conçus comme un toit végétalisé. L'excédent d'eau de ces bacs se draine sous le balcon, l'eau glisse le long de poutres d'acier et termine sa course en une petite chute dans un bassin d'évapotranspiration.





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Celui-ci a été conçu comme un milieu humide, le fond du bassin ayant été imperméabilisé par une importante couche d'argile. L'objectif était de tester certains végétaux dans des conditions urbaines changeantes au niveau du taux d'humidité. Nous désirions également tester la capacité des végétaux de transpirer le surplus d'eau reçue. Contrairement à nos attentes, une très faible quantité d'eau reste en surface lors de fortes pluies. La mince couche de 30 cm de sol absorbe l'eau et les végétaux s'occupent du reste. Lorsqu'il pleut, il n'est pas rare de voir les passants s'arrêter devant l'aménagement et regarder le spectacle.

#### **CRÉATION ARCHITECTURALE D'UN BASSIN DE RÉTENTION – PARC DES SEMIS, LONGUEUIL**

*Figures 1 + 3 :* Projet de construction d'un immense bassin de rétention destiné à desservir un quartier résidentiel sur la Rive-Sud de Montréal. En plus de l'objectif de végétalisation du bassin de rétention, nous nous sommes appliqués à assurer la filtration de l'eau de pluie récupérée en intégrant des marais filtrants de manière architecturale. L'eau récupérée dans le bassin de rétention passe tout d'abord dans de petits bassins de décantation pour éliminer les sédiments plus grossiers. L'eau poursuit ensuite sa course dans les marais filtrants qui servent de champs de polissage pour éliminer les sédiments plus fins, le phosphore et les bactéries présentes. Les marais sont fonctionnels pour les pluies les plus fréquentes, c'est-à-dire les petites pluies, qui représentent environ 75 pour cent des pluies reçues.

L'image créée est une grande feuille dont la forme des nervures et des lobes

varie en fonction de la quantité d'eau reçue par les marais filtrants. La forme en plan, vue des belvédères ou du ciel, impressionne par son côté ludique et sa dimension. Il s'agit d'un bel exemple d'aménagement d'un milieu humide en zone urbaine, remplittant des fonctions de rétention, de filtration et d'habitat faunique tout en participant à la création d'un paysage nouveau et stimulant.

#### **REDYNAMISATION D'UN QUARTIER – BOULEVARD PIE IX, MONTRÉAL**

*Figure 4 :* Étude pour l'arrondissement Montréal-Nord, où la gestion de l'eau devient la ligne directrice de design pour repenser un secteur désuet, mais stratégique de la ville. Tout d'abord, l'eau de pluie des rues et des toitures est récupérée pour alimenter les arbres de rue et leur plate-bande longeant le boulevard. Celui-ci se retrouve ainsi avec un encadrement végétal latéral intéressant et fonctionnel.

Les quadrilatères donnant sur le boulevard ont été aménagés en îlots immobiliers dont chacun possède en son centre des espaces de loisirs, tantôt privés tantôt publics. Ainsi, nous avons proposé de récupérer l'eau de pluie pour animer ces espaces. Que ce soit la surface de jeux d'eau devant la bibliothèque, la fontaine au centre de la gare intermodale ou encore le jardin d'eau et ses marais filtrants au centre des habitations communautaires, l'eau agit à titre de liant social et d'agent d'animation. Qui a dit qu'il faut évacuer l'eau de pluie en ville?

#### **CRÉATION D'UNE PLAGE URBAINE – PLAGE DE L'EST, MONTRÉAL**

*Figures 2 + 6 :* Proposition finaliste d'un concours de design, l'aménagement

propose la récupération de l'eau de pluie d'une partie d'un quartier et sa filtration dans un milieu humide en lien avec le fleuve Saint-Laurent. La particularité de cet aménagement est sa mise en scène de l'eau et du milieu humide afin que les enfants du quartier et d'ailleurs, puissent y jouer en toute sécurité.

Des jeux d'eau près du pavillon amusent les enfants sur le plateau supérieur. L'eau transite ensuite vers le milieu humide en contrebas et circule au centre de l'espace. Les jeunes peuvent s'y tremper les pieds et sauter d'une pierre à l'autre. L'eau poursuit sa course au travers des marais filtrants et est ensuite pompée et retournée vers les jeux d'eau en amont. L'excédent d'eau est redonné au fleuve au moyen d'un long milieu humide qui sert de tampon sécuritaire entre les espaces de jeux et le fleuve. La proposition se veut une réinterprétation fonctionnelle et esthétique d'une plage urbaine.

Il faut poursuivre nos efforts pour protéger les milieux humides naturels. Les autorités publiques et les gestionnaires privés doivent continuer d'investir dans la restauration de ces milieux lorsqu'ils sont affectés. Il faut également emprunter la voie du design pour créer de nouveaux espaces portant la signature de l'eau.

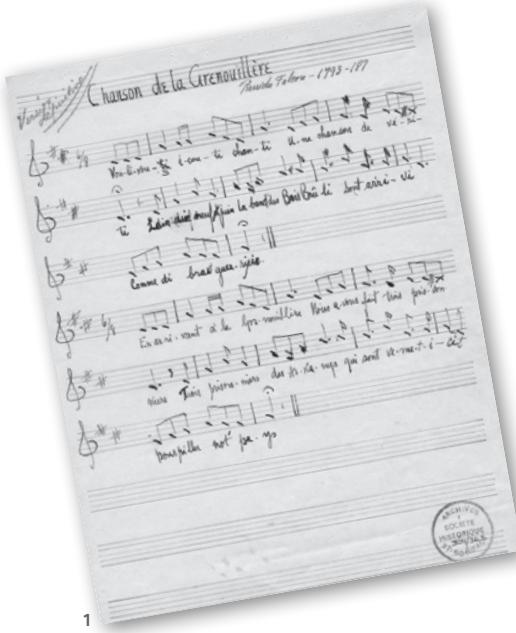
Pensez design mouillé!

**m.rousseau@rousseau-lefebvre.com**

Le basin des Semis: la vidéo:

> <http://bit.ly/1SOicVY>

4 REDYNAMISATION D'UN QUARTIER, BOULEVARD PIE IX CIVIQUE, MONTRÉAL 5 QUE VIENNE LA PLUIE : LA FAÇADE DU BUREAU DU GROUPE ROUSSEAU LEFEBVRE, LAVAL 6 PLAGE DE L'EST – VUE DE FLEUVE PHOTOS MICHEL ROUSSEAU



1

## &gt;FR\_LP+

## LA CHANSON DE LA GRENOUILLE

EN\_

**TWO HUNDRED YEARS** ago, an expansive stretch of wet meadows covered some 120 hectares of what is now Winnipeg's West Kildonan Community. These wetlands, which would typically have held water most of the year, were densely populated – with a vast choir of Boreal Chorus Frogs. The meadows lay in the heart of the Scottish Red River Settlement. Not surprisingly, the settlers named the area Frog Plain.

The Boreal Chorus Frog is Manitoba's smallest frog. Because the frogs are less than three centimetres long and hide under leaves or in tall grass during the day, they often go unseen, but their dusk and dawn chorus is a sign of spring. Come winter, the tiny amphibians hibernate under leaves or logs above the frost line, since they can tolerate being frozen solid. In spring, they emerge quickly, and soon tiny tadpoles dart about the waters of the spring melt before hotter temperatures dry out the temporary breeding ponds.

## 2 RED RIVER SETTLEMENT 1816

IMAGES 1 SOCIÉTÉ HISTORIQUE DE SAINT-BONIFACE ARCHIVES, COLLECTION GÉNÉRALE DE LA SHSB, 0001/9/304/36 2 HUDSON'S BAY COMPANY ARCHIVES, ARCHIVES OF MANITOBA, N6962



4

| DON HESTER

# THE BALLAD OF FROG PLAIN

**FROG PLAIN IN HISTORY: CHANSON DE LA GRENOUILLE**

In 1814, Frog Plain was the site of a deadly confrontation between the Red River Settlers, who had arrived two years earlier, and the Manitoba Métis. The first winters were harsh; the settlers required all available provisions to survive. Therefore, the Governor placed an embargo on the pemmican trade. The trade, however, was an essential part of the Métis' livelihood. Disregarding the proclamation, a small band of Métis was discovered passing through Frog Plain on their way to trade on Lake Winnipeg; 24 settlers then confronted them. The battle is immortalized in the "Ballad of Frog Plain" or "Chanson de la Grenouillère" by Pierre Falcon, a Métis poet and troubadour who worked for the North West Company. Gunfire was exchanged: in the words of the songwriter, "the Governor is full of ire and forthwith tells his men to fire." In the end, two Métis and 20 settlers were killed.

**WHAT ABOUT THE FROGS?**

In 2004, Novamet Development Company asked AECOM to update and renew City of Winnipeg development and zoning approvals for the Riverbend South Subdivision. AECOM proposed a basic public consultation program, since Winnipeg's Community Committees are typically concerned that "the neighbours" be consulted about any new development, particularly infill. An initial site visit in the fall did not find any significant tree cover or standing water.



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>LP+  
TO HEAR THE CHORUS!  
POUR ENTENDRE LE CHOEUR!

AECOM expected issues related to traffic, and local school and park space, but during the first Public Open House a different question was raised: "What about the frogs?" A local resident, who worked as a naturalist at the city's Oak Hammock Marsh Interpretive Centre, identified their home as an intermittent wetland between existing Murray Avenue housing and the Chief Peguis Trail corridor.

The challenge became immediately clear: how could we protect the remaining frog habitat while maintaining very nearly the land developer's lot yield expectations, given substantial off-site cost sharing requested by the City? The land was already constrained by existing housing development, offsets from railway tracks and space required for noise attenuation berms for the future extension of the Chief Peguis Trail.

The journey through the Community Committee process was not short, nor without heated discussion, tears and the recorded sounds of Boreal Chorus Frogs. AECOM collaborated with the City of Winnipeg Naturalist and local residents to conduct a detailed ecological assessment and prepare a revised Plan of Subdivision, which allocated Public Reserve credits to the intermittent wetland area, while remaining economically feasible.

Almost 1.6 hectares were set aside within Riverbend South to protect the remaining breeding grounds of the Boreal Chorus Frog. Although it is a small piece, Frog Plain today is alive and well,

and a valuable piece of the region's natural heritage: most of the wetlands in the Red River Valley are long gone.

The site was carefully protected from intrusion during the construction of adjacent roads and housing, and the landscape architects also provided recommendations on adjacent lot grading and prepared public information materials. These were required because, in order to preserve the frogs' habitat, the rainwater catchment area of the intermittent wetland needed to be fully preserved. Neighbouring property owners were encouraged not to modify their lot grades or use any chemicals on their yards.

The plan for Frog Plain Park, also prepared by AECOM, included design of a boardwalk through the site and a small plaza with an interpretive cairn, which tells the natural and human history of the area. In 2015, the growth of wetland vegetation was lush, although the grassland portion of the site had been mowed. Although the boardwalk was never constructed, school children from the nearby Riverbend Elementary had made field trips to the site to learn about frogs and the importance of wetlands to us all.

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>LP+\_EN\_FR Listen to the boreal chorus frog in the fullness of spring | Écoutez le chant des rainettes faux-grillon en période printanière

3 BOREAL CHORUS FROG 4,5,6 FROM SEDGES TO WETLAND MACROPHYTES

PHOTOS 3 SHUTTERSTOCK/MATT JEPSON 4,5,6 DON HESTER



6



RICHARD WYMA, A GUEST EDITOR OF THIS ISSUE  
RONALD MIDDLETON, FESLA, MALA

# THE ALBERTA WETLAND BANK

RICHARD WYMA SPEAKS WITH | PARLE AVEC RON MIDDLETON

## FR\_ LA BANQUE DE TERRES HUMIDES DE L'ALBERTA

*À l'été de 2015, le ministère des Ressources naturelles et forêts de l'Ontario a reconnu qu'il faudrait modifier les politiques pour mieux protéger les précieuses terres humides de la province : celle-ci a publié un document de consultation sur son registre de la Charte des droits environnementaux. Comme l'Alberta avait mené un examen similaire en 2013, notre rédacteur invité Richard Wyma (RW) s'est entretenu avec Ron Middleton (RM) qui a été longtemps le directeur des Services de gestion environnementale au ministère des Transports de cette province. Ron possède une vaste expérience du droit environnemental et Richard est le DGA de la Régie de conservation de la région d'Essex.*

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**IN SUMMER 2015,** the Ontario Ministry of Natural Resources and Forestry acknowledged that policy changes may be needed to better protect the province's valuable wetlands: the province posted a Discussion Paper for consultation on its Environmental Bill of Rights Registry. Because Alberta completed a similar review in 2013, Guest Editor Richard Wyma (RW) spoke at length with Ron Middleton (RM), who for many years was Director, Environmental Management Services, Alberta Transportation. The department was key to the Alberta process, and Ron gained considerable knowledge of environmental law. Richard is CAO of Ontario's Essex Region Conservation Authority.

...because safety trumps environmental protection...highways inevitably involve damage to or destruction of wetlands.

## CONVERSATION

**RW:** Despite the myriad policies in place to protect them, we're still losing wetlands. In my southern Ontario region, we have lost as much as 95 per cent. Our understanding and appreciation for wetlands is growing, but the current patchwork of policies, regulations and programs has not stopped the losses.

Nonetheless, in 2011, NRCAN estimated that Canada still holds 20 per cent of the world's remaining wetlands. Governments are shaping inventive new policies and regulations, such as those in Alberta. But you have said, Ron, that the Alberta review took several years to complete, with many false starts. What is it about wetlands that made this process so difficult?

**RM:** There is a mythology of wetlands – that they are such special, complex, almost magical places that they cannot possibly be replicated. The reality is that wetlands are simply the poorly drained areas of the landscape that remained when the glaciers retreated. Ultimately, this mythology and passion for wetlands has led to policies that incorporate bad or no science into policy.

...With a banking approach, you are discussing actual, not hypothetical, replacement wetlands...questions of wetland function and equivalency [are] much easier to address...

For example, the value of wetlands as groundwater recharge zones remains in Alberta's policy even though research, funded by Ducks Unlimited, has shown that this is rarely the case in the prairies because most of the landscape is underlain by virtually impervious till. Similarly replacement ratios used in wetland compensation are claimed to be supported by science. They rarely are. It is a case where frequent repetition amongst jurisdictions has created the false perception of fact.

**RW:** So, why don't we regulate wetlands?

**RM:** It is difficult for governments to regulate wetlands. Governments regulate resources, not landscapes, though Ontario has set up Conservation Authorities which are responsible for managing natural resources on a watershed, or landscape, scale. But we can only manage based on the regimes available to us, and there is no one body having overall jurisdiction. That has resulted in government resorting to wetland policies, which are clumsy and open to interpretation, instead of regulation.

Since wetlands do not fall within a single mandate, it is a challenge for any agency to secure the full budget to inventory and monitor wetlands. So, though there

may be funding available for creating wetlands, there is limited funding available for monitoring wetlands. It means we often regulate that which is easy to regulate and ignore that which is not. For example, we can regulate wetland loss and compensation for a major oilsands project, but not for the drainage and cultivation that occurs on farms.

As well, when we do regulate, we have not had the right mechanism to properly do so. In Alberta, wetland loss and compensation are regulated under the *Water Act*. The *Water Act* does not contain the word wetland.

**RW:** As you know, Ontario released a discussion paper to look at how we should best manage our wetlands. Based on your experience with Alberta's policy, what overall advice do you have?

**RM:** Our first attempts failed because we tried to create a robust system that could be applied across the province. This resulted in an oversimplification: the same standards and replacement requirements which apply to grasslands where prairie potholes may occupy less than 1 per cent of the landscape cannot be repeated in the boreal forest landscapes where muskeg can take up 60 per cent of the land area.

**RW:** So, you learned from that and set up systems that provide for wetland compensation and banking that fits the landscape?

**RM:** I led the environmental team for Alberta Transportation. The department implemented hundreds of projects in all ecological zones across the province annually. Highway rights-of-way are relatively inflexible and because safety trumps environmental protection when it comes to alignment, highways inevitably involve damage to or destruction of wetlands.

Alberta's wetland policy calls for the replacement of wetland losses where avoidance is not feasible. Our situation was tailor-made for developing a system whereby we could build replacement wetland where it was feasible and economical to do so, and draw on that bank of created wetlands to offset losses on projects that provided no opportunity for on-site compensation. It's true that highways can reroute surface flow and starve wetlands of their water supply. However, with proper planning the process can be reversed with flow directed to restore or even create wetlands. This is also true with the numerous borrow areas and gravel pits used in highway construction that are ready-made opportunities for wetland creation, if properly sited and developed.

**Our situation was tailor-made for developing a system whereby we could build replacement wetland where it was feasible and economical to do so...**

**RW:** Shouldn't we be encouraging a net-gain concept as opposed to a no-net-loss model, especially in areas where wetland loss has been greatest?

**RM:** The stated principle of the wetland policy as it relates to development is that of no-net-loss, but involves consideration of the functions and uniqueness of the wetland in question in the determination of compensation requirements. Replacement ratios of greater than one are usually couched in terms of adjusting for the uncertainties in wetland replacement. They are, however, often used to achieve a net gain in total wetland area. If we wish to have a net gain policy, it should be explicit; otherwise it amounts to a tax on new development to compensate for previous losses.

**RW:** So, how can other jurisdictions convince regulators that banking is an acceptable approach?

**RM:** In developing our system we encountered both internal and external obstacles. While the wetland policy accepts the concept of wetland banking, there was fear that making it too easy to achieve replacement might undermine the preferable options of avoidance and minimization.

There were also concerns with respect to accounting,

monitoring, equivalency, and so on. In fact a banking scheme where the replacement wetlands already exist makes questions of wetland function and equivalency much easier to address than a situation where the regulators must accept the **promise** of compensation for a real loss. With a banking approach, you are discussing actual, not hypothetical, replacement wetlands.

**RW:** So, assessments are based on science. But how does Alberta's system encourage restoration – that is, adding to the bank?

**RM:** Internally we added incentives: we needed an internal accounting mechanism that credited projects for wetland creation so that it was not adding to project cost, and a system to charge projects for drawing on the bank. We also had to develop design guidelines to illustrate what we were after when wetlands were created. Alberta's talented consulting community was capable of providing the support we needed. (See articles by Carol Craig, p. 51, and Bernie Amell, p. 20.)

**RW:** In the Essex Region Conservation Authority – in fact in all of Ontario's 36 Conservation Authorities – we work with public and private sector partners and conservation agencies to fund stewardship programs with landowners. Other partners, such as Ducks Unlimited, have similar

programs as well as landowner/conservation lands incentive programs. How can we landscape architects stay in the complicated loop, and take better advantage of these tools?

**RM:** The willingness of government agencies to increasingly make their scientific data available online and the increasing availability of remotely sensed data at low cost is removing barriers to the problems of inventory and monitoring. By being aware of the regulatory regime and of the private and public players in conservation and wetland construction, we can use our skills to facilitate partnerships and develop creative solutions. In our case, we used our design skills to design and sell a system rather than a project: our wetland bank is very much within the realm of landscape architecture.

Similarly, every time a natural or constructed wetland is incorporated into a residential community, it provides an opportunity for public education. Residents begin to take ownership of the naturalized landscape. The more these are seen in new neighbourhoods, the more generally accepted they become.

KEES LOKMAN

# DYNAMIC STABILITY

## LABORATORIES FOR FLOOD-RESILIENT LANDSCAPES

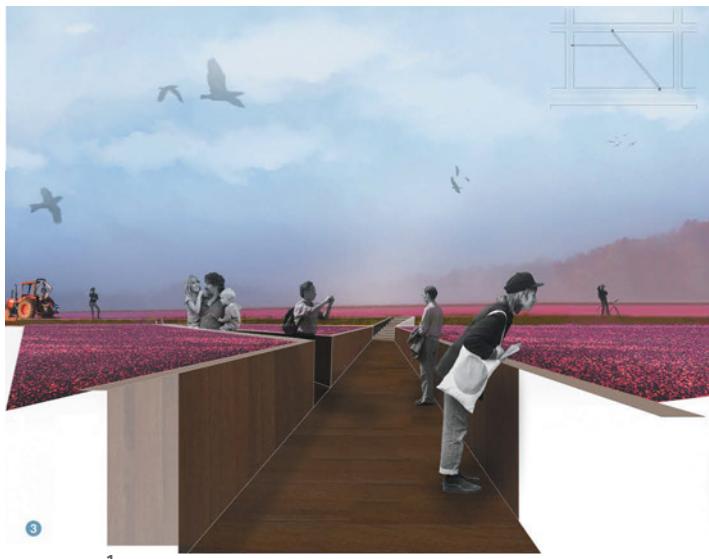


IMAGE MIYO TAKEDA, REFRAMING RICHMOND

## FR\_RESUMÉ

## STABILITÉ DYNAMIQUE

On doit enclencher une nouvelle dynamique entre la population et les écosystèmes spécialement dans les régions côtières et le long des principaux fleuves. Deux projets conçus par des étudiants proposent des paysages de « stabilité dynamique » : des environnements productifs qui orchestrent soigneusement les infrastructures « dures » et « molles » pour faire place au changement. L'inondation n'est plus perçue comme un risque, mais plutôt comme un mécanisme pour revigorer les écosystèmes, produire des aliments et de l'énergie, recycler les rejets et nutriments et promouvoir des échanges bénéfiques entre les processus sociaux et biophysiques.

**1 AS SALT WATER INTRUSION INCREASES,  
CRANBERRY BOGS CAN BECOME CONSTRUCTED  
WETLANDS OR FISH FARMS**

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**OVER A DECADE ago**, Nobel Prize-winning scientist Paul Crutzen coined the term “Anthropocene” to denote that human actions have significantly altered the earth’s geologic and biospheric conditions and processes. This means we are no longer confronted with an indifferent nature but with an environment characterized by a profound blurring of social and biophysical processes.

In order to address the global challenges of ongoing urbanization, climate change and environmental degradation, we not only have to understand how these complex social-ecological systems work across different spatial and temporal scales, but we also have to imagine new design solutions that interweave anthropogenic and natural processes. Especially in coastal areas and along major rivers – environments that provide

incalculable benefits but simultaneously face tremendous pressures – it is critical that we develop new dynamics between people and ecosystems.

Two projects developed by landscape architecture students reveal possibilities for the design of flood-resilient landscapes. Both projects propose landscapes of ‘dynamic stability’: productive environments that carefully orchestrate ‘hard’ and ‘soft’ infrastructures in order to accommodate change, reduce risks, cultivate new ecologies, experiment with multifunctional land uses, and re-connect urban populations with the temporalities of river systems.

### MIGRATORY LANDSCAPES, SHIFTING PROGRAMS

The first project titled *Migratory Lands* by Emily Chen, a dual degree MArch-MLA



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student at Washington University in St Louis, focuses on the region of Alton, a small post-industrial city situated at the confluence of three major rivers (the Mississippi, the Missouri and the Illinois). Over the past century, the construction of extensive flood control infrastructures has allowed for unchecked development in the floodplain. This command-and-control approach toward natural systems has both increased the risk of "natural" disasters and stifled Alton's ability to adapt to unknown future conditions.

*Migratory Lands* suggests an integrated management approach that allows the dynamics of the rivers to shape new social-ecological programs and spatial relationships. The project takes direct cues from the *Riverlands Migratory Bird Sanctuary*, which is located directly across the Mississippi River from Alton. Here, a carefully constructed network of levees, canals and sluice gates enables ecologists to create and manage a series of wetlands

with different hydrological conditions, which in turn cultivate a variety of habitats for fish and wildlife. Similarly, *Migratory Lands* proposes alternative floodplain management strategies to link the seasonal dynamics of the river to flexible land uses and programs. This way, a single site can transition from an area that accommodates temporary flood storage in the spring, to a campsite in the summer, and grazing land in the fall.

At the same time, the proposal promotes the development of targeted habitat restoration. Levees are notched in strategic locations to allow for periodic flooding and to encourage sedimentation. Over time sediment accumulation behind the levee results in gradual land building and allows new ecosystems to emerge, including sand bars, wetlands and floodplain forests. Furthermore, the project utilizes available dredged materials

from the Mississippi River to create new artificial islands within the floodplain. These landscape infrastructures act as stepping-stones to create ecological sanctuaries, host cultural programs and shape new aesthetic experiences. In times of high water, they provide safe grounds for humans and wildlife.

By favoring landscapes and programs that are seasonal and can adjust to changing dynamics, the project shows that flooding can be a productive mechanism to manufacture new ecologies and economies.

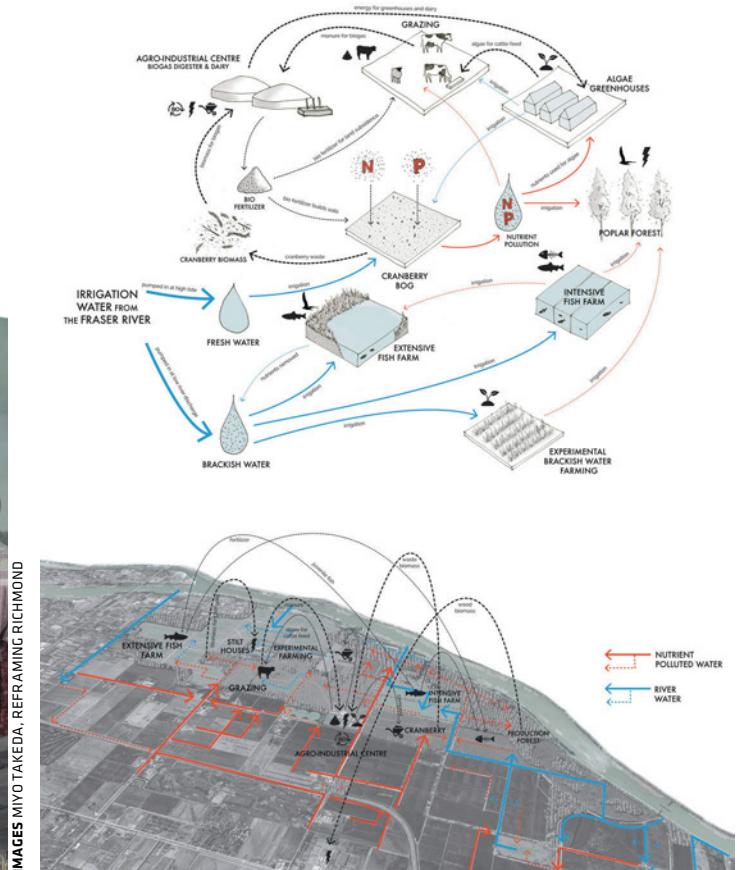
**2 + 3 MIGRATORY LANDS:** AN APPROACH THAT LINKS THE SEASONAL DYNAMICS OF THE RIVER TO FLEXIBLE LAND USES. COLLAGES SHOW HOW NEW LANDSCAPES ARE REVEALED AND COLONIZED.

**4 + 5 REFRAMING RICHMOND:** A TOWER FOR OBSERVING THE DYNAMICS OF THE LANDSCAPE MACHINE WHICH IS DRIVEN BY NATURAL PROCESSES BUT RELYS ON HUMAN INTERVENTIONS. WASTE PRODUCTS CAN BECOME VALUABLE RESOURCES.

...landscape infrastructures act as stepping-stones to create ecological sanctuaries... | ...les infrastructures paysagères servent de point de départ pour créer des sanctuaires écologiques...



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### **REFRAMING RICHMOND, ORCHESTRATING CHANGE**

Miyo Takeda, a recent graduate student from the University of British Columbia (UBC), crafted her MLA thesis around climate change adaptation strategies for Richmond, B.C. Situated in the Lower Mainland, Richmond is facing many challenges that affect urban deltas worldwide, including significant population growth, sea level rise, land subsidence, rising groundwater tables and salinization.

Entitled *Reframing Richmond*, Takeda's project speculates on the redesign of a predominantly agricultural area, which is currently protected by a vulnerable perimeter dike. The dike does not meet the province's 2100 flood guidelines and reinforcing it would not only be very costly, it would also not help to increase the city's adaptive capacity. As such, the project proposes to construct a higher, yet more affordable setback dike while

readapting a system of interconnected dikes, gates and irrigation channels built to support cranberry farming. Since land subsidence and salt water intrusion will make cranberry farming increasingly more difficult in the future, this operable infrastructure provides a perfect framework to introduce new types of productive, climate-proof landscapes.

Envisioned as what landscape architect Paul Roncken calls a "landscape machine," the proposal integrates the mechanical characteristics of agricultural systems based on production with dynamic natural processes such as carbon sequestration, climate regulation and nutrient cycling. For example, a proposed agro-industrial center collects the manure from floodplain grazers and the organic waste from cranberry farming and surrounding municipalities to produce renewable energy. Similarly,

a network of aquaculture and hydroponics produces food while recycling and purifying nutrient rich water.

By orchestrating change and recalibrating the flow of resources and waste materials, the project promotes the emergence of new social, ecological and economic conditions. As climate change continues and cranberry farming makes way for alternative farming practices, the infrastructures initially built for cranberry farming are adapted to create novel ecosystems and new opportunities for recreation. The result is a dynamic landscape that experiments with flood resilient land uses while allowing urban populations to engage with ever-changing processes.

### **LIVING LABORATORIES, EXPERIMENTAL LANDSCAPES**

Because future impacts of climate change are unpredictable, there is a tendency for decision-makers and planners to get

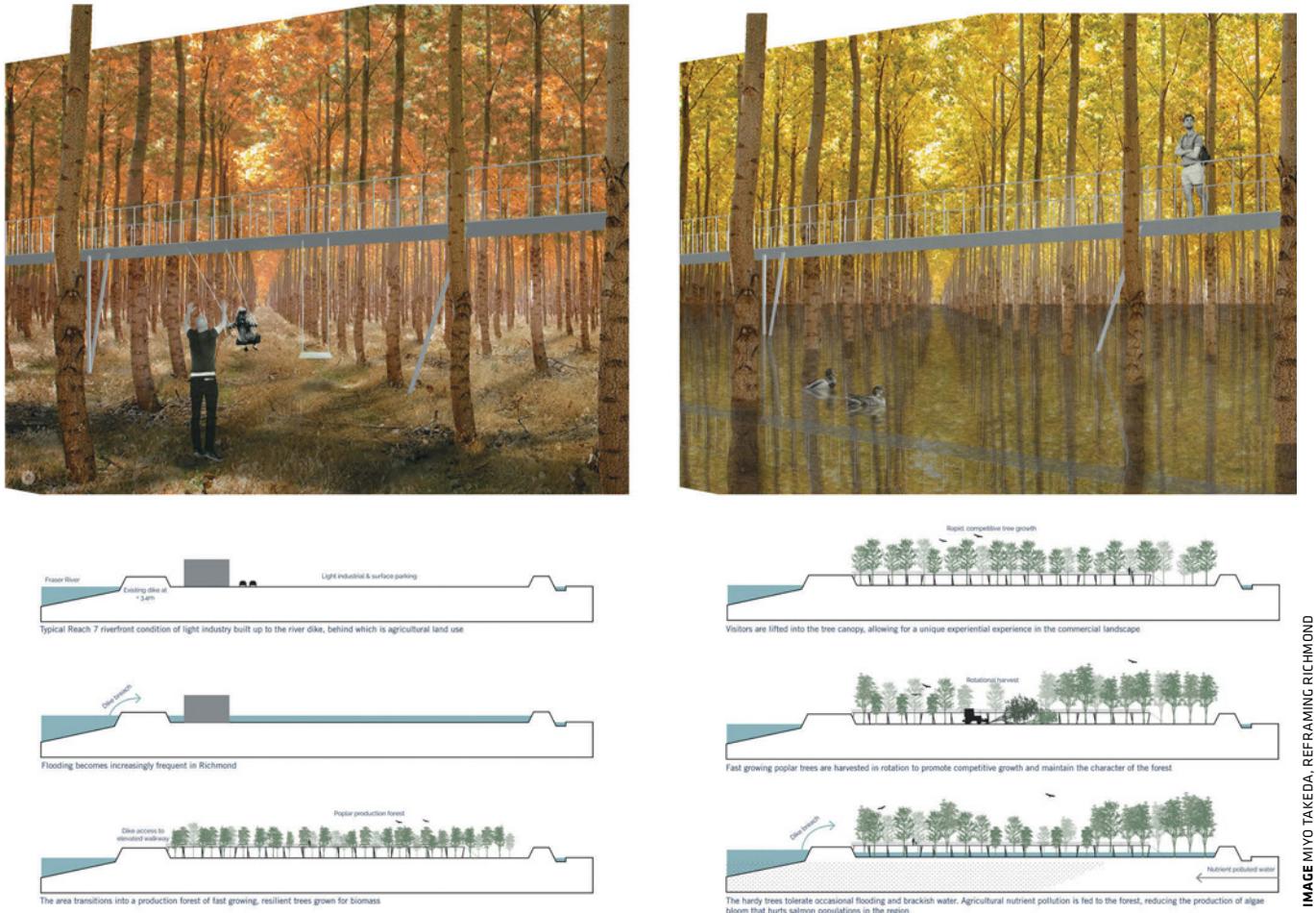


IMAGE MIYO TAKEDA, REFRAMING RICHMOND

locked in ideological disputes resulting in policy paralysis. Yet, rather than maintaining the status quo, it is urgent that we develop, implement and test new spatial models that promote more sustainable interactions between social and ecological systems. We must change longstanding practices that promote mono-functional land uses and instead approach climate change as an opportunity to conceptualize and visualize wholly new relationships between ecology and economy.

The focus here shifts from planning landscapes with a predetermined form and function to designing strategic interventions that can accommodate dynamic processes and shape productive

spatial relationships. This way, flooding is no longer seen as a risk but instead as a mechanism to revive ecosystems, produce food and energy, recycle waste and nutrients, and promote beneficial exchanges between social and biophysical processes.

By understanding social-ecological systems as constantly changing and evolving, we can articulate and design feedback mechanisms that accommodate or realign these dynamic processes. Optimistically, this suggests the possibilities for developing landscape laboratories that don't simply operate in the present, but instead design social-ecological systems which can accommodate change. In combination

with integrative management approaches, we can create 'smarter' landscapes that grow more resilient over time.

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**6 HYBRID POPLARS TOLERATE PERIODIC FLOODING AND CAN BE HARVESTED FOR ENERGY, PULP OR LUMBER.**

RICHARD WYMA

# 1000 ACRES IN ESSEX



AT POINT PELEE NATIONAL PARK DURING MAY MIGRATION: A PROTHONOTARY WARBLER, AN ENDANGERED SPECIES IN CANADA | AU PARC NATIONAL DE LA POINTE-PELÉE PENDANT LA MIGRATION DE MAI : UNE PARULINE ORANGÉE, ESPÈCE CANADIENNE MENACÉE

PHOTO BRANDON HOLDEN

&gt;FR\_LP+

1000 ÂCRÈS EN ESSEX

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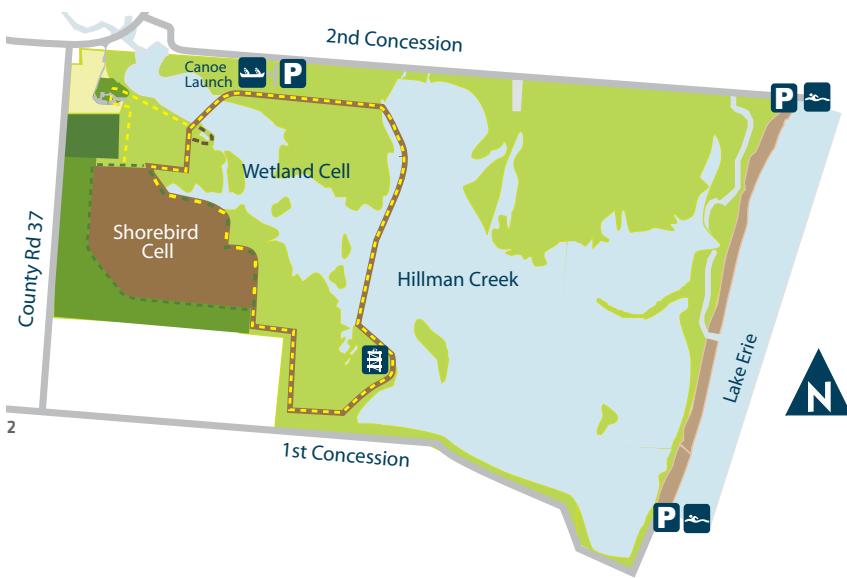
**FOR UNTOLD THOUSANDS** of birds, and butterflies as well, the wetland landscapes of Essex County, Ontario, are of immense significance. Essex County is at the confluence of two migration routes, the Atlantic Flyway and the Mississippi flyway. In the spring, birds who have spent the winter in southern climes rush to reach their northern breeding grounds, flying straight over Lake Erie to the closest point of land, which is Point Pelee National Park/Hillman Marsh Conservation Area. Especially when the weather shifts unpredictably, intermittent waves of thousands of birds will land there exhausted after their crossing, in need of a meal before making their next hop.

This landscape is inside the Carolinian Life Zone, which sits south of an imaginary line running from Grand Bend to Toronto. The Carolinian Life Zone is actually the northernmost edge of North America's eastern deciduous forest region. It comprises just 0.25 per cent of Canada's landmass, yet it is home to 25 per cent of Canada's population. This density puts tremendous pressure on such a small landscape, which also boasts a greater biodiversity of flora and fauna than any other ecosystem in Canada. The tally is extraordinary: an estimated 2,200 species of herbaceous plants (including 70 species of trees), numerous reptiles and amphibians and several mammals are primarily restricted to this zone, making it a haven for birders and naturalists. Almost 400 bird species, which is more than half of all the bird species recorded in Canada, have been recorded in the Carolinian Zone. More than 300 of those species have been recorded at Hillman Marsh. This geography and unique ecosystem makes the Point Pelee National Park/Hillman Marsh Conservation Area region one of the top 10 birding hotspots in North America.

*“...so temperate, so fertile and so beautiful that it may justly be called the earthly paradise of North America...”*



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46 LANDSCAPES PAYSAGES

#### 800 ACRES OF SLOPPY GROUND

In 1702, things were different in the Essex Region. This was a magnificent landscape, once described by Antoine de la Mothe Cadillac as “so temperate, so fertile and so beautiful that it may justly be called be the earthly paradise of North America.”

Fast forward 270 years. By 1973, when the Essex Region Conservation Authority (ERCA) was formed with a mandate to manage and restore the watersheds of Lake St. Clair, the Detroit River and western basin of Lake Erie,

**1-3 HILLMAN MARSH | 1-3 MARAIS HILLMAN**  
**PHOTOS 1 ESSEX REGION CONSERVATION AUTHORITY (ERCA)**  
**2 ANDREW MCKINLEY**



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(325 ha) of sloppy ground, impacted by the surrounding agricultural landscape.

Hillman was isolated from Lake Erie by only a narrow, sandy beach ridge. The marsh was periodically flooded by storms, and the high lake levels and ice storms of the 1970s flooded out all the vegetation, essentially turning a once-rich wetland into an open water system with no emergent vegetation, except along shoreline edges.

#### BUYING MARSHLAND

Hillman's key location on migration routes made it a prime candidate for restoration. There was a slight complication, however: ERCA did not own the marsh; 25 landowners did...which meant negotiating 25 separate real estate deals. In 1977, ERCA acquired the first parcel, 70 acres (28 ha). A decade later, 21 properties had been acquired, securing 900 acres (360 ha) of Hillman Marsh and a kilometre long beach ridge that separates the marsh from Lake Erie.

The Ontario Ministry of Natural Resources supported the project by matching funding raised for the acquisition, and the Nature Conservancy of Canada helped fund the remaining half with ERCA and the Essex Region Conservation Foundation (ERCF) – some \$1,112,000 in all. Ducks Unlimited designed a system for controlling water levels in the marsh, and corporate supporters covered DU's costs for dike construction and pumps to manage the wetland. Dow Chemical's donation (totalling \$500,000 U.S.) was the largest ever made to DU by a Canadian company at the time. H.J. Heinz Company of Canada helped fund the conversion of the old farmhouse and barn into classrooms to bring student visitors to the marsh. (It is visited by more than 3,500 students each year.)

natural heritage cover had dropped to less than 3.5 per cent. The region has lost most of its forests and even more of its wetlands (some 97 percent). What remained were small, isolated remnants of forest, wetland, prairie, savanna, alvar and riparian habitat.

Nowhere was the ecological richness challenged more than at Hillman Marsh, an area which was originally part of a massive 10,000 acre (4,000+ hectare) wetland which stretched from Hillman Creek up to, and including, present day Point Pelee National Park on Lake Erie. Once viewed as wasteland, this natural area was drained around the turn of the century. Only Hillman Marsh remained, and it had become not so much a marsh as 800 acres

#### CELL DIVISION

Once properties were assembled for the Hillman Marsh Conservation Area, the project team created two cells, or individually managed water containment areas, representing about 40 per cent of the entire marsh. Construction of the cells effectively removed the historic low flow channel of Hillman Creek from the watercourse so a carefully designed bypass channel was established using a hydraulic assessment based on U.S. Army Corps of Engineers' models. This channel redirected stream flows, sediment and run-off from surrounding lands, ensuring the project would not increase potential flooding of lands upstream. This is a significant priority in this area where hundreds of homes are situated behind dikes, and the landscape is 3 to 4 metres below Lake Erie water levels.

Since natural water level fluctuations in Hillman Creek were "flashy" and would not allow for frequent enough natural drawdowns, planners installed controlled water level structures to regulate water levels to mimic those in a natural wetland. In total, almost 7 kilometres of dikes were built around the cells. On one dike, a 4.5 kilometre trail leads visitors through the heart of the marsh.

#### DORMANT SEEDS COME TO LIFE

Because the Marsh was in such poor condition, prior to the official opening of the Conservation Area, ERCA and DU drained the larger of the two cells. Draining exposes the marsh bottom to sunlight and oxygen, which helps organic matter to decompose and release its natural nutrients, thus encouraging long-dormant seeds to spring to life. To ensure optimal biodiversity in the cells, managers aimed for "hemi-marsh" conditions: 50 per cent vegetation to 50 per cent open water, with



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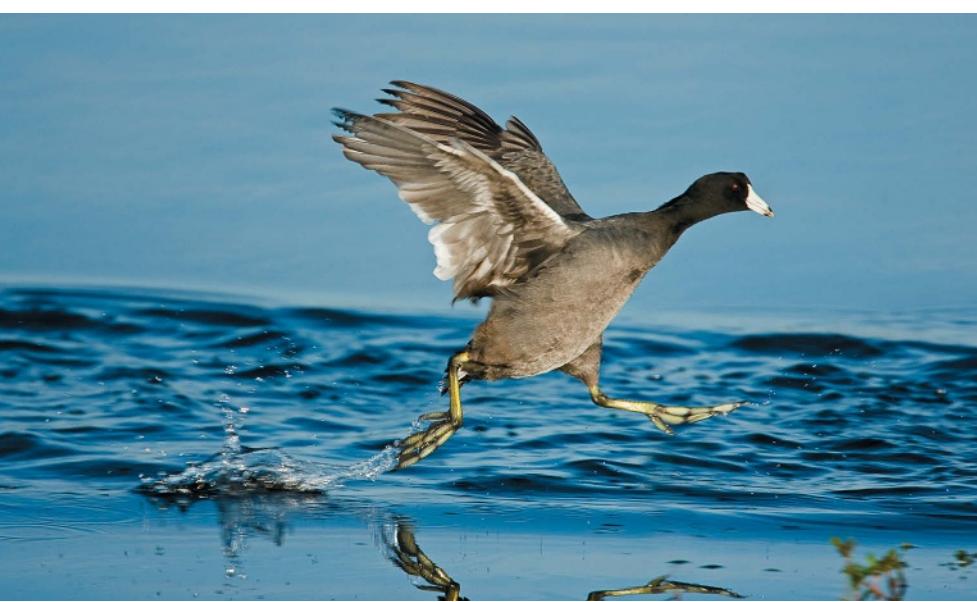
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a more complex “interspersion” pattern of smaller patches of water and diverse vegetation to provide cover for breeding birds, and support waterfowl and other species. In the first decade, vegetation coverage increased from 218.2 acres (88 ha) to 310 acres (125 ha). Marsh cells were emptied again in 1994 and in 2005. A next draw down is currently being planned for 2016/17.

On lands adjacent to the wetland cells, ERCA established tall grass prairie, and utilized prescribed burns approximately every decade to remove any woody vegetation. Tall grass prairie species frequent the landscape, including species at risk such as the eastern meadowlark and bobolink. Here, woodcocks showcase their elaborate courtship displays over the open field.

In 1999, the partners broadened their focus to include shorebirds, since lakefront development and hardening shorelines had diminished mud-flat habitats of Lake Erie. ERCA acquired a neighbouring 87 acre (35 ha) farm field, and by 2003, had constructed a 42-acre “Shorebird Cell,” the first of its kind in North America. Like the wetland cells, the shorebird cell is encircled by a berm to contain water. The site is planted with barley in the summer and flooded in the fall to speed up the decaying process and promote growth of larvae, worms and other prey for shorebirds. In late April, a gradual drawdown of the water starts, which exposes mudflats rich in invertebrate prey for the shorebirds.

The area is becoming known by the shorebirds themselves! One shorebird, Winnie the Willet, became an international

**4 GREAT EGRET (ARDEA ALBA)** **5 CANADA WARBLER** **6 SOLITARY SANDPIPER** **7 SCARLET TANAGER (PIRANGA OLIVACE)** **8 CAPE MAY WARBLER** **9 AMERICAN COOT (FULICA AMERICANA)** **10 HILLMAN MARSH BIRDERS | 4 GRANDE AIGRETTE (ARDEA ALBA)** **5 PARULINE DU CANADA** **6 CHEVALIER SOLITAIRE** **7 PIRANGA ÉCARLATE (PIRANGA OLIVACE)** **8 PARULINE TIGRÉE** **9 FOULQUE D'AMÉRIQUE (FULICA AMERICANA)** **10 ORNITHOLOGUES DU MARAIS HILLMAN**

**PHOTOS 4,5,7,8,9 ETHAN MELEG 6 ANDREW MCKINLEY 10 ERCA**

**There was a slight complication, however: ERCA did not own the marsh; 25 landowners did...which meant negotiating 25 separate real estate deals.**

celebrity. Researchers in Virginia tracked Winny by satellite, from the Eastern Seaboard of U.S. to Hillman where she spent several days feeding well, before taking the largest migratory hop ever recorded. Winny confirmed the shorebird cell is now behaviourally engrained as a stopover point.

#### **BIRDS BRING BIRDERS**

Since the creation of Hillman Marsh Conservation Area, the diversity and numbers of birds has increased dramatically. Birders have recorded more than 300 species here, including at least 75 breeding species. Hillman Marsh is also home to at least 13 Species at Risk (and 6 others which have not been recently confirmed). This includes 4 endangered species (King Rail, Prothonotary Warbler,

Spotted Turtle, and Eastern Foxsnake), 5 threatened species (including Blanding's Turtle, Spiny Softshell Turtle, Common Hoptree, round-leaved greenbrier, and dense blazing star) and 4 species of concern.

Birders from around the world come to observe migrating shorebirds, songbirds and waterfowl during the spring months, which provides economic benefit to the region. Although visitation declined in the 2000s, birding contributes between \$12.4 million and \$14.4 million in annual, seasonal, direct spending to a small regional economy.

#### **THE NEXT GENERATION**

Over time, Hillman has also exhibited its tremendous ecological value, and the Marsh is recognized as one of the most

significant wetlands in the Carolinian life zone. But today, new problems need solutions. For example, there is an increasing urgency to manage for invasive species such as phragmites. One of the only effective controls is manipulation of water depths, but with variable Great Lakes water levels, water is not always available. Despite the significance of the Marsh, ERCA must demonstrate how its pumping regime respects neighbouring interests through the Permit to Take Water system in Ontario. As well, although phragmites, like purple loosestrife and other invasive species, can be managed within the cells, it is not possible to control outside the cells under current restrictions. As well, the more intense, shorter duration and more frequent spring storms increase the threat of blue-green algal blooms,



fed in large part by excessive loadings of phosphorous run-off from land use.

Projects can be more challenging to implement today. ERCA is therefore establishing new approaches and partnerships. In 2012, and in response to significant declines in wetland habitat and water quality in Lake Erie's western basin, coupled with increases in phosphorous and blue-green algae, ERCA brought together federal, provincial, national and international agencies to create a Priority Natural Area: Western Lake Erie Watersheds. This agreement, the first of its kind in North America, brings together government, conservation agencies (Ducks Unlimited, Nature Conservancy of Canada, and ERCA) with municipalities (City of Windsor) and U.S. Fish and Wildlife, to create a Canadian sister to the International Wildlife Refuge on the Michigan side of the Detroit River. One of the first products of this unique partnership was a Byways to Flyways cross-border initiative: a driving tour that

highlights birding 'hotspots' in Southeast Michigan and Southwest Ontario (including Hillman Marsh Conservation Area), promoting the area as a premier international birding destination.

Over its four decades, ERCA has restored almost 10,000 acres (4,000 ha) of forest, tall grass prairie, and wetlands like Hillman Marsh Conservation Area. Natural cover has more than doubled to 8.5 per cent – still a long way from the region's 12 per cent goal, and even further from Environment Canada and others who recommend 30 per cent for a region to be sustainable. The Hillman Marsh model, however, shows that it can be achieved.

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**...birding contributes between \$12.4 million and \$14.4 million in annual direct spending to a small regional economy.**



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**11 HILLMAN MARSH BOARDWALK 12 FEMALE AMERICAN BULLFROG | 11 LE TROTTOIR DE BOIS DU MARAIS HILLMAN | 12 GRENOUILLE-TAUREAU FEMELLE**  
PHOTO 11 ERCA 12 ANDREW MCKINLEY



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CAROL CRAIG

# 3 WETLANDS: 3 DISCOVERIES... AND A LITTLE SERENDIPITY

## FR\_RESUMÉ

### TROIS TERRES HUMIDES : TROIS DÉCOUVERTES

Pourquoi s'ouvrir à la sérendipité? Les vingt ans de travail de Carol Craig dans trois terres humides albertaines démontrent que, malgré tous nos efforts, nous ne sommes jamais pleinement maîtres de ce qui arrive dans nos paysages. Malgré toutes nos recherches et tous nos plans, le succès dépend parfois d'une coïncidence heureuse, que ce soit une inondation, une sécheresse ou la défaillance du contrôle des sédiments.

**1 FULTON:** DURING 2 YEARS OF DROUGHT, THE SITE WAS LEFT ALONE TO MATURE ON ITS OWN | **1 FULTON :** PENDANT DEUX ANS DE SÉCHERESSE, LE SITE A ÉTÉ LAISSÉ À LUI-MÊME POUR PRENDRE DE LA MATURITÉ

PHOTOS RON MIDDLETON

## EN\_

**THREE CONSTRUCTED WETLANDS** used for stormwater management. Three locations. Three clients. Three problems. Serendipity. Three outcomes.

Serendipity: when Horace Walpole, English Man of Letters, coined the word in 1754, it meant, simply, “a pleasant surprise.” Today, serendipity means much more, implying an accidental discovery of something wonderful in the course of searching for something unrelated. Many scientific discoveries are serendipitous, none more so than our “accidental discoveries” in three Alberta wetlands.

### THE ACCIDENTAL DISCOVERY

It was in the early 1990s that we began our work to construct Fulton Creek Marshland. The site was situated on what was then the very outskirts of Edmonton and surrounded by farmland. (Today, the area is residential.) The city needed fill material for the extension of Whitemud Drive and the Highway 21 interchange in south-east Edmonton. Once the fill was removed, the resulting “hole” would have a second use; it would become the largest constructed

wetland/stormwater management facility in Edmonton.

An integrated team of engineers, environmental scientists and a landscape architect created the vision, pulled the drawings together and specified a variety of soil preparations and planting and mulching techniques to see what would work. The clients, Alberta Transportation and the City of Edmonton, were open to some experimentation; they trusted they would gain knowledge that could be applied in other locations.

Research – lots and lots of research – was undertaken to determine the planting palette, upland soil sources and wetland soil sources, and choose three different mulch types. We investigated planting techniques including plowing, seed stratification and scarification, lifestaking, brushmattresses, live plug transplants and growing whips in advance, and tested them on the site. Slope orientation influenced the planting palette as did anticipated flood levels. Below-normal water zones were manipulated to provide both benching for varying emergent plant communities and deeper zones for

submergents. Many of these techniques are considered standard today but were then in their infancy in Alberta.

A year after landscape installation, a monitoring program for vegetation and water quality began. The grasses had established, the warranty and maintenance were completed and the site was on its way to maturity. Then serendipity struck: drought. For two years, this wetland became a small wet pond in what had been considered the deep water zone. The monitoring program was abandoned; minimal water was entering the site.

#### DROUGHT AS SERENDIPITY?

Why was the drought serendipitous? It caused the site to be left alone. Without water, any attempts to control what occurred on site were impossible. It became a backwater (no pun intended!), which we occasionally visited to see what was happening. The resulting hands-off approach allowed it to mature on its own, without interference (other than noxious weed removal). Left alone, serendipity could work its magic, under the auspices of nature. Today, over twenty years later, it is a thriving wetland. Many people think it has always been there.

#### A BATTLE IS AVOIDED

A second very interesting site, Clarkdale Meadows Pond in Sherwood Park, was constructed in the mid-nineties to serve as a stormwater management facility for the neighbourhood, as well as a recreational amenity: it is surrounded by single family residential homes. The concept was to surround a wetland with a meadow, take full advantage of vistas and viewpoints, and install asphalt and granular walking paths, a sand volleyball court, lookouts, gazebos, seating areas, a sliding hill and bridge to add to the sense of place.

It was an excellent opportunity to build a wetland: the area had a larger than



2

**2 CLARKDALE: AFTER FLOODING SATURATED THE SOIL, AREAS WHICH HAD BEEN LEFT UNDISTURBED QUICKLY REBOUNDED BACK | 2 CLARKDALE : UN FOIS QUE L'INONDATION IMPRÉGNÉ LE SOL, LES SECTEURS NON PERTURBÉS SE SONT RAPIDEMENT REMIS.**

PHOTOS RON MIDDLETON

required Public Utility Lot (PUL) which allowed for the manipulation of the slopes (other than the standard 7:1 H:V). We had the freedom to design flatter areas adjacent to the water's edge and to separate the sedimentation forebay as a distinct body of water, with a meandering channel (for low flows) linking it to the main body of the wetland.

The team lined the shore with undulating shallow benches that were primed with wetland soils, then installed emergent plantings as well as a riparian edge and meadow. More ornamental planting was provided in the upland areas, closer to the private properties. The difficulties: homeowners began to take ownership beyond their fence line, mowing native grasses and establishing private uses on public property. Even with interpretive signage on site, they did not understand how the facility was designed to function, and with continued disturbance, plants would not

establish as planned. A conflict was well on its way when serendipity arrived.

Two 1:100 year flood events occurred within weeks of each other. The site was flooded to the back of lot fences. The drawdown, which met engineering requirements, was slower than the public anticipated.

#### FLOODING AS SERENDIPITY?

Now flooding is serendipitous? The soils became saturated and the native vegetation thrived. The residents witnessed this "demonstration" of how the facility worked. The areas that had not been disturbed rebounded back faster than the modified areas and they could see the difference. Most people moved their "additions" back onto their property above the high water level (although in some cases, not all the way!). Serendipitous events taught the community about the facility and how specific plants thrive in fluctuating water conditions.



# 3

**3 STARLING: THE DRAWDOWN HELPED REDUCE A WEED PROBLEM, CURTAILING THE CATTAILS, THE DANDELION OF WETLANDS! | 3 ÉTOURNEAU : L'ASSÈCHEMENT A CONTRIBUÉ À ATTÉNUER UN PROBLÈME DE MAUVAISES HERBES, PRÉVENANT LA CROISSANCE DES QUENOUILLES, PISSENLITS DES TERRES HUMIDES.**

PHOTOS RON MIDDLETON

## DIRT TO THE RESCUE

Serendipity struck again in one of the newer subdivisions in north-east Edmonton, Starling at Big Lake. In 2011, this community was designed using Low Impact Development (LID) techniques to help improve stormwater quality prior to its release into Horseshoe Creek, and ultimately Big Lake Provincial Park to the north.

An existing wetland was claimed by the Crown and integrated into the Starling storm system. Previous to development, the wetland had been heavily impacted by agricultural practices and suffered extreme degradation of the riparian edge. The design around this feature focused on rehabilitating this edge, and also on protecting the wetland from polluted runoff by adding an integrated system of sedimentation ponds to pre-treat stormwater before it reached the wetland. Prior to design, we undertook continuous water balance calculations to determine the amount of stormwater required to maintain the existing wetland.

The development also included a constructed wetland for stormwater management within the neighbourhood. Now, during major rain events, the natural wetland overflows into the constructed wetland. In addition to this overflow channel, the constructed wetland is fed through more "typical" engineered inlets that collect water from catch basins, from rain gardens (corner bump outs) and a bioswale. The constructed wetland was planned with various below normal water benches to facilitate the development of a diverse emergent zone.

The constructed wetland is now two years old, and its riparian edge reflects some of the natural growth at the adjacent Horseshoe Creek. However, the constructed wetland had to be drawn down to remove heavy sediments resulting from the failure of erosion and sediment controls (ESC) to the south on undeveloped lands. (The lands had been stripped to ready the site for future development.)

## SEDIMENT AS SERENDIPITY?

Serendipity arrived in time again – this time as sediment. The drawdown helped reduce a weed problem in the riparian and emergent zones, as well as potentially curtailing the cattail population, the dandelion of wetlands! The sediment is being removed from any inlets/outlets but some will remain below normal water level, making the shores and slopes shallower and more conducive to growing a wider variety of preferred emergents. In addition, this wake-up call demonstrates the need for rigorous monitoring: there is not always a benefit from when erosion and sediment controls fail.

Why embrace serendipity? It demonstrates that, try as we might, we are never in complete control over what happens in our landscapes. Despite our best research, planning and design, sometimes success depends on a "fortunate" happenstance.

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RYAN WAKSHINSKI WITH KELLY-ANNE RICHMOND,  
PEGGY BAINARD ACHESON AND CARL SMITH

# ONCE IN A LIFETIME

## FEN AND WHITE CEDAR

**"Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connect."**

...Chief Seattle

### FR\_RESUME

#### MARAIS ET CÈDRE BLANC

Combien de fois au cours d'une carrière a-t-on la chance de concevoir une promenade surélevée unique serpentant un paysage presque mystique de peupliers, de sapins, de cèdres et de terre humide au moyen d'une technique expérimentale de construction ne pouvant être utilisée que durant un hiver long et très froid? Le sentier d'interprétation de la zone humide Brokenhead se trouve à moins d'une heure de voiture, au nord de Winnipeg. Il côtoie une réserve écologique rare et fascinante qui protège un marais calcaire et les sources qui l'irriguent au milieu d'une communauté forestière de cèdres blancs.

Pour voir des images de ces travaux de construction hivernaux,

**> LP+ Battre un sentier au plus creux de l'hiver**

### EN\_

**HOW MANY TIMES** in a career do you get to design a one-of-a-kind, elevated walkway through an almost mystical landscape of poplar, fir, cedar and wetland, using an experimental application and construction technique only possible during a long, cold winter with heavy snowfall? This has been my reality for the past three years working for Manitoba Conservation and Water Stewardship towards the completion of the Brokenhead Wetland Interpretive Trail. It is a project that thoroughly delighted me; I wonder if I will ever work on anything as interesting again...

The Brokenhead Wetland Interpretive Trail is less than an hour's drive north of Winnipeg. It flanks a rare and fascinating ecological reserve, which protects a calcareous fen and the springs that feed it, within a white cedar forest community. This exceptional wetland landscape is home to 23 species of rare and uncommon plants such as Indian Pipe, which lacks chlorophyll and is ghostly white in colour; many carnivorous plants such as the pitcher plant and sundew, and 28 of Manitoba's 37 native orchid species, including the globally rare ram's-head lady's slipper, the dragon's mouth orchid and more common yellow and pink lady slippers. The fen is characterized by a fluctuating water table rich in calcium carbonate, as well as magnesium and sulfate, all released from the sand and gravel in the surrounding soils. (Fens as a rule are mineral rich and alkaline, as opposed to bogs, which are acidic.) Groundwater and surface water movement is a common characteristic of fens and can be observed here in channels, pools or upwellings as water moves from the high Grand Beach ridge west down to Lake Winnipeg.

The Brokenhead Wetland Ecological Reserve itself was established in 2005 and doubled in size to encompass over 12 square kilometres in 2012. For hundreds of years, the Brokenhead Ojibway Nation has been visiting the wetland to harvest plants and berries for medicinal and traditional ceremonial use. Orchid lovers and eco-tourists, too, know the wetland, but while ecological reserves are of major educational and aesthetic benefit, they



1

**"The Ojibway teach us... that everything alive is interconnected and has a purpose to fulfill; we need to respect that purpose to maintain a balance in the world."**

...BROKENHEAD WETLAND  
INTERPRETIVE TRAIL SIGNAGE

are not created for outdoor recreation. In the past, visitors were not encouraged, both for their own safety and because the ground and vegetation are sensitive to foot traffic. That finally changed this autumn, with the opening of the Brokenhead Wetland Interpretive Trail, which is adjacent to the reserve. The Trail sits within a 100 metre-wide buffer that follows the edge of the ecological reserve for about 1.2 kilometres, allowing views in – but not access.

A decade ago, Riverside Gravel supported the trail's development by relinquishing a portion of their quarry lease to accommodate the trail. Shortly thereafter, Debwendon Inc. was established to make the dream a reality, building and then maintaining the trail. Debwendon, which means "trust" in Ojibway, is made up of two non-profit organizations, Native Orchid Conservation Inc. and the Manitoba Model Forest, along with Eastside Aboriginal Sustainable Tourism Inc. and the Brokenhead Ojibway Nation.

With funding from its four founding groups, Debwendon produced a video entitled "EKO" (2007) along with an educational brochure and banner to encourage donations. When the fundraising campaign fell short, Debwendon's "angel" appeared in the form of Eugene Reimer, a local naturalist and former board member of both Native Orchard Conservation Inc. and Debwendon, who established a \$600,000 endowment fund to support the trail project. Manitoba Parks agreed to build the \$1 million elevated boardwalk, parking lot and access road, while the Eugene Reimer Environment Fund would provide funding to Debwendon in perpetuity for the trail's upkeep.

#### **OUR GOOD LUCK: A LONG COLD WINTER**

The boardwalk utilizes an entirely new approach, designed to avoid damaging the sensitive ground and to simplify the maintenance and yearly levelling requirements of the typical driven-post

boardwalk system. Floating dock billets, laid on the ground, support the boardwalk structure above. This effectively mimics the contours of the sensitive topography, and allows water to pass underneath, while providing a consistent surface navigable by wheelchairs.

To eliminate any contact with the delicate landscape, the deck sections were prefabricated and hauled in on the snow. Seaco Marine Inc. fabricated a specialized snowmobile trailer which hauled two of the 6 x 16-foot (2 x 5 metre) sections out onto the trail. Using a wide-tracked mini excavator and brute force, the team moved them into position, pinning sections together with heavy-duty galvanized hardware and fashioning turns and angles by constructing ad-hoc sections on site. At important locations, they created larger nodes by combining multiple sections, or used the custom hexagonal sections devised as accents. An extremely long, cold winter (even for Winnipeg) over 2013-14, along with unprecedented levels of snow, allowed the project to be completed with zero impact. Once the snow melted, crews did some minor levelling by substituting standard billets for thicker or thinner units, as required.

Officially opened in September, 2015, the wheelchair accessible trail features more than a kilometre of the suspended cedar boardwalk winding through various habitat types: gravel moraine, balsam poplar and fir forest, cedar wetland, and finally the calcareous fen. Numerous benches offer space for reflection, and at the southern end of the route, an octagonal forest 'plaza' serves as an outdoor classroom or picnic site.

Interpretive nodes highlight specific plants – the orchids, pitcher plants and Labrador tea – as well as features such as glacial erratics, and primarily, the special relationship of the Ojibway Nation with the wetland. Debwendon intends to offer live interpretive programming by Ojibway people during the summer months. But whenever you arrive, the interpretive signs voice a welcome: you are invited to "step

into the lands of Cedar Lake – home to the Brokenhead Ojibway Nation. Listen to the birds...smell the cedar...Take in the details, large and small, that surround you. The lessons of respect, purpose, balance and interconnection are here to discover at every turn."

**ryan.wakshinski@gov.mb.ca**

For images of its innovative mid-winter construction,

**> LP+ Trail Building in Deep Winter**



**1 INDIAN PIPE 2 LABRADOR TEA 3 PITCHER PLANT  
4 SUNDEW | 1 MONOTROPE UNIFLORE 2 THÉ DU  
LABRADOR 3 SARRACÉNIE POURPRE 4 DROSERA**

PHOTOS KELLY-ANNE RICHMOND



2, 3, 4



1



2

ROBIN TRESS

# ECOLOGICAL LANDSCAPING

## FR\_RESUMÉ

### LITTORAUX VIVANTS

À Halifax, à Brûlé, dans l'île Caribou et à Malagash, des habitants à la recherche de solutions de remplacement aux digues de ciment et aux brise-lames de pierre ont joint leurs efforts à ceux du Centre d'action écologique et des entreprises locales pour mener des expériences de contrôle de l'érosion. Grâce à des initiatives inspirantes comme celle des Littoraux vivants, ils aident le paysage à contrer l'érosion du littoral.

## EN\_

**FOR ALL THOSE** who work in the environmental field, climate change is an ever-pressing issue, and hope is a key ingredient in any success. The *Leap Manifesto*, inspired by the likes of Naomi Klein, David Suzuki and Stephen Lewis, is a recipe for hope. Since its September launch, almost 30 000 people and organizations have signed on, endorsing its vision for "a Canada based on caring for the earth and for one another."

## TAKING THAT FIRST LEAP

Behind this vision is a simple truth: we, as a global society, don't have time to move slowly. We cannot passively amble towards a low-carbon, climate-smart future. We have to leap towards that future with both feet.

The *Leap Manifesto* challenges us to run our society in a way that is sustainable for our environment, our economy and our communities. It is about more than reducing greenhouse gas emissions. This leap will require investments in low-carbon electricity production, public transit, local food systems and many other areas: it will require hard work. For people in coastal areas, it will involve preparing their communities for the impacts of climate change.

## THE WORK TO PREPARE OUR COASTS

Nova Scotia can be described as a rainy would-be island: it is connected to New Brunswick by the low-lying Isthmus of Chignecto. Already, Nova Scotia is experiencing an increase in storm surges, floods and coastal erosion. Luckily, our New England neighbours can offer guidance on what we can do to prepare through inspiring initiatives such as Living Shorelines.

Deeply rooted in the Living Shorelines coastal management ethos is the understanding that coastal ecosystems have thrived for billions of years. Without human interference, they are incredibly adaptive and observably resilient. Because coastal ecosystems such as beaches and salt marshes offer countless ecosystem services, Living Shorelines seeks to restore them, producing untold adaptive value for our communities.

A "living shoreline" is generally defined as one in which landscapes manage coastal erosion: natural coastal processes remain. This can involve the strategic placement of plants, stone, sand fill and other structural and organic materials both above and below the high tide line. Unlike concrete breakwaters or other erosion and flood-control methods, these measures don't try to stop the coast from changing outright. Instead, native ecosystems manage erosion and flooding so that human communities can co-exist.

These techniques are not the norm in North America, but today, many landscape architects are leading our Leap into a climate-smart future by pushing for Living Shorelines to be adopted by governments and consumers as the preferred method of coastal management. In Halifax, for example, the non-profit Ecology Action Centre has



3

**The first day of a Living Shoreline's life is the worst, and every day after it becomes stronger and more resilient as roots deepen and shoots grow. | Leur premier jour est le plus difficile et ils se renforcent ensuite à mesure que les plants s'enracinent et s'étalent.** – KEVIN SMITH, LIVING SHORELINES

been working with landscape architects and communities to implement four Living Shorelines demonstration sites.

#### FOUR SITES TO WATCH

In Halifax, in Brule, on Caribou Island and in Malagash, residents looking for alternatives to cement seawalls and stone breakwaters joined forces with the Ecology Action Centre, and coastal businesses. All four communities engaged in erosion control experiments. While each site is different, the pre-planting conditions had similarities: obvious signs of rapid erosion, bare soils, signs of failing intertidal health... and landowners willing to try something new. To manage erosion, landowners, EAC staff, coastal businesses, and interested volunteers planted native grasses, shrubs and trees, to cover bare soil and provide soft barriers between the land and sea. At all four sites, plants are growing, root systems are taking hold and the ecosystems have a fighting chance at re-establishing balance.

#### THE THREE PILLARS OF SUSTAINABILITY ECOLOGY, ECONOMY, COMMUNITY

Research from the **University of North Carolina** shows that intact coastal ecosystems offer storm, flood and erosion

protection that is as good as, or better than, any shoreline hardening approaches. The systems build on ecological principles. Each site will experience some erosion and deposition of sediment; each requires local perennial plants both below and above the high tide mark, and each has unbridled physical space to move and change.

As Maryland's Living Shorelines guru Kevin Smith says, Living Shorelines are inherently regenerative. The first day of a Living Shoreline's life is the worst, and every day after it becomes stronger and more resilient as roots deepen and shoots grow. Conversely, hard coastal armouring structures are inherently degenerative; they become weaker with every wave and storm.

The ecological resilience of a Living Shoreline is accompanied by a strengthening of the economy and the social fabric. Companies across New England and Atlantic Canada are already doing climate adaptation work and providing green jobs. Some Nova Scotia enterprises, such as Helping Nature Heal and CB-WES, work primarily in rural communities, and employ dozens of skilled people. Other members of the community volunteer. Through the four projects, we've directly involved over 180 community members in putting roots in the ground at

our Living Shorelines sites. Over 120 people contributed to the Halifax project alone, and their work helped return erosion rates and flood risks to levels resembling those of an intact natural ecosystem.

#### THE POWER TO MAKE REAL CHANGE

In the process, Nova Scotians have built stronger connections to their community and their land. At the Halifax demonstration site, for example, the shoreline was underused; most people who participated didn't know the land was public! The Living Shorelines project intentionally engaged the community. Together we reclaimed the public land, turning it into a functional, beautiful green space that people would share with their friends and families.

**coastal@ecologyaction.ca**

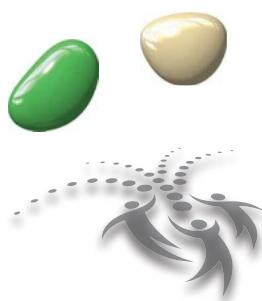
**1+2 EAC'S LIVING SHORELINES PROJECT, HALIFAX: A YOUNG GIRL PLANTING NATIVE YARROW WORKS TOGETHER WITH PEOPLE OF ALL AGES 3 CARIBOU ISLAND, N.S. – COVERING THE EMBANKMENT BY PLANTING DIRECTLY ON EXPOSED SOIL | JUNE JEUNE FILLE PLANTE DE L'ACHILLEÉ DANS LE CADRE DU PROJET DE LITTORAL VIVANT D'HALIFAX. 2 LE PROJET DE LITTORAL VIVANT DU CAE D'HALIFAX A RASSEMBLÉ DES PARTICIPANTS DE TOUS ÂGES. 3 LES OUVRIERS ET LES BÉNÉVOLES COUVERT LE REMBLAI ET PLANTENT DIRECTEMENT DANS LA TERRE EXPOSÉE DE L'ÎLE CARIBOU, EN NOUVELLE-ÉCOSSE.**

**PHOTO 1+2 JESSICA SYPER 3 ECOLOGY ACTION CENTRE**



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Properties receive certification by designing outdoor spaces that incorporate plants and habitat that supply food, water and shelter to wildlife. Certification remains in place for five years, and certified gardens are eligible to receive signage from CWF recognizing them as official "wildlife friendly habitats." So far nearly 1,000 gardens have been certified across Canada!

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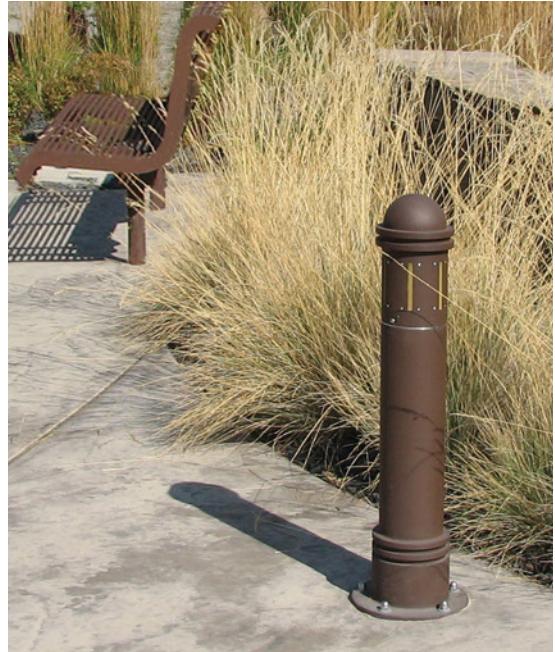
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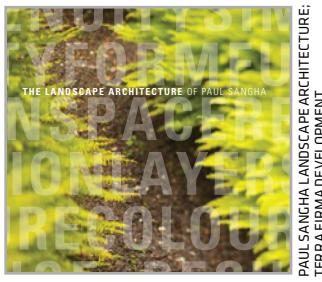
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# UNE RICHESSE PARTICULIÈRE

FR\_

**QUELLE EST LA** définition de terres humides, en vérité? Suivant l'endroit où vous vivez, les terres humides peuvent désigner un marais de quenouilles, une tourbière, un marais de cèdres blancs ou encore un marais salin ou de carex. Il pourrait être tout aussi pertinent de se demander ce que les terres humides ne sont pas : un plan d'eau aux contours parfaitement définis sur un terrain de golf ou un « lac » créé par un orage violent.

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La condition évidente selon laquelle il doit y avoir de l'eau ou un terrain inondé pour parler de terres humides, du moins au cours de certaines saisons, pourrait décrire aussi bien les rives de tout plan d'eau artificiel. Mais les terres humides doivent satisfaire un autre critère qui se distingue sur le plan écologique et esthétique. En agissant entre les terres en amont et le milieu aquatique, les terres humides constituent le lieu où le tissu de la vie est le plus finement et richement brodé. Leur caractère transitoire est évident pour la majorité des espèces animales puisque dans une biorégion donnée, la majorité des animaux dépendent des terres humides pour certains aspects de leur vie. C'est ce qui rend les terres humides si fascinantes pour la plupart des gens, lorsqu'ils sont en mesure d'accepter dans une certaine mesure le caractère sauvage qui en constitue l'essence. Cette acceptation en émergence mène à...

Qu'est-ce qu'un réseau écologique si ce n'est un ensemble de relations entre entités, éléments fondamentaux et circulation de fluides? Cette définition revêt de profondes implications en matière de conception écologique. Avant de restaurer ou de créer des terres humides, nous devrions d'abord comprendre dans leur essence les flux de minéraux, de matières organiques, d'eau et d'énergie qui existent dans des terres humides résilientes et en santé. Comment les flux hydrauliques et les inondations interagissent-ils au fil des siècles et des millénaires avec le transport des

sédiments et les processus de dépôt pour créer la structure du paysage? Comment l'enracinement et la sénescence des terres humides et des plantes riveraines répondent-ils à la structure fondamentale du sol pour éventuellement la transformer? Comment les animaux utilisent et modifient-ils la matrice de ce sol et de cette végétation? Quels sont les points de tissage essentiels (nœuds ou niches) dans ce paysage qui le définissent et qui lui donnent sa résilience? Comment ce réseau complexe et complet vient-il modifier l'importance du flux de carbone, de nutriments et de fins sédiments dans les cours d'eau, les lacs et la mer? Peut-on intégrer efficacement des objectifs humains, comme la purification de l'eau, aux caractéristiques naturelles essentielles des terres humides? Il semble clair qu'un tel niveau de complexité dépasse notre entendement et celui de toute discipline professionnelle.

## UN REGARD ESTHÉTIQUE SUR LA NATURE

Nous devons aussi faire face au défi d'une culture qui baigne depuis longtemps dans un souci esthétique méfiant, sinon hostile envers les caractéristiques de la nature. Lors de rencontres publiques, combien de fois n'avons-nous pas entendu des commentaires explicites tels que : « Si je voulais voir un marécage, j'irais à la chasse au canard! Je ne veux pas de ça dans mon arrière-cour! » Les objections sont parfois plus diplomatiques (mais parfois beaucoup moins). Néanmoins, le concept de beauté est en grande partie déterminé par notre culture, il n'évolue pas rapidement et il est très mal vu, dans une société libre, d'aller à l'encontre des sensibilités esthétiques du grand public.

## LE CARACTÈRE TRANSITOIRE DES TERRES HUMIDES

Selon moi, l'architecture paysagère partage une caractéristique importante avec les terres humides, celle de son « caractère transitoire ». Comme c'est le cas pour les terres humides, notre valeur particulière découle de la compréhension de nos forces

et de nos limites au sein du réseau formé des autres professionnels, des politiciens, des administrateurs et du public.

Au mieux, nous pouvons agir comme des agents de liaison et des intégrateurs créatifs parmi les diverses compréhensions et sensibilités de plusieurs disciplines spécialisées et les divergences d'opinion du public. Seule une extrême arrogance pourrait nous pousser à concevoir des aménagements avant d'avoir écouté attentivement et assimilé le savoir des biologistes, des hydrologues et des experts de la qualité de l'eau. Notre profession peut toutefois produire des créations que les esprits les plus linéaires ne sauraient même imaginer. La conception écologique requiert un subtil équilibre contextuel entre « ce qui est » (sciences), « ce qui est faisable » (ingénierie), « ce qui devrait être » (culture/politique) et « ce qui pourrait être » (créativité conceptuelle). Lorsque le travail est bien fait, le leadership rafraîchissant qui s'en dégage est particulièrement précieux pour faire évoluer graduellement la perception publique quant à la place de la nature dans nos villes et municipalités. Nous devrions célébrer le rôle que notre profession joue dans l'émergence d'une véritable esthétique du « Nouveau Monde ».

En réalité, nous ne pouvons recréer, au cours des quelques années que dure un projet de construction, la subtilité complète des terres humides en santé qui existent depuis longtemps. Toutefois, comme l'illustrent les exemples présentés dans le présent journal, nous pouvons créer avec une compréhension suffisante des principaux processus, de la trame fondamentale du réseau et des valeurs culturelles environnantes un aménagement paysager qui tient compte de la biodiversité, de la productivité, des schémas et de la résilience qui émergeront au cours des prochaines décennies.

\*PENSEZ COMME L'EAU est la réflexion provocante qui sert de frontispice au site. source2source : [www.source2source.ca](http://www.source2source.ca)



TONY BOWRON

# INVERSER LA VAGUE

CHEVERIE  
COGMAGUN  
ST. CROIX  
WALTON  
SALMON RIVER  
MONITORING

1. ARPENTAGE D'UN CHENAL DE MARÉE POUR  
LA CONCEPTION DU PROJET. 2 COUCHER DE  
SOLEIL À MARÉE BASSE SUR LA CRIQUE  
CHEVERIE. PHOTOS TONY BOWRON



# 10 ANS DE RÉTABLISSEMENT DES MARAIS LITTORAUX

2

« Les travaux de rétablissement ne visent pas à revenir en arrière, mais à recommencer à aller de l'avant. »

...ALAN WATSON FEATHERSTONE –  
FONDATEUR ET DIRECTEUR GÉNÉRAL DE TREES FOR LIFE

FR\_

« VOUS FAITES ÇA pour les oiseaux et les poissons ? Dans ce cas... »

Sur ces mots, la Nouvelle-Écosse a accepté, en 2005, de financer le premier projet intentionnel de rétablissement des marais salés dans cette province. Dix ans et autant de projets plus tard, avec le concours de CBWES, elle a rétabli l'écoulement des marées, le passage des poissons et les conditions de l'habitat palustre sur plus de 225 ha de systèmes littoraux dégradés et perdus.

Il y a dix ans, on savait peu de choses sur l'écologie de ces systèmes dynamiques. On ne savait pas s'ils réagiraient aux efforts de rétablissement, si on pouvait « relancer la machine ». Quelle satisfaction, aujourd'hui, d'avoir la certitude scientifique, données à l'appui, qu'il est possible de ramener la marée !

## UNE SIMPLE QUESTION D'HYDROLOGIE

C'est le message que nous ont transmis les experts en marais salés de la Nouvelle-Angleterre, alors que nous élaborions le premier projet. Depuis, peu importe les travaux de remise en état (remplacement de ponceaux, ouverture de digues, nouvelles constructions), nous tentons de rétablir un régime hydrologique plus naturel pour recréer des conditions palustres similaires à celles qui régnait avant les altérations néfastes. Or, il ne

suffit pas de lever les obstacles et de ramener la marée : ces marais littoraux doivent s'équilibrer en fonction des conditions actuelles, s'autosuffire et avoir la force de s'adapter aux imprévus.

Si la remise en état se concentre sur les variables fondamentales qui motivent les comportements de l'écosystème (hydrologie et niveau des marais), les autres composantes palustres réagissent promptement. À l'aide d'un suivi écologique complet et de longue durée, nous avons documenté les changements positifs quant au sol, à la salinité, à la flore et à la faune (poissons, oiseaux, invertébrés). C'est vrai des travaux sur les ponceaux restrictifs de la crique Cheverie et les digues agricoles ou de retenue sur la rivière Walton, comme des travaux plus actifs, par exemple la conception et la réalisation de chenaux de marées et d'étangs au site St. Croix.

## CRIQUE CHEVERIE : IL FALLAIT BIEN COMMENCER QUELQUE PART

Notre premier projet de rétablissement en Nouvelle-Écosse était la crique Cheverie, un ruisseau à marées dont l'embouchure était traversée par un pont-jetée au ponceau trop étroit, limitant l'écoulement de la marée à moins de 5 ha sur les 43 ha du marais salé et de son ruisseau. Les

travaux, codirigés par l'Ecology Action Centre, la municipalité et l'Université Saint Mary's, ont commencé en 2002. En 2005, le ministère provincial des Transports a remplacé le ponceau-caisson en bois par un ponceau elliptique en aluminium nettement plus large. Cela a permis d'augmenter le flux de marée de 88 pour cent et de multiplier par huit l'aire inondée en amont. J'ai eu le privilège de participer à chaque étape du projet. En observant la transformation rapide de la végétation d'une flore d'eau douce et terrestre en flore palustre, j'ai dû admettre que je n'avais jamais été aussi heureux de voir des arbres périr.

## RIVIÈRE WALTON : QUE CRÈVENT LES DIGUES

Notre deuxième projet, plus petit et moins complexe, avait le mérite d'être le premier cas d'ouverture intentionnelle d'une digue dans la province. Il consistait à creuser, dans la digue, cinq brèches de 150 à 200 m et à remplir les sections parallèles de l'emprunt.

Dans la première année suivant les travaux de terrassement, un chenal de 12 m x 14 m s'est formé dans la brèche centrale, reconnectant le réseau de la crique réactivée (y compris les restes de l'emprunt). La sédimentation et la colonisation végétale ont été si rapides



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que, trois ans après les travaux, le niveau du marais approchait celui des marais de référence et les plantes halophytes avaient repris possession des lieux.

Le projet Walton a été suivi, quatre ans plus tard, d'autres projets d'ouverture de digues aux travaux beaucoup plus poussés. Sur la rivière Cogmagun, nous avons travaillé sur une retenue d'eau douce semblable à la rivière Walton, tandis qu'à la rivière St. Croix, le projet comportait des digues agricoles, des aboiteaux et des champs en jachère. Ces deux projets ont été conçus à l'aide d'images historiques, de données LiDAR validées sur le terrain et de maquettes d'écoulement détaillées. Nous avons fait correspondre les ouvertures de digues et les chenaux creusés aux bassins hydrographiques délimités, aux chenaux antérieurs et aux fossés. En associant les brèches et les chenaux aux vestiges d'éléments palustres, nous avons pu réduire de beaucoup la taille des brèches et, par le fait même, la durée et le coût des travaux, tout en assurant un rétablissement hydrologique et écologique complet.

#### AJOUTER DES OUTILS

Forts de ces expériences, nous avons complété quatre autres projets de remplacement de ponceaux, en plus d'en démarrer trois autres. Quatre consistaient en passages à niveau; les autres, en ponceaux et en petits ponts sur d'anciens tronçons de chemin de fer convertis en sentiers publics. À Antigonish Landing North, nous avons creusé un vaste réseau de chenaux de marées avec des étangs d'eaux libres pour créer un habitat propice aux poissons et aux oiseaux aquatiques.

Ces projets démontrent qu'il est possible de rétablir l'écosystème d'un marais littoral et de ramener les espèces rapidement. On a vu la flore se réinstaller en moins de trois ans, puis s'approcher de la composition des marais intacts en cinq ans.

Étant donné qu'on a perdu plus de 80 pour cent des marais côtiers uniquement dans la baie de Fundy et que près de 60 pour cent des régimes de marées sont entravés, les bienfaits de chaque projet de remise en état dépassent largement l'écologie locale. Notre capacité à concevoir des projets comme celui d'Antigonish Landing s'alimente aux recherches que mènent, depuis dix ans, les professeurs et les étudiants de l'Université Saint Mary's; ceux-ci se servent de nos sites pour étudier l'écologie des marais salés et la conception des remises en état. Chaque projet comportait un programme de documentation pendant un an avant et cinq ans après les travaux. Nous avons recueilli des données sur plusieurs indicateurs physiques et biologiques pour documenter la nature, l'étendue et la direction des changements à l'hydrologie, aux conditions du sol, à la végétation et aux populations de poissons et d'invertébrés attribuables aux activités de rétablissement. À chaque site est associé un milieu humide sain (un marais de référence); en comparant les conditions des deux sites, nous sommes en mesure d'évaluer les progrès du site restauré.

L'indicateur le plus frappant est le retour observable du recouvrement par les marées et les changements au peuplement végétal. Le rétablissement hydrologique est à la fois immédiat, avec la première marée montante, et délicat, avec la réactivation et le développement du

réseau hybride propre à chaque site. Étant donné le passé agricole de nombreuses régions, les systèmes hydrologiques qui se créent combinent généralement chenaux historiques et vestiges de fossés agricoles.

#### PENSER AUX IMPRÉVUS

Notre suivi permet de mesurer la réussite de chaque projet : si les conditions du site rétabli ressemblent à celles du marais de référence, mission accomplie. Et si elles en diffèrent, cela ne se traduit pas nécessairement en échec. D'expérience, les objectifs de rétablissement ne doivent pas être trop rigides ; il faut laisser de la marge au caractère variable et imprévisible de la nature. Les marais littoraux sont des systèmes dynamiques et souvent déterminés par les perturbations ; il arrive que les fonctions et leurs caractéristiques se transforment au fil de leur rétablissement. Dans la baie de Fundy, par exemple, une seule tempête peut laisser plusieurs centimètres de sédiments qui altèrent le régime des marées, les conditions du sol et, en bout de piste, la communauté végétale.

La réussite tient surtout à une bonne compréhension de la morphodynamique du système et de ses interactions avec les principaux processus physiques et biologiques. Par exemple, le projet a peu de chance de s'épanouir si le niveau du marais est bas et que l'apport en sédiments ne suffit pas au rythme de l'hydrologie rétablie. L'intégration d'un suivi nous permet d'évaluer le degré de réussite, de parfaire nos connaissances sur ces habitats et de mieux concevoir les projets suivants.

Nos projets-pilotes ont réussi à rétablir une hydrologie naturelle ; dans bien des cas, le site redévient productif en moins



de deux ans. Précisons, néanmoins, que ces premiers projets étaient « faciles ». Les prochains seront probablement plus exigeants, vastes et complexes. Les changements climatiques, l’élévation du niveau de la mer, ainsi que la fréquence et la gravité accrues des tempêtes risquent de menacer plus que jamais les systèmes côtiers intacts, les habitats en rétablissement et les infrastructures humaines avoisinantes. Si nos projets avaient pour but de rétablir des habitats palustres, les prochains auront probablement pour objectifs l’adaptation aux changements climatiques et la résilience côtière, reléguant les bienfaits écologiques au second rang. Ces travaux de remise en état approfondissent notre compréhension de la forme et de la fonction de ces systèmes ; ils nous préparent à ce que l’avenir nous réserve.

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**3** LE MARAIS SALÉ DE LA RIVIÈRE SALMON EN AUTOMNE **4** UN MEMBRE CRUCIAL DE L’ÉQUIPE DE TERRAIN PARTICIPE À LA CUEILLETTE D’ÉCHANTILLONS AU SITE WALTON, 7 ANS APRÈS LES TRAVAUX. **5** L’ÉQUIPÉ DE TERRAIN COMPARE SES NOTES SUR LA VÉGÉTATION. **6** NOUVEAU PONCEAU DE LA CRIQUE CHEVERIE EN 2009, 4 ANS APRÈS LES TRAVAUX. **7** DOCUMENTATION DU NIVEAU ET DE LA SÉDIMENTATION À COGMAGUN, 4 ANS APRÈS LES TRAVAUX. **8** CREUSAGE DU NOUVEAU CHENAL DE MARÉES SUR LA COGMAGUN, 2009. **9** VÉGÉTATION PALUSTRE ÉMERGANT DE L’EAU À MARÉE HAUTE, COGMAGUN, 2013. **10** COUCHER DE SOLEIL SUR LE MARAIS DE LA COGMAGUN PENDANT L’ÉCHANTILLONNAGE DES POISSONS, 4 ANS APRÈS LES TRAVAUX  
PHOTOS TONY BOWRON

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MICHEL ROUSSEAU, AAPQ, FCSLA

# WET DESIGN MEI DESIGN

EN\_

**IT MAY SEEM** like a strange title for an article: it is closer to free association than new terminology. Regardless, it is an apt summary of a new approach available to landscape architects. The idea is to treat water as integral to the design of a city.

With a warming climate, all countries have concerns related to one or more aspects of water: rising sea level, tropical storms, freshwater reserves, drought. Yet Canada is a country shaped by water. Ice sculpted the eastern part of the country; Ontario and Quebec have the largest freshwater reserves. Cities in the St. Lawrence valley have a temperate climate characterized by frequent precipitation – more than 1,000 mm (rain and snow combined) in the Montreal area, for example. Nonetheless, few people worry about water management in urban settings. Rain is an urban constraint that professionals still prefer to get rid of, but growing numbers of landscape architects and engineers are taking a sustainable approach to rainwater management. Rather than channelling all runoff into storm sewers, they are redirecting it to bioretention areas. It is a different approach and a fine improvement, but the end result is the same as ever: it is disposed of.

**1+3** CRÉATION ARCHITECTURALE D'UN BASSIN DE RÉTENTION - PARC DES SEMIS, LONGUEUIL  
**2** CRÉATION D'UNE PLAGE URBAINE À MONTRÉAL - PLAGE DE L'EST - VUE NOCTURNE DE LA CRIQUE

PHOTOS MICHEL ROUSSEAU

We have all heard that water is the source of life. If so, why are we so eager to rid ourselves of it? Because it is also a development constraint, limiting the amount of space usable for construction! Elected officials, managers, professionals: all are in the habit of thinking like real estate developers. And yet water is the source of life. Should we integrate water into the design of a city? In fact, the question ought to be, "how can water restore life to cities?"

The protection and rehabilitation of wetlands is a hot topic. Some of these environments have been lost, and the remaining ones are under enormous pressure. The team I have the good fortune to lead is working on improving and restoring such environments. Over the years, we have learned to characterize them thoroughly before taking action of any kind. That acquisition of knowledge has led us to grasp the very essence of these fragile but rich environments so that we can inform the public about them. We create urban wetlands, whether marshes, swamps or ponds. We integrate these extraordinary landscapes into everyday urban environments, in the process making people more aware of water's critical importance. Water can be the solution to many ills and problems encountered in urban areas. In this article, we will look at three conceptual characteristics that are particular to water: motion, temporality, life.



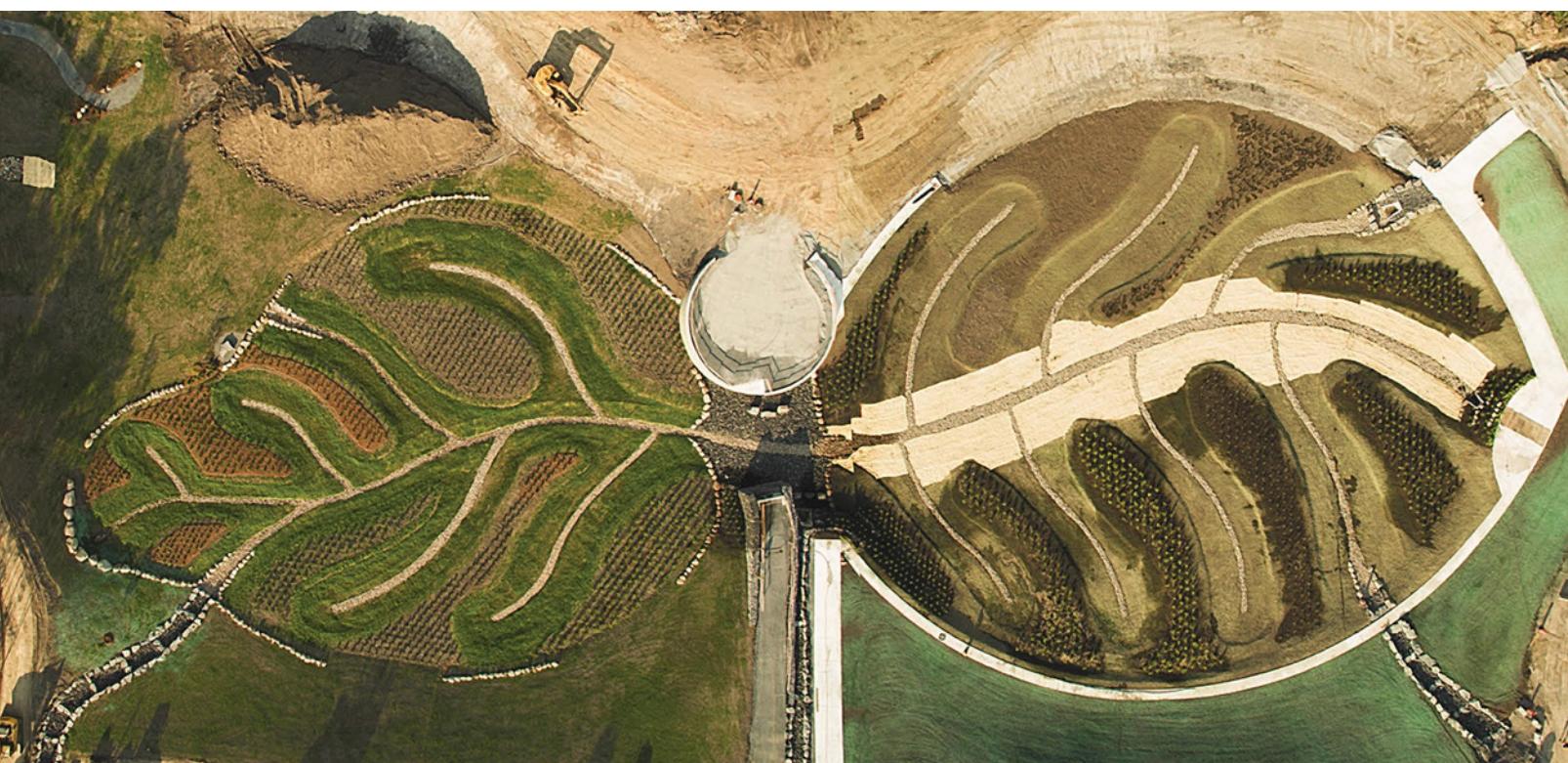
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## MOTION

Water is always synonymous with motion. It fascinates us as it flows in a stream, tumbles over an escarpment to form a waterfall, or rises into steep breakers on a beach. It is even fascinating when it is perfectly still. When it transforms a pond into a mirror, it reflects images of everything in movement all around. A light breeze makes ripples on the surface, which everyone notices. In urban settings, we can make use of water's motion in many ways. Fountains have been used to that precise end for centuries: they have provided animation, decoration, wonderment. The



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sustainable management of rainwater leads us to the possibility of collecting and managing water in a network – known as a blue network – which allows open-air landscaping. Water is no longer a development “constraint”; it can be reclaimed either architecturally or artistically. If the design of a building or a public square is a reflection of our cultural values, water must be a value we express in the shape of our living spaces.

#### TEMPORALITY

Water comes from irregular precipitation – irregular both in terms of occurrence

and quantity. This unpredictable, ephemeral element provides an incredible opportunity to create changing landscapes that will thrive on that erratic dynamic. The seasons are another element to consider. Our team approaches its projects in an event-oriented manner, in which the arrival of rain is a show in its own right. We also integrate elements of rain art into our designs, so that an entire project site, park or street is animated by rainfall. It is an actor that invites itself into the space, takes its place and plays its part.

#### LIFE

Like natural wetlands, those created in the city must be sources of life. They can be fed by whatever water the rain can provide, but through careful planning they can also be small yet viable and sustainable ecosystems. Depending on the type of natural wetland we want to emulate, we can select certain plants to create a community. When we manage rainwater intelligently and efficiently, plants grow faster. Aside from the humans that inevitably colonize this type of space in a city, birds, reptiles and certain small mammals will visit or move

**In fact, the question ought to be “how can water restore life to cities?” | ...la question devrait être « Comment l'eau peut redonner vie aux villes »?**

in, given appropriate conditions. On the simplest social level, the presence of these types of fauna is beneficial for urban children, who have a well-documented and growing shortage of nature in their lives.

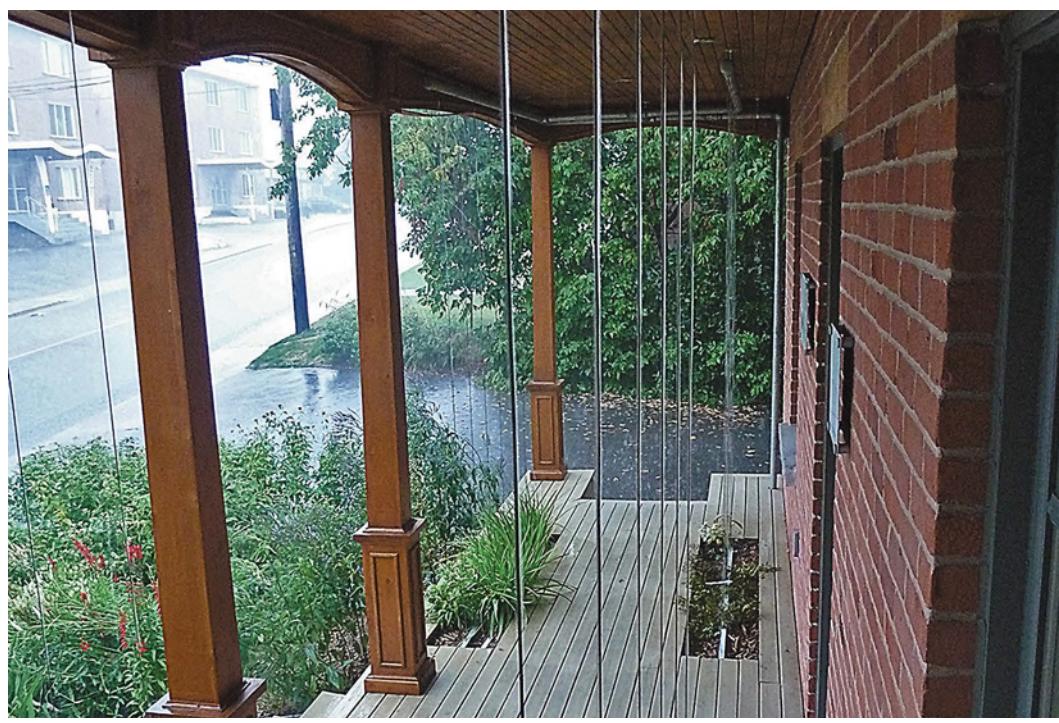
These are all interesting ideas, but they are only theoretical. How can we turn these opportunities into real designs? Our team, which works on this problem regularly, would like to take a look at certain projects in which we have explored these ideas.

#### **INTEGRATION WITH AN EXISTING MARSH - SAINTE-DOROTHÉE COMMUNITY CENTRE, LAVAL**

Here we constructed a new public building near a natural wetland. The marsh is fed by nearby fallow lands. The new building and its parking lot add significant impermeable surface area. After characterizing the site, we proposed a runoff management strategy to feed the same amount of water into the marsh from the parking lot, only filtered by plants.

#### **LET IT RAIN! - GROUPE ROUSSEAU LEFEBVRE OFFICE, LAVAL**

*Figure 5:* Here we created a playful, event-style design for the façade of a commercial building. Rainwater is collected in an ingenious gutter and channel system, descends along long metal wires, and fills planters on the deck over the entrance. These planters are designed like a green rooftop. Any overflow from the planters drains below the balcony, where the water slides along steel beams and ends its flow in a small waterfall that drains into an evapotranspiration basin.





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The basin was designed as a wet area, its bottom being sealed by a thick layer of clay. The goal was to test certain plants in urban conditions with variable moisture levels. In addition, we wanted to test the capacity of plants to transpire surplus water. Contrary to expectations, a very small amount of water remains on the surface during heavy rainfalls. The thin, 30-cm layer of soil absorbs the water and the plants take care of the rest. When it rains, it is not unusual to see passers-by stop to watch the show.

#### **ARCHITECTURAL CREATION OF A RETENTION POND - PARC DES SEMIS, LONGUEUIL**

*Figures 1 + 3:* On the South shore of Montreal, we constructed a very large retention pond intended to serve a residential area. In addition to the objective of greening the pond, we wanted to filter reclaimed runoff by integrating filtering marshes architecturally. First, water captured in the basin passes through small decanting ponds where large suspended particles are precipitated. The water then flows into the filtering marshes, which serve as a drain field to remove finer particulates along with phosphorus and bacteria. The marshes work for the more frequent rains: smaller rainfalls, which represent around 75 per cent of all rain.

The resulting image is that of a large leaf whose veins and lobes change with the amount of water flowing into the filtering marshes. In plan view, as seen from lookouts or the air, it is impressive for its playful character and large size. This is a good example of a wetland design in an urban area, performing functions of retention and filtration while

providing wildlife habitat and creating a stimulating new landscape.

#### **NEIGHBOURHOOD REVITALIZATION - BOULEVARD PIE IX, MONTREAL**

*Figure 4:* In this study for the Borough of Montréal-Nord, water management was the guiding design principle in a rethinking of an area that is run-down yet of strategic importance to the city. First, runoff from streets and roofs is to be channelled to street-side trees and planters along the boulevard, which then has interesting and functional lateral vegetation.

The blocks with one side on the boulevard were designed as housing islands; at the centres, each has its own recreational space, whether public or private. We therefore proposed to capture runoff to bring life to these spaces. Whether it is the surface of the water games in front of the library, the fountain in the middle of the intermodal terminal or the water garden and its filtering marshes in the centre of the social housing developments, water serves as an agent for social bonding that promotes lively public life. Who says we need to dispose of runoff in the city?

#### **CREATION OF AN URBAN BEACH - PLACE DE L'EST, MONTREAL**

*Figures 2 + 6:* A finalist in a design competition, this proposal calls for the reclamation of rainwater from part of a neighbourhood, to be filtered by a wetland connected to the St. Lawrence River. The design is unique for its arrangement of water and wetland allowing children from the neighbourhood and elsewhere to play in complete safety. Water games near the pavilion entertain children on the upper platform.

Water then flows toward the wet environment below. It flows through the centre of the space, where children can dip their feet, jump from rock to rock and so on. The water then continues through the filtering marshes, and is eventually pumped back up to the water games. Any excess is returned to the river via a long wet area that serves as a safety buffer between play areas and the river. The proposal is conceived as a functional and aesthetic reinterpretation of an urban beach.

We must continue our efforts to protect natural wet environments. Public authorities and private managers need to keep investing in the rehabilitation of these environments. We must also use design to create new spaces with a signature water element. Think wet design!

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>The Bassin des Semis video:  
[https://www.youtube.com/watch?v=eCKgmQYoPG4&feature=em-share\\_video\\_user](https://www.youtube.com/watch?v=eCKgmQYoPG4&feature=em-share_video_user)

**4** REDYNAMISATION D'UN QUARTIER, BOULEVARD PIE IX CIVIQUE, MONTREAL **5** QUE VIENNE LA PLUIE : LA FAÇADE DU BUREAU DU GROUPE ROUSSEAU LEFEBVRE, LAVAL **6** PLAGE DE L'EST - VUE DE FLEUVE

**PHOTOS MICHEL ROUSSEAU**

RICHARD WYMA

# 1000 ÂCRES EN ESSEX



1 AU PARC NATIONAL DE LA POINTE-PÉLÉE, PENDANT LA MIGRATION DE MAI : UNE PARULINE ORANGÉE, ESPÈCE MENACÉE AU CANADA 2 LE TROTTOIR DE BOIS DU MARAIS HILLMAN

PHOTO 1 BRANDON HOLDEN 2 ERCA

FR\_

**LES MILIEUX HUMIDES** du comté d'Essex revêtent une énorme importance pour un nombre incalculable d'oiseaux et de papillons. Le comté d'Essex se situe au croisement de deux routes migratoires : celles de l'Atlantique et du Mississippi. Au printemps, les oiseaux qui ont passé l'hiver au sud se dépêchent de regagner leurs aires de reproduction du nord; ils survolent le lac Érié pour toucher terre le plus tôt possible, dans l'aire de conservation du marais Hillman, au parc national de la Pointe-Pelée. Par intermittence, surtout si la météo fait des siennes, des milliers d'oiseaux y posent patte par vagues, épousés par la traversée, pour manger avant de reprendre la route.

Ce paysage se situe à l'intérieur de la zone carolinienne. Cette zone se trouve au sud d'une ligne imaginaire allant de Grand Bend à Toronto, la limite nordique de la forêt caducifoliée de l'est de l'Amérique du Nord. Elle représente à peine, 0,25 pour cent du territoire continental canadien, mais elle abrite 25 pour cent de la population du pays. Cette densité exerce une pression gigantesque sur un si petit territoire qui accueille aussi la biodiversité florale et faunique la plus riche de tous les écosystèmes canadiens. En tout, 2200 espèces de plantes herbacées (dont 70 espèces d'arbres), de nombreux reptiles et amphibiens, ainsi que plusieurs mammifères y vivent quasi exclusivement, ce qui en fait un paradis pour les ornithologues amateurs et les naturalistes. On a recensé, dans la zone carolinienne, près de 400 espèces d'oiseaux, soit plus de la moitié des espèces recensées au Canada, dont 300 espèces au marais Hillman. La géographie et l'écosystème unique en son genre de cette aire de conservation en font l'un des dix points d'observation les plus courus en Amérique du Nord.

## 325 HECTARES DE TERRAIN EN MAUVAIS ÉTAT

La région d'Essex était bien différente en 1702. Selon Antoine de la Mothe Cadillac, son paysage était « si tempéré, si fertile et si magnifique qu'on pourrait le qualifier de paradis terrestre de l'Amérique du Nord... »

En 1973, 270 ans plus tard, on créait l'Essex Region Conservation Authority (ERCA) pour gérer et remettre en état les bassins hydrologiques du lac St. Clair, de la rivière Détroit et du bassin ouest du lac Érié, où la couverture naturelle patrimoniale avait chuté sous les 3,5 pour cent. La région avait perdu une bonne partie de sa forêt et presque tous ses milieux humides (97 pour cent). Il ne restait plus que de petits vestiges isolés d'habitats forestiers, humides, riverains, de prairie, de savane et d'alvar.

C'est au marais Hillman que la richesse écologique était la plus menacée. À

l'origine, ce secteur faisait partie d'une énorme zone humide de 4 000 hectares qui s'étendait de Hillman Creek jusqu'à l'emplacement actuel du parc national de la Pointe-Pelée, sur le lac Érié. Au tournant du siècle, on a drainé cet espace naturel qu'on percevait alors comme une zone inculte. Il n'en est resté que le marais Hillman, 325 hectares de terrain en mauvais état, souffrant des activités agricoles de la région.

Ce marais était coupé du lac Érié par une simple crête de plage sablonneuse étroite. Les tempêtes l'inondaient périodiquement. Dans les années 70, le niveau élevé du lac et les tempêtes de verglas en avaient inondé la luxuriante végétation, transformant les lieux en un système d'eaux libres sans végétation émergente, à l'exception des abords du rivage.

## ACHETER LE MARAIS

Les routes migratoires faisaient du marais Hillman un excellent candidat au rétablissement. Il y avait toutefois une légère complication : l'ERCA n'était pas maître du marais. Celui-ci appartenait à 25 propriétaires avec lesquels il a fallu négocier autant d'ententes particulières. En 1977, l'ERCA acquérait une première parcelle de 28 ha. Dix ans plus, elle avait repris 21 propriétés totalisant 360 ha et un kilomètre de crête de plage entre le marais et le lac Érié.

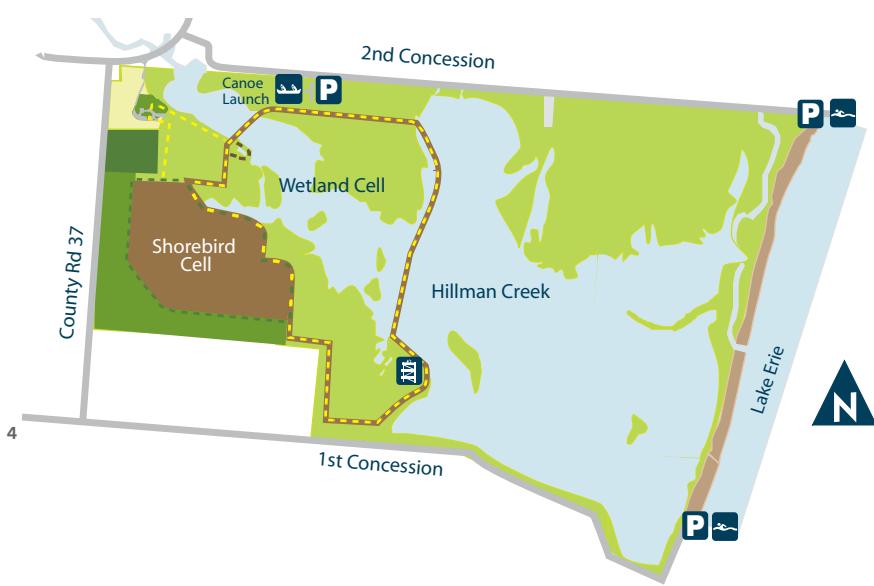
Le ministère ontarien des Ressources naturelles a apparié les fonds recueillis pour ces acquisitions ; Conservation de la nature Canada a financé le reste de la somme avec ERCA et l'Essex Region Conservation Foundation (ERCF), pour un budget total de 1 112 000 \$. Ducks Unlimited a conçu un système pour contrôler le niveau de l'eau dans le



*“...so temperate, so fertile and so beautiful that it may justly be called be the earthly paradise of North America...” | « si tempéré, si fertile et si magnifique qu'on pourrait le qualifier de paradis terrestre de l'Amérique du Nord... »*



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marais ; les coûts de construction et d'équipements ont été couverts par des entreprises commanditaires. À l'époque, le don de Dow Chemical (500 000 dollars américains) était la somme la plus importante versée à DU par une société canadienne. La Compagnie H.J. Heinz du Canada a participé à la conversion de la ferme et de la grange en salles de classe pour l'accueil d'étudiants visiteurs au marais (il en vient plus de 3 500 par année).

#### DIVISION DES CELLULES

Une fois l'aire de conservation constituée, l'équipe a créé deux « cellules », deux zones de confinement des eaux, couvrant 40 pour cent du marais. La construction



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l'équipe a mis en place des structures pour réguler le niveau de l'eau et simuler les conditions d'un marécage naturel. On a érigé des digues sur près de 7 km autour des cellules. L'une de ces digues forme un sentier de 4,5 km ; elle mène les visiteurs au cœur du marais.

### LES SEMENCES S'ÉVEILLENT

Le marais était en si piteux état que l'ERCA et DU ont vidé la plus grande cellule avant l'ouverture officielle de l'aire de conservation. Ce drainage a exposé le fond du marais au soleil et à l'oxygène, ce qui a accéléré la décomposition des matières organiques et le relâchement de leurs nutriments, encourageant ainsi les semences dormantes depuis longtemps à germer. Pour assurer aux cellules une biodiversité optimale, les gestionnaires ont opté pour un marais « semi-émergent » : 50 pour cent de végétation, 50 pour cent d'eaux libres et une alternance complexe de petits plans d'eau et de végétaux variés pour abriter les oiseaux nicheurs et répondre aux besoins de la sauvagine. Dans la première décennie, le couvert végétal est passé de 88 ha à 125 ha. On a vidé les cellules marécageuses à nouveau en 1994 et en 2005. Le prochain abaissement est prévu pour 2016-2017.

Sur les terres qui jouxtent les cellules, l'ERCA a mis en place une prairie à herbes hautes. Elle y procède à un essartage tous les dix ans pour en éliminer les végétaux ligneux. Cette prairie attire des espèces menacées, comme la sturnelle des prés et le goglu des prés. La bécasse y déploie ses danses amoureuses sophistiquées.

En 1999, les partenaires ont commencé à s'intéresser aux oiseaux de rivage, l'aménagement et le durcissement des rives du lac Érié ayant réduit les vasières du lac. L'ERCA a fait l'acquisition de 35 ha

de champs agricoles, où, en 2003, elle a inauguré une « cellule pour oiseaux de rivage » de 17 ha, la première du genre en Amérique du Nord. Cette cellule, comme ses consœurs marécageuses, est circonscrite par une berme qui retient l'eau. On y plante de l'orge en été, puis on l'inonde à l'automne pour stimuler le processus de décomposition et la croissance des larves, vers et autres proies prisées par les oiseaux de rivage. À la fin d'avril, l'eau se retire graduellement pour exposer les vasières riches en invertébrés.

Les oiseaux de rivage commencent à apprécier la région. Winny the Willet, une femelle chevalier semipalmé, a acquis le statut de célébrité mondiale. Des chercheurs de la Virginie l'ont suivie par satellite de la côte est américaine à Hillman, où elle a consacré plusieurs jours à se nourrir, avant d'établir un record de distance migratoire. On sait maintenant que la cellule est ancrée comme escale dans les comportements migratoires.

### AVEC L'OISEAU VIENT L'OBSERVATEUR

On constate une hausse énorme de la population et de la diversité d'oiseaux depuis l'ouverture de l'aire de conservation du marais Hillman. Les observateurs y ont recensé plus de 300 espèces, dont 75 espèces nicheuses. Le marais accueille aussi 13 espèces en péril (et six autres non confirmées récemment), dont quatre espèces en voie de disparition (le râle élégant, la paruline orangée, la tortue ponctuée et la couleuvre fauve de l'Est), cinq espèces menacées (la tortue mouchetée, la tortue molle à épines, le ptélea trifolié, le smilax à feuilles rondes

de ces cellules indépendantes éliminant du cours d'eau l'ancien chenal à bas débit de la crique Hillman, on a soigneusement conçu un canal de dérivation à l'aide d'évaluations hydrauliques se basant sur les maquettes du U.S. Army Corps of Engineers. Ce canal a redirigé l'écoulement du cours d'eau, des sédiments et des eaux de ruissellement, pour éviter d'accroître le risque d'inondation pour les terres en amont. Il s'agissait d'une priorité, puisque la région comptait des centaines d'habitations sisées derrière des digues ; le territoire est 3 à 4 mètres sous le niveau du lac Érié.

Le niveau naturel de l'eau fluctuant brusquement dans la crique Hillman, sans rabattements naturels assez fréquents,

**4 HILLMAN MARSH 5 FEMALE AMERICAN BULLFROG | 4 MARAIS HILLMAN 5 GRENOUILLE-TAUREAU FEMELLE**

**PHOTOS 3 ESSEX REGION CONSERVATION AUTHORITY (ERCA) 4 ANDREW MCKINLEY**



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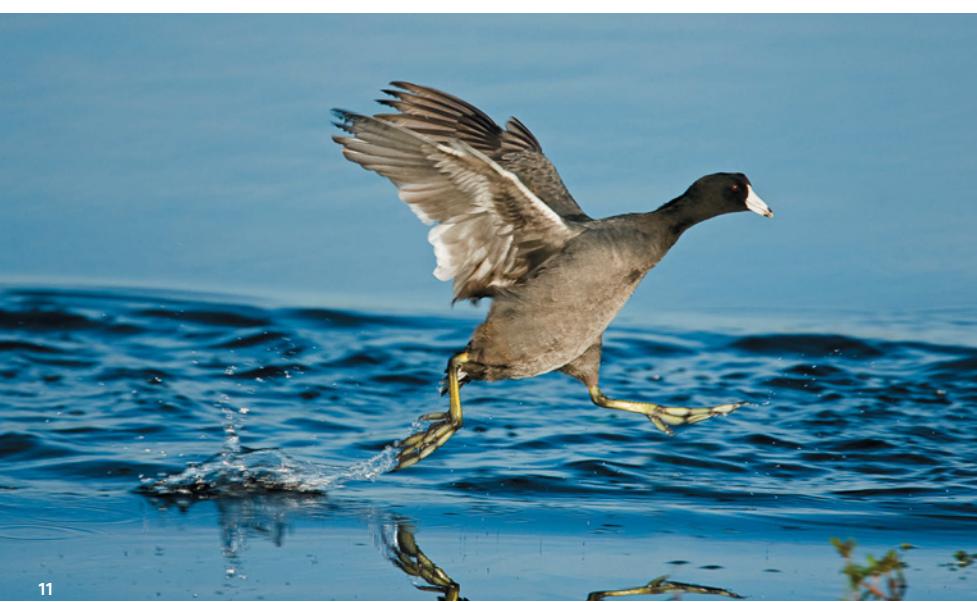
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et le liatris à épis) et quatre espèces préoccupantes.

Il vient des gens de partout dans le monde pour observer les oiseaux de rivage migrateurs, les oiseaux chanteurs et les oiseaux aquatiques. Bien que les visites périclitent depuis les années 2000, l'observation des oiseaux rapporte à l'économie locale, chaque année, entre 12,4 et 14,4 millions de dollars de dépenses directes.

#### LA PROCHAINE GÉNÉRATION

Le marais Hillman a révélé son incroyable valeur écologique au fil du temps. Il se classe parmi les milieux humides les plus importants de la zone carolinienne. Or, de nouveaux problèmes se déclarent. Par exemple, il faut gérer de toute urgence les espèces envahissantes, dont les phragmites. Idéalement, on le ferait en contrôlant la profondeur de l'eau, mais le niveau variable des Grands Lacs ne le permet pas toujours. Malgré l'importance du marais, l'ERCA doit demander un permis de prélèvement d'eau et faire la preuve que ses pompages ne perturbent pas le voisinage. De même, en raison des restrictions actuelles, on peut contrôler les phragmites, comme la salicaire pourpre, dans les cellules, mais pas autour de celles-ci. De même, le raccourcissement et l'intensification des tempêtes printanières favorisent la prolifération des algues bleues, plantes qui foisonnent grâce, en partie, aux eaux de ruissellement riches en phosphore provenant des terres agricoles.

**6 GREAT EGRET (ARDEA ALBA)** **7 CANADA WARBLER**  
**8 SOLITARY SANDPIPER** **9 SCARLET TANAGER** (*PIRANGA OLIVACEA*) **10 CAPE MAY WARBLER**  
**11 AMERICAN COOT (FULICA AMERICANA)**  
**13 HILLMAN MARSH BIRDERS** | **6 GRANDE**  
**AIGRETTTE (ARDEA ALBA)** **7 PARULINE DU CANADA**  
**8 CHEVALIER SOLITAIRE** **9 PIRANGA ÉCARLATE** (*PIRANGA OLIVACEA*) **10 PARULINE TIGRÉE**  
**11 FOULQUE D'AMÉRIQUE (FULICA AMERICANA)**  
**13 ORNITHOLOGUES DU MARAIS HILLMAN**

PHOTOS 6,7,9,10,11 ETHAN MELEG 8 ANDREW MCKINLEY 13 ERCA

Il est plus difficile de mettre des projets sur pied aujourd'hui. C'est pourquoi l'ERCA tisse de nouveaux partenariats. En 2012, devant le déclin significatif de la qualité de l'habitat et de l'eau dans le bassin occidental du lac Érié, conjugué à la prolifération des algues bleues, l'ERCA a rallié des organismes fédéraux, provinciaux, nationaux et internationaux afin de créer la zone naturelle prioritaire du bassin versant ouest du lac Érié. Cette entente, la première du genre en Amérique du Nord, réunit le gouvernement, les organismes de conservation (Ducks Unlimited, Conversation de la nature Canada et ERCA), les municipalités (Windsor) et le ministère américain des Pêcheries et de la Faune, dans le but de créer l'équivalent canadien du refuge faunique international situé du côté Michigan de la rivière Détroit. L'un des

premiers résultats de ce partenariat consiste en un circuit ornithologique transfrontalier, « Byways to Flyways », qui met en valeur les « points chauds » du sud du Michigan et du sud-ouest de l'Ontario, dont le marais Hillman, qu'il présente comme une destination ornithologique de niveau mondial.

En quatre décennies, ERCA a remis en état près de 4 000 ha de forêts, de prairies et de milieux humides comme l'aire de conservation du marais Hillman. La couverture naturelle a doublé pour atteindre 8,5 pour cent, ce qui est encore loin de la cible régionale de 12 pour cent ou même des 30 pour cent recommandés, entre autres, par Environnement Canada pour assurer la pérennité d'une région. Néanmoins, le cas du marais Hillman démontre que c'est réalisable.

[rwyama@erca.org](mailto:rwyama@erca.org)

**...birding contributes between \$12.4 million and \$14.4 million in annual direct spending to a small regional economy. | ...l'observation des oiseaux rapporte à l'économie locale, chaque année, entre 12,4 et 14,4 millions de dollars de dépenses directes.**



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**IL Y A** deux cents ans, une grande étendue de terres inondées couvrait 120 hectares de ce qui allait devenir le quartier West Kildonan de Winnipeg. Ces terres humides, qui étaient recouvertes d'eau la majeure partie de l'année, étaient densément peuplées et comptaient une grande chorale de rainettes faux-grillon. Ces terres humides s'étendaient au cœur de la colonie écossaise de la rivière Rouge. On comprend pourquoi les pionniers ont appelé la région la Plaine aux grenouilles.

Les rainettes faux-grillon sont les plus petites grenouilles du Manitoba. Comme elles ne mesurent que trois centimètres et se cachent sous le feuillage ou dans les herbes hautes pendant la journée, on les aperçoit rarement, mais leurs chants à l'aube et au crépuscule annoncent le printemps. En hiver, ces petits amphibiens hibernent sous les feuilles ou les bûches au-dessus du niveau du gel, puisqu'elles survivent même lorsqu'elles sont complètement gelées. Au printemps, elles émergent rapidement, et peu après, des petits têtards apparaissent dans les eaux de fonte printanière, avant que la hausse des températures n'assèche les étangs de reproduction.

**1** SOCIÉTÉ HISTORIQUE DE SAINT-BONIFACE ARCHIVES, COLLECTION GÉNÉRALE DE LA SHSB, 0001/9/304/36 **2** HUDSON'S BAY COMPANY ARCHIVES, ARCHIVES OF MANITOBA, N6962

**IMAGES** **1** SOCIÉTÉ HISTORIQUE DE SAINT-BONIFACE ARCHIVES, COLLECTION GÉNÉRALE DE LA SHSB, 0001/9/304/36 **2** HUDSON'S BAY COMPANY ARCHIVES, ARCHIVES OF MANITOBA, N6962

DON HESTER

# LA CHANSON DE LA GRENOUILLERE

## LA PLAINE AUX GRENOUILLES À TRAVERS

### L'HISTOIRE : CHANSON DE LA GRENOUILLERE

En 1814, la Plaine aux grenouilles a été le théâtre d'une confrontation meurtrière entre les pionniers de la rivière Rouge, qui s'y étaient installés deux ans plus tôt, et les Métis du Manitoba. Les premiers hivers ont été ardu. Les pionniers ont réclamé toutes les provisions disponibles pour survivre. Par conséquent, le gouverneur a proclamé un embargo sur la vente de pemmican. Ce commerce faisait toutefois partie intégrante du mode de vie des Métis. En dépit de la proclamation, une petite bande de Métis a été aperçue alors qu'elle traversait la Plaine aux grenouilles pour aller faire du commerce au Lac Winnipeg. Pas moins de 24 pionniers les ont confrontés. La bataille qui s'ensuivit a été immortalisée par Pierre Falcon dans une chanson intitulée « Chanson de la Grenouillère » ou « Ballad of Frog Plain ». Falcon était un poète et un troubadour qui travaillait pour la Compagnie du Nord-Ouest. Des coups de feu ont été échangés, ce que le compositeur a traduit dans les mots suivants : « the Governor is full of ire and forthwith tells his men to fire ». La bataille a fait deux victimes chez les Métis et vingt chez les pionniers.

### QU'ADVENT-IL DES GRENOUILLES?

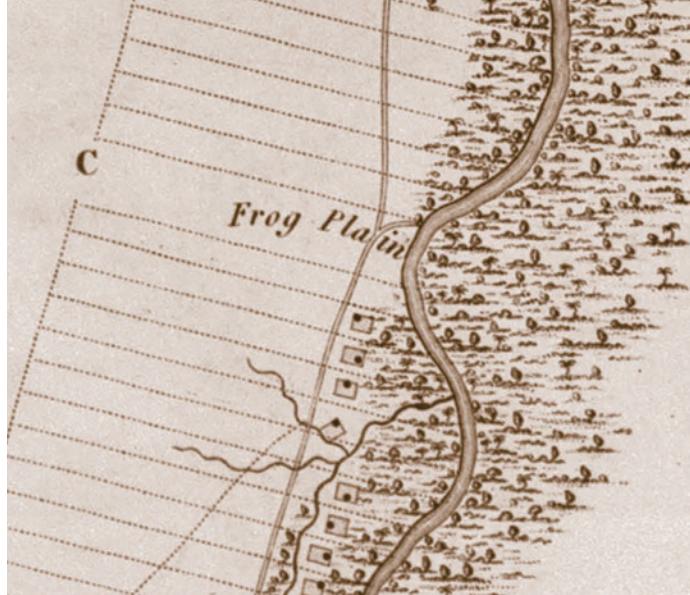
En 2004, Novamet Development Company a demandé à AECOM de mettre à jour et de renouveler les approbations liées au développement et au zonage de la Ville de Winnipeg pour la sous-division Sud de Riverbend. AECOM a proposé un simple programme de consultations publiques, car les comités de citoyens de Winnipeg tiennent habituellement à être consultés sur tout nouveau projet de développement, en particulier sur les terrains intercalaires. Une



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TO HEAR THE CHORUS, TURN THE PAGE! POUR ENTENDRE LE CHOEUR...TOURNER LA PAGE.

première visite au cours de l'automne a permis de constater qu'il n'y avait pas de couvert forestier ni d'eau stagnante.

AECOM s'attendait à des questions liées à la circulation, aux écoles ou aux parcs du quartier, mais au cours de la première journée porte ouverte, on a plutôt soulevé la question suivante : « Que fait-on des grenouilles? » Un résident du quartier, qui travaillait comme naturaliste au centre d'interprétation municipal Oak Hammock Marsh, a expliqué que celles-ci vivaient sur des terres humides par intermittence, situées entre les résidences de l'avenue Murray et le corridor du sentier Chief Peguis.

Le défi était très clair : comment pouvions-nous protéger ce qui restait de l'habitat des grenouilles tout en conservant les terrains voisins réclamés par les développeurs immobiliers, étant donné l'importance du partage des coûts hors chantier exigés par la Ville? Les terres étaient déjà soumises à certaines contraintes découlant des développements immobiliers existants, des emprises des chemins de fer et des espaces nécessaires aux ouvrages antibruit pour l'agrandissement éventuel du sentier.

L'aventure du processus de consultation du voisinage a été plutôt longue et a donné lieu à d'intenses discussions, à des larmes et à l'écoute du chant des rainettes faux-grillon. AECOM a collaboré avec le naturaliste de la Ville de Winnipeg et les résidents du voisinage afin de mener une évaluation environnementale détaillée et de préparer un plan de sous-division révisé, qui réservait un espace public pour les terres humides en intermittence tout en demeurant acceptable sur le plan économique.

Près de 1,6 hectare du sud Riverbend a été réservé afin de protéger les étangs de reproduction des rainettes. Même si l'il s'agit

d'un espace assez restreint, la population des rainettes se porte bien et constitue un élément de l'héritage naturel de la région : la plus grande partie des terres humides de la vallée de la rivière Rouge n'existe plus depuis longtemps.

Le site a été soigneusement protégé de toute intrusion au cours des travaux de construction des routes et bâtiments adjacents, et les architectes paysagistes ont également produit des recommandations quant à la pente des terrains adjacents de même que des documents d'information pour le public. Cela était nécessaire, car pour préserver l'habitat des grenouilles, les ouvrages permettant de gérer les eaux de surface aux abords des terres humides intermittentes devaient être complètement préservés. Les propriétaires des terrains voisins ont été encouragés à ne pas modifier la pente de leurs terrains et à ne pas utiliser de produits chimiques sur ces derniers.

Le plan pour le Parc des rainettes faux-grillon préparé par AECOM comprenait la conception d'un trottoir traversant le site et d'une petite esplanade avec un centre d'interprétation pour expliquer l'histoire naturelle et humaine du secteur. En 2015, la croissance de la végétation des terres humides a été abondante, même si la partie gazonnée a été tondue. Bien que le trottoir n'ait jamais été construit, les élèves de l'école primaire Riverbend, voisine des lieux, ont fait des sorties de classe sur le site afin de mieux connaître les rainettes et l'importance des terres humides pour l'Homme.

**don.hester@aecom.com**

**3 BOREAL CHORUS FROG 4,5,6 FROM SEDGES TO WETLAND MACROPHYTES**  
**PHOTOS 3 SHUTTERSTOCK/MATT JEPSON 4,5,6 DON HESTER**



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# HEAR THE CHORUS! | ECOUTER LE CHOEUR !

SEE THE STORY >**LP THE BALLAD OF FROG PLAIN**

## RIVERBEND AND ITS BOREAL CHORUS FROGS

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**IN WINNIPEG'S RIVERBEND** Community in April and May, the annual chorus begin at dusk, and again at dawn, as it has for many hundreds of years. The Boreal Chorus Frog is in full-throated celebration of spring. Perhaps there are not as many frogs as there were when the Frog Plain Marsh stretched as far as the eye could see, but when the new development of Riverbend began to take shape, the frogs – and the area's colourful history – helped forge a unique sense of place for the new community. Tales of Red River Settlers, Métis, balladeers and battles lay at the heart of the landscape.

Lyne Jones, Development Manager, Qualico Communities Winnipeg, tells the developer's story. "When we purchased the Riverbend land for development, the street name "Frog Plain Way" was already designated for one of the roads in the neighbourhood. It's an interesting name, so we started to research the history behind it and learned about the singing Chorus Frog. The City of Winnipeg Naturalist at the time also lived in the area and knew quite a bit about the frogs. We thought there was a story to tell here and we found people really appreciated the history of the area once they read about it. It brought forward a unique piece of nature and history into the community."

Click the frog to hear its song!



CLICK THE FROG TO LOCATE ITS SONG! | CLIQUEZ SUR LA GRENOUILLE POUR ENTENDRE LE CHOEUR!

<https://www.naturewatch.ca/frogwatch/boreal-chorus-frog/>  
<https://www.youtube.com/watch?v=gcVHhcUqHfY> or  
<http://www.californiasherps.com/noncal/misc/misfcrogs/pages/p.maculata.sounds.html>

VOIR L'ARTICLE >**LP+ LA CHANSON DE LE GRENOUILIERE**

## RIVERBEND ET LA RAINETTE FAUX-GRILLON BORÉALE

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**DANS LE QUARTIER** Riverbend de Winnipeg, en avril et en mai, le chœur des grenouilles se fait entendre à l'aube et au crépuscule depuis des siècles. La rainette faux-grillon boréale chante le printemps à pleine gorge. Peut-être n'y a-t-il pas autant de rainettes qu'à l'époque où la grenouillière s'étendait à perte de vue, mais quand le redéveloppement de Riverbend a commencé à prendre forme, les grenouilles – et l'histoire colorée du secteur – ont contribué à créer une identité locale pour le nouveau quartier. Les légendes des colons de la Rivière Rouge, des Métis, des troubadours et des batailles sont au cœur du paysage.

Lyne Jones, directrice du développement chez Qualico Communities Winnipeg, raconte l'histoire de ce promoteur.

« Lorsque nous avons acheté les terres de Riverbend pour les mettre en valeur, le nom de "Frog Plain Way" était déjà celui d'une des rues du quartier. C'était un nom intéressant, alors nous avons fait des recherches sur son histoire et découvert qu'il faisait référence à la rainette faux-grillon. Le naturaliste de la Ville de Winnipeg de l'époque vivait aussi dans le secteur, et il savait bien des choses à propos des grenouilles. Nous avons vu qu'il y avait là une histoire à raconter et nous avons découvert que les gens appréciaient vraiment l'histoire du quartier une fois qu'ils la lisraient. »

**IMAGES** **1** BOREAL CHORUS FROG SHUTTERSTOCK / MATT JEPSON **2** HUDSON'S BAY COMPANY ARCHIVES, ARCHIVES OF MANITOBA, N6962 **3** SECTION OF BROCHURE: COURTESY QUALICO COMMUNITIES | **1** RAINETTE FAUX-GRILLON BORÉALE SHUTTERSTOCK / MATT JEPSON **2** ARCHIVES DE LA COMPAGNIE DE LA BAIE D'HUDSON, ARCHIVES DU MANITOBA, N6962 **3** SECTION OF BROCHURE: COURTESY QUALICO COMMUNITIES'



The cover of a Riverbend brochure. At the top is a stylized graphic of a green mountain and yellow sun. Below it, the word "RIVERBEND" is written in large blue capital letters. In the center, there is a circular inset showing two people sitting at a table outdoors, and a smaller inset below it showing a man and a woman smiling. The background of the cover is a photograph of a wetland area with tall reeds and a boardwalk. The title "A RICH HISTORY, A BRIGHT FUTURE" is printed in white capital letters across the middle of the cover. At the bottom left, there is a small number "3".

A RICH HISTORY,  
A BRIGHT FUTURE

A detailed map of the Frog Plain Wetland area. It shows a green-shaded "NATURAL AREA" and a blue-shaded "WETLAND". A "BOARDWALK" is indicated by a dashed line leading into the wetland. The map also shows "ERDFLIEFE PLACE" and "FROG PLAIN WAY". A north arrow is located in the bottom right corner of the map area.

### FROG PLAIN WETLAND

Almost four acres has been set aside within Riverbend as a park. This is a small piece of the historic wetland called Frog Plain that once covered some 300 acres. The park protects the breeding grounds of the Boreal Chorus Frog, which is Manitoba's smallest frog. As virtually 100% of the wetlands in the Red River Valley have been drained and cultivated or developed, recovering and preserving any portion is a valuable addition to our natural heritage. School children from Riverbend Elementary learn about frogs and the importance of wetlands in field trips to this nature preserve.



KEVIN CONNERY

# URBAN WETLANDS: THE RE-ENCHANTMENT OF MESSY LANDSCAPES

EN\_

In 1845 Henry Thoreau moved to the edge of a small pond near Concord Massachusetts, on land owned by his friend Ralph Waldo Emerson, to “live deliberately, to front only the essential facts of life...” He spent two-plus years in a one room cabin exploring Walden Pond and its environs. Nine years later he published his masterwork, *Walden*, in which he described in detail his spiritual journey amongst Walden Pond’s nature.

## THE NAVEL OF THE EARTH

While *Walden* would become one of the most influential books in framing the 20<sup>th</sup> Century’s environmental movement, what is less well known about Thoreau’s musings is his affinity for swamps, fens and marshes. Not only did he enjoy exploring the margins of these landscapes, he also liked to immerse himself in them, literally walking into swamps to see how deep they were. “Yes, though you may think me perverse,” he wrote, “if it were proposed to me to dwell in the neighbourhood of the most beautiful garden that ever human art contrived, or else of a Dismal Swamp, I should certainly decide for the swamp.” Thoreau even referred to one of the Concord’s wetlands, Going’s Swamp, as possessing an “omphalos”, a term from ancient Greek mythology referring to the navel of the earth.

The allure of wetlands led him to write, “my temple is the swamp.” It was an infatuation that has led one current Thoreau scholar to call him the Patron Saint of Swamps. Yet Thoreau’s reverence for wetlands was not widely shared among his peers, nor with the public. Most people feared swamps as “bearers of disease”. Moreover, people generally thought they looked ugly, devoid of the picturesque qualities possessed by rolling farm fields, mountains and lakes – qualities which engender adulation and motivate efforts to conserve these beloved landscapes.

Sadly, since *Walden* was published little has changed in terms of how wetlands are perceived and valued. And worse, their

future has become far more precarious. Ramsar , which is responsible for the International Convention on Wetlands, estimates that between 64 per cent and 71 per cent of the planet’s wetlands have been lost since 1900 due to various forms of land development and water diversion projects. In Canada, about 15 per cent of the country’s wetlands have been filled in for development during the last two centuries. And near major Canadian cities and towns, that number rises to 70 per cent.

## CUES TO CARE

Changing this apparent disdain for one of the planet’s most productive and important ecosystems depends, in part, on reframing how people see, understand and value wetlands. And with the emerging popularity of green infrastructure as a means of mimicking predevelopment hydrologic function in cities – from small rain gardens to large constructed wetlands – opportunities abound to help initiate this change.

Joan Nassauer is a landscape architect who has widely researched and written about the need to change public perceptions for more than two decades. She argues that one cannot simply construct wetlands and expect attitudes to change; that the aesthetic challenges that Thoreau faced, where wetlands are perceived as messy, weedy, unkempt, even potentially abandoned, remain. To address this Nassauer advocates for the use of a suite of “Cues to Care”, design strategies that signal intention and

“Hope and the future for me are not in lawns  
and cultivated fields, not in towns and cities, but  
in the impervious and quaking swamps”.

...HENRY DAVID THOREAU



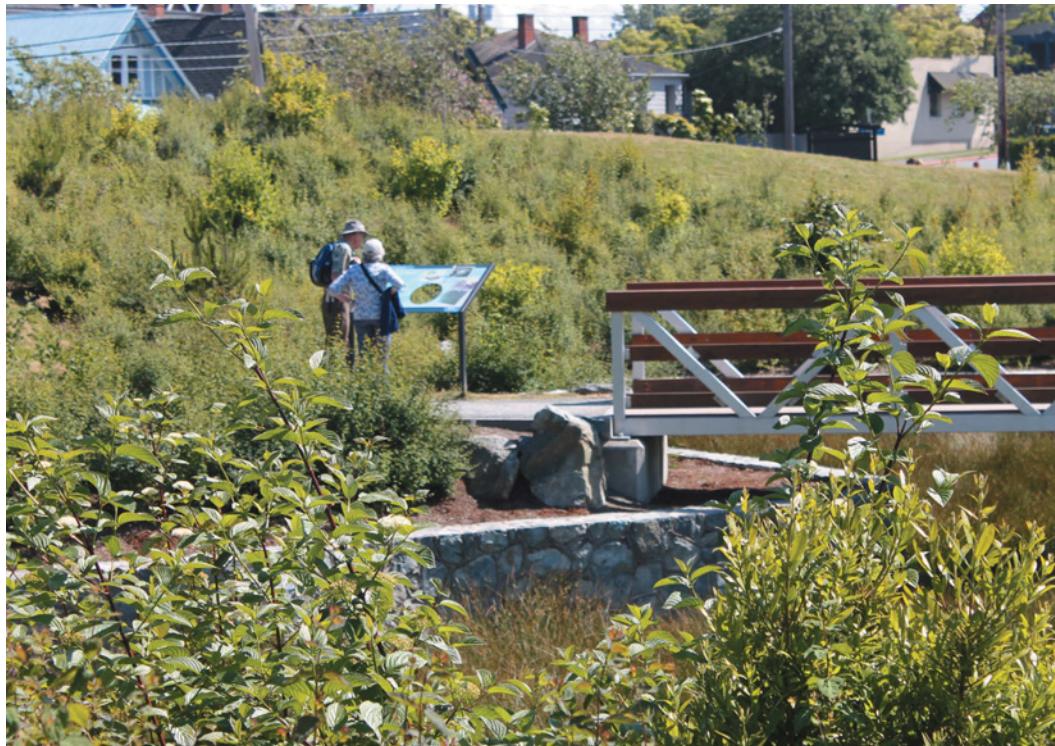
GRAUER LANDS – CITY OF RICHMOND

purpose, which in turn begin to build the necessary constituency for wetlands.

These 'cues' include:

- > Ensuring the wetland's context supports its ecological values and becomes part of a contiguous experience of nature for visitors.
- > Maximizing habitat values for avian species to help people engage with the wetland and to nurture interest.
- > Bringing people near open water without fragmenting wetlands, and designing extended views over water.
- > Incorporating familiar landscape elements (such as fences, defined edges, signs, strategically placed turf) to signal clear stewardship intentions and to help reframe the beauty of the wetland.
- > Anticipating maintenance requirements.

Murdoch de Greeff designed a 352 m<sup>2</sup> rain garden...in the redevelopment of Fisherman's Wharf Park...[that] treats stormwater runoff from a highly urbanised catchment before releasing it to the ocean.



1,2

**At Dockside Green...**  
**PWL Partnership**  
designed a series of small wetlands and weirs to treat both stormwater and wastewater before the water is released to the ocean.



3

#### **FISHERMAN'S WHARF**

In Victoria, Murdoch de Greeff designed a 352 m<sup>2</sup> rain garden, the city's largest, in the redevelopment of Fisherman's Wharf Park. The rain garden treats stormwater runoff from a highly urbanised catchment before releasing it to the ocean. The design includes 'cues to care' such as clearly defined edges and mowed strips of grass that frame the garden and signal purposeful management, a bridge to view the rain garden from above, and a seating stairway that descends into the rain garden and allows people an intimate experience with the garden. Furthermore, an ornamental stone retaining wall that meanders through the garden and marks the former harbour line, reveals a historical narrative of changes to the landscape.

#### **DOCKSIDE GREEN**

At Dockside Green, also in Victoria, PWL Partnership designed a series of small wetlands and weirs to treat both stormwater and wastewater before the water is released to the ocean. The wetlands are constructed on top of, and separated from, underlying contaminated soils by a liner. They establish the key central greenway that defines this LEED Platinum development. In addition to their hydrologic function the wetlands have been colonized by a variety of aquatic wildlife including crayfish and stickleback fish, and provide numerous opportunities for both residents and the public to interact with these wetlands. Public art and interpretive signage provide key messaging about intentions. Ironically, condominiums that sit adjacent

to the wetlands have been marketed as waterfront units while the fact that treated sewage is passing in front of the units is not typically highlighted.

**1+2 FISHERMAN'S WHARF PARK - MURDOCH DE GREEFF INC (OF MDG)**  
**3 DOCKSIDE GREEN GREENWAY**  
- PWL PARTNERSHIP



4



5



## **GRAUER LANDS**

Unlike Fisherman's Wharf and Dockside Green which have embedded many of Nassauer's design cues, the wetland restoration project on the Grauer Lands in Richmond, B.C., has yet to do so, and as a result there has been confusion about intentions and some criticism.

The City of Richmond and Ducks Unlimited Canada collectively purchased 51 hectares of degraded tidal wetland that sits adjacent to the Sturgeon Bank, one of North America's most ecologically important intertidal areas and a pivotal part of the Pacific Flyway. Sturgeon Bank is used annually by over one million migratory birds and hosts at least 47 species of shorebirds, as well as a variety of raptors. Furthermore, all five species of Pacific salmon use the area for passage, food, shelter and acclimatizing to salt water.

In 2013 approx. 5.0 hectares of wetland enhancements were constructed on the Grauer Lands. This included consolidating log debris that for decades has smothered the underlying salt water marsh, excavating new pools and widening existing channels to create off channel habitat for salmonids, and reducing dense monotypic stands of cattail and reed canary grass in favour of native sedge and bulrush.

After two years the enhancements are beginning to fulfil some of their desired ecological objectives. However, for many who were accustomed to a visually simple, unproductive landscape, the significant alterations have led to confusion and criticism. These have been compounded by the absence of Nassauer's cues which, due to budget constraints, were deferred to the next phase of work, when boardwalks for public access, public art and interpretive signage will be incorporated.

## **MANAGING THE MESSAGE**

The Grauer Lands wetland enhancement project highlights the importance of managing the message when developing restoration projects that challenge the prevailing picturesque landscape aesthetic. In order for people to develop an understanding of wetlands, and even a reverence for them, design elements and maintenance practices need to be deliberately and visibly incorporated, alongside the functional requirements. When executed well, the reconstruction of wetlands within an urban context can afford an opportunity for people to embrace the inherent messiness that is the wetland.

**kconnery@richmond.ca**

**5-7 GRAUER LANDS – CITY OF RICHMOND**

# BROKENHEAD: TRAILBUILDING IN DEEP WINTER

EN\_

**THE BROKENHEAD WETLAND** interpretive trail is a one-of-a-kind elevated walkway through a mystical landscape. It was constructed using an experimental technique in the deep of winter.

**SEE THE STORY > LP FEN AND WHITE CEDAR**

1, 2, 3



4, 5, 6

**1** AN EXTREMELY LONG, COLD WINTER OVER 2013/14 (EVEN FOR WINNIPEG), ALONG WITH UNPRECEDENTED LEVELS OF SNOW, ALLOWED THE PROJECT TO BE COMPLETED WITH ZERO IMPACT ON THE SENSITIVE TOPOGRAPHY OF THE FEN.

**2** TO ELIMINATE ANY CONTACT WITH THE DELICATE LANDSCAPE, THE DECK SECTIONS WERE PREFABRICATED AND HAULED IN ON THE SNOW.

**3** SEACO MARINE INC. FABRICATED A SPECIALIZED SNOWMOBILE TRAILER WHICH HAULED TWO OF THE 6 X 16-FT (2 X 5M) SECTIONS OUT ONTO THE TRAIL. USING A WIDE-TRACKED MINI EXCAVATOR AND BRUTE FORCE, THE TEAM MOVED THEM INTO POSITION.

**4-6** FLOATING DOCK BILLETS, LAID ON THE GROUND, SUPPORT THE BOARDWALK STRUCTURE ABOVE. DECK SECTIONS WERE PINNED TOGETHER WITH HEAVY-DUTY GALVANIZED HARDWARE AND TURNS AND ANGLES WERE FASHIONED BY CONSTRUCTING AD-HOC SECTIONS ON SITE.

PHOTOS RYAN WAKSHINSKI

# BATTRE UN SENTIER AU PLUS CREUX DE L'HIVER

FR\_

**LE SENTIER D'INTERPRÉTATION** des terres humides de Brokenhead est un trottoir surélevé unique qui serpente un paysage mystique . On l'a construit au plus creux de l'hiver selon une technique expérimentale.



**1** OUTRE L'ACCUMULATION DE NEIGE RECORD, L'HIVER EXTRÈMEMENT LONG ET FROID DE 2013-2014 (MÊME POUR WINNIPEG), A PERMIS DE RÉALISER LE PROJET SANS AUCUN IMPACT SUR LA TOPOGRAPHIE DÉLICATE DE LA TOURBIÈRE.

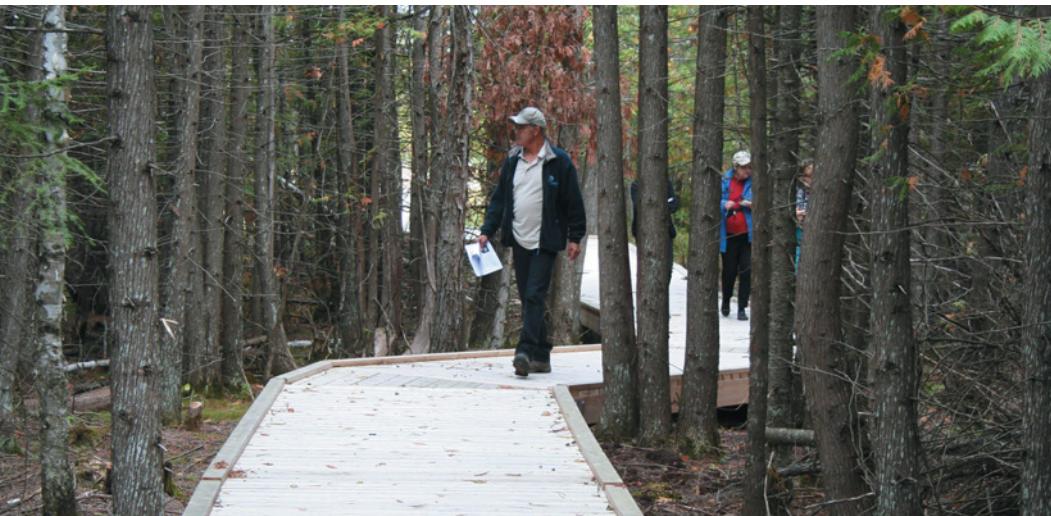
**2** POUR PRÉVENIR TOUT CONTACT AVEC LE PAYSAGE DÉLICAT, LES SECTIONS DE TROTTOIR ONT ÉTÉ PRÉFABRIQUÉES ET TRANSPORTÉES SUR LA NEIGE.

**3** SEACO MARINE INC. A FABRIQUÉ UNE REMORQUE DE MOTONEIGE SPÉCIALE POUVANT TRANSPORTER DEUX SECTION DE 6 X 16 PI (2 X 5 M). L'ÉQUIPE METTAIT ENSUITE CES SECTION EN POSITION AU MOYEN D'UNE MINI EXCAVATRICE À CHENILLE LARGE ET À FORCE DE BRAS.

**4-6** DES BILLES DE QUAI FLOTTANT, ÉTENDUES SUR LE SOL, SOUTIENNENT LA STRUCTURE DU TROTTOIR. LES TRAVÉES ONT ÉTÉ FIXÉES AU MOYEN DE FERRURES GALVANISÉES ROBUSTES, ET LES DÉTOURS ET ANGLES ONT ÉTÉ FAÇONNÉS EN CONSTRUISANT DES SECTION SUR LE CHANTIER MÊME.

# BROKENHEAD: STEPPING LIGHTLY

7, 8, 9



10, 11, 12



EN\_

**THE WHEELCHAIR-ACCESSIBLE** trail, officially opened in September, 2015, features more than a kilometer of the suspended cedar boardwalk winding through various habitat types: gravel moraine, balsam poplar and fir forests, cedar wetland, and finally the calcareous fen. Numerous benches offer space for reflection, and at the southern end of the route, an octagonal forest 'plaza' serves as an outdoor classroom or picnic site.

# BROKENHEAD : AVANCER D'UN PAS LÉGER



FR\_

**LE SENTIER ACCESSIBLE** en fauteuil roulant, inauguré en septembre 2015, comprend un trottoir de cèdre suspendu de plus d'un kilomètre qui serpente à travers divers types d'habitat : moraine de gravier, forêts de peuplier baumier et de sapin, mouillère de cèdre et tournières calciques. De nombreux bancs invitent à la réflexion. Une « plaza » octogonale, située à l'extrême Sud, sert de classe en plein air ou de terrain de pique-nique.

# 2015



WENDY GRAHAM + ED VERSTEEG

## SCHOLARS LACF RISING STARS

LACF Andre Schwabenbauer Scholarship Award + LACF\_APALA Peter Klynstra Memorial Scholarship Award

EN\_

**ON NOVEMBER 9, 2015**, faculty and students gathered at a reception at the University of Guelph School of Landscape Architecture to present this year's LACF Scholarships to three shining stars.

Congratulations to Michelle Peeters from the BLA program and Emily French from the MLA program who received this year's LACF National Andre Schwabenbauer Scholarships, as well as to Aislin Livingstone, a 2017 MLA candidate who was awarded the second LACF\_APALA Peter Klynstra Memorial Scholarship.

### ABOUT MICHELLE PEETERS

A very strong student, Peeters (photo 3) is also a tremendous mentor for her class and champion for the profession. As a second year BLA student, she became student representative to the OALA where her contributions have heightened student profile to the benefit of all programs within the association. Now in her final year, Peeters maintains part-time employment with a professional office and has been facilitating a resurgence of a southwestern chapter of the OALA.

### ABOUT EMILY FRENCH

Emily French (photo 2) is well known amongst faculty and students for her strong design skills, particularly with sensitivity to cultural context and place. She has made good use of research opportunities to broaden her design skills, and her thesis research on climate change and disaster management places her at the cutting edge of the discipline. Finally, French is known for her willingness to help her peers and for her quiet leadership in motivating others.

### ABOUT AISLIN LIVINGSTONE

The Peter Klynstra Memorial Scholarship recognizes Aislin Livingstone's ties to Atlantic Canada (photo 1) and the passion for the profession which she has demonstrated in her academic work, employment and volunteer activities. Livingstone describes herself as passionate about design but with a pragmatic world view which has been shaped by life, work and study in diverse places.

Visit the [lacf.ca NEWS](http://lacf.ca/NEWS) to learn more about our scholarships and our 2015 recipients:  
**><http://lacf.ca/news-updates>**

You can **Donate Online** to contribute to either of these endowment scholarship funds.

**><http://lacf.ca/membership-support/donate-online>**

For specific information regarding LACF Scholarships, contact LACF Executive Director, Paulette Vinette.

**>[info@lacf.ca](mailto:info@lacf.ca)**



AISLIN LIVINGSTONE

LACF  
FAPC

## LES ÉRUDITES ETOILES MONTANTES DE LA FAPC

LACF Andre Schwabenbauer Scholarship Award + LACF\_APALA Peter Klynstra Memorial Scholarship Award

FR\_

LE 9 NOVEMBRE 2015, professeurs et étudiants se sont réunis lors d'une réception à l'Université de Guelph pour présenter les trois lauréates des bourses de la FAPC.

Félicitations à Michelle Peeters du programme de BAP et à Emily French du programme de maîtrise, étudiantes de l'École d'architecture de paysage de l'Université de Guelph, qui ont reçu les Bourses André Schwabenbauer, de même qu'à Aislin Livingstone, candidate à la maîtrise de 2017 qui a reçu la deuxième Bourse commémorative Peter Klynstra.

### MICHELLE PEETERS

Étudiante émérite, Michelle est également une formidable mentore pour sa classe et une championne de la profession. En qualité d'étudiante de deuxième année du baccalauréat, elle a représenté les

étudiants à l'OALA qui l'a grandement apprécié, car ses contributions ont accru la place occupée par les étudiants, à l'avantage de tous les programmes au sein de l'association. Actuellement en dernière année du BAP, Michelle travaille à temps partiel dans un cabinet professionnel; bien qu'étudiante, elle participe au renouveau d'une section sud-ouest de l'OALA.

### EMILY FRENCH

Emily est appréciée par les professeurs et les étudiants pour ses solides compétences en conception, et particulièrement pour sa sensibilité à la dimension culturelle des contextes et des lieux. Elle sait faire bon usage des possibilités de recherche pour élargir ses compétences en conception. Sa thèse de recherche sur le changement climatique et la gestion des catastrophes la place à la fine pointe de la discipline. On apprécie chez Emily, sa volonté d'aider ses pairs et son leadership en matière de motivation d'autrui.

### AISLIN LIVINGSTONE

La Bourse commémorative Peter Klynstra souligne les liens entre Aislin et le Canada atlantique de même que sa passion dont elle a fait preuve dans ses activités académiques, professionnelles et bénévoles. Aislin se décrit comme une passionnée de design qui regarde le monde avec pragmatisme.

Visitez la page NOUVELLES de lacf.ca pour en savoir plus sur nos bourses et lauréates de 2015.

><http://lacf.ca/news-updates>

Vous pouvez faire un don en ligne pour contribuer à l'un de ces fonds de dotation de bourses d'études.

><http://lacf.ca/membership-support/donate-online>

Pour des informations spécifiques concernant les bourses de la FAPC, communiquez avec sa directrice générale, Mme Paulette Vinette.

>[info@lacf.ca](mailto:info@lacf.ca)

# BOOKS

## THE LANDSCAPE ARCHITECTURE OF PAUL SANGHA

### THE LANDSCAPE ARCHITECTURE

WRITTEN BY CAROLYN DEUSCHLE  
ESSAY BY BYRON HAWES  
PHOTOGRAPHY BY NIC LEHOUX  
EDITED BY OSCAR RIERA OJEDA



The Landscape Architecture of Paul Sangha presents twelve residential projects by the award-winning Vancouver-based firm. Sensuous, playful, and provocative, designs by Paul Sangha are as deep as they are challenging, and the outdoor environments they create are as dynamic as they are. As a deep understanding of client habits and desires, works by Paul Sangha are robust systems as well as a deep understanding of clients' habits and desires, works by Paul Sangha are robust systems as well as a deep understanding of clients' habits and desires.

The Landscape Architecture of Paul Sangha reveals twelve residential projects by the award-winning Vancouver-based firm. Sensuous, playful, and provocative, designs by Paul Sangha are as deep as they are challenging, and the outdoor environments they create are as dynamic as they are. As a deep understanding of client habits and desires, works by Paul Sangha are robust systems as well as a deep understanding of clients' habits and desires.

This book documents the inspiration, process, and poetry of Paul Sangha's designs. Coupled with text that vividly describes the details and design concepts, photographer Nic Lehoux sensitively captures each project, narrating through image the spellbinding experience of discovering the projects. This is a book that reveals the inner-workings of a dynamic practice built on the notion that man can write himself in the land, and land can write itself in the man.

www.sangha.com  
www.sangha.com



### The Landscape Architecture of Paul Sangha

Written by Carolyn Deuschle  
Essay by Byron Hawes  
Photography by Nic Lehoux  
Edited by Oscar Riera Ojeda

Book Size: 11 x 8.5 x 2.2 in / 280 x 207 x 56 mm  
Book Type: Hardback  
Pages: 528  
Language: English  
Photographer: Nic Lehoux  
Rights: World Rights Available

Publisher: Oscar Riera Ojeda  
ISBN: 978-9881619505  
Weight: 3.1 kg  
Dimensions: 280 x 207 x 56 mm  
Barcode: 9789881619505

Printed in Canada

Published in Canada



# BLOG

## THE BUSINESS OF DESIGN

6 Six Ways to Set Up Expectations as a Project Begins

PETER BRIGGS, BLOGGER

**CHECK OUR PETER BRIGGS' blog for November 27. When clients demand the project "fast, cheap and good" – isn't that always the case? – and you can choose only two, take note of Peter's observations.**

The take-home message...is to set a process for managing expectations, and this is grounded in some intensive work at the beginning of your project. Make sure you ask the HARD questions at the beginning of the project. If experience is worth anything, I'd say we need to talk [to the client] about:

> **We will have some tough conversations.** We'll have a process in place for these conversations, and we'll try to anticipate them to the best of our abilities.

> **We need to both have a shared understanding of what "perfect" means for this project.** Let's try to visualize what success means. What are the ten things that you need to see when you are looking around at the ribbon-cutting?

> **You probably won't have the budget for what you want.** We're going to focus first on making sure you get what you need. We don't want to "value engineer," we want to "value design." (\*\*for those that don't know "value engineer"... it's a hilarious industry term for deleting things to reduce costs\*\*\*)

> **We're going to work hard with you to make sure this project is right-sized for you.** You save a tonne of money when you don't build things!

> **Let's have a discussion about how you will learn to use your new building/landscape...and that there will be challenges.** Imagine reorganizing your kitchen for efficiency. You know you'll spend a month or two trying to remember where something is, but in the long term it will be better for you. New buildings and sites are the same, and come with frustrations until you've learned them.

> **What other painful conversations did you have during a project which you could have had at the beginning?** There's nothing wrong with discussing previous challenges with your clients in order to show them that you learn, and you don't want to revisit them again.

> <http://highestexpertise.com/>

# MUSINGS REFLECTIONS



## ARE WE REALLY OUT THERE?

MUSINGS FROM OUR PAST PRESIDENT, CAROL CRAIG

EN\_

**ACCORDING TO THE** Internet's Wise Geek, about 90 per cent of belly buttons are innies. The innie is preferred to the outie from an aesthetic perspective, maybe because it is the norm.

How are they different? The innie is defined and discrete, though it may occasionally be decorated with a piercing. The outie is, well, out there – bold and obvious. Unlike the innie, it does not collect dust, just because of what it is – a bump on the body's landscape. I don't think I have seen an embellished outie but then again I may not have been looking.

So what brought this small body part to mind? Over the years, I have talked to a great many people in our profession – passionate, successful people. Their focus is on the client, the project, the end user, the service and the business. Don't get me wrong – these are good things if we are to survive, pay our bills and create great projects. Our focus is defined and often discrete. (Are you reminded of an innie?)

That said, we operate within very strong boundaries often established by others. We are celebrated for our innovative

designs for a specific park or wetland or streetscape, but rarely for our broader vision. Yet LAs know how to create an engaging, integrated public domain from the building envelope out (don't forget the views from the inside too!) We need to be bold...to broaden our scope. We need to champion for the bigger picture and set the stage for the projects we love to do.

Yes, some of us stick out like protuberances – like outies – when we advocate and champion causes. Perhaps 10 per cent of us? Probably not, because being an outie in any profession is difficult, sometimes exhausting, and can involve risk. But we all can do it to some degree. Let's dig out the lint and take a look at how, what and who we can influence to set the vision for great open spaces and places.

**CAROL CRAIG**, FCSLA, has 30 years of experience in landscape architecture and a decade in public engagement. Kinnikinnick Studio Inc. focuses on challenging the status quo (one step at a time) to develop new places for people.

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# SOMMES NOUS VRAIMENT PRÉSENTS?

CAROL CRAIG, PRÉSIDENTE SORTANTE, AAPQ

FR\_

**SELON LE WISE** Geek d'Internet, environ 90 pour cent des nombrils sont « renfoncés ». Ces nombrils « renfoncés » sont mieux cotés, d'un point de vue esthétique, que les nombrils « débordants », sans doute parce qu'ils sont plus nombreux.

Comment se distinguent-ils? Le « renfoncé » est net et discret, même si on l'enjolive parfois d'un piercing. Quant au « débordant », eh bien il est en saillie – affirmé et bien évident. Contrairement au « renfoncé », il ne ramasse pas la poussière, juste à cause de ce qu'il est – une bosse sur le paysage corporel. Je ne pense pas avoir vu de « débordant » enjolivé, mais peut-être n'ai je pas suffisamment cherché.

Mais qu'est-ce qui m'a fait penser à ce petit organe? Au fil des années, j'en ai parlé à beaucoup de gens de notre profession – des gens passionnés, comblés de succès. Ils se concentrent sur le client, le projet, l'utilisateur final, le service et l'entreprise. Ne vous méprenez pas – ce sont là des traits bénéfiques si nous voulons survivre, payer nos factures et créer de grands

projets. Notre champ d'attention est net et souvent discret. (Ça ne vous rappelle pas les « renfoncés »?)

Cela dit, nous opérons dans des limites très rigides, souvent établies par d'autres. On nous félicite de nos conceptions novatrices pour un parc, une terre humide ou rue particulière, mais rarement pour notre vision plus large. Les AP savent pourtant comment créer un domaine public engageant et intégré qui s'étend de l'enveloppe du bâtiment vers l'extérieur (sans oublier les vues de l'intérieur aussi!) Nous devons être audacieux...élargir notre champ de vision. Nous devons promouvoir la vue d'ensemble et préparer le terrain pour les projets que nous aimons réaliser.

Oui, certains d'entre nous sont à la vue comme des « débordants » lorsque nous plaidons et défendons des causes. Dix pour cent d'entre nous, peut-être? Probablement pas, car être « débordant » dans toute profession est difficile, parfois épuisant, et peut comporter des risques. Mais nous pouvons tous le faire dans une

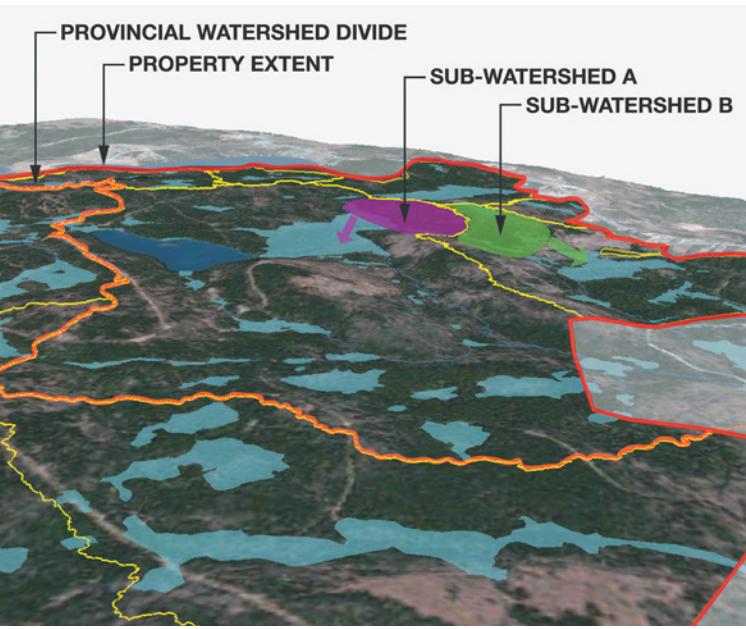
certaine mesure. Examinons comment, quoi et qui nous pouvons influencer pour définir la vision d'espaces et de lieux formidables.

**CAROL CRAIG**, FAAPC, a 30 ans d'expérience en architecture de paysage et une décennie dans l'engagement du public. Kinnikinnick Studio Inc. se concentre sur la contestation du statu quo (une étape à la fois) pour concevoir de nouveaux lieux publics.

[carol@kinnikinnickstudio.com](mailto:carol@kinnikinnickstudio.com)

DRAWING RYAN JAMES

# A QUESTION OF BALANCE



1

## FOR THE STORY > LP A QUESTION OF BALANCE

### PROJECT CREDITS:

ENVIRONMENTAL DESIGN AND MANAGEMENT (EDM) created the model approach and structure.

Team Members included:

Margot Young, MCIP, LPP, ASLA

Eva Moores, P. Eng.

Trevor Hume, BA, Dip GIS/RS

J. Leo Brooks, FEC, M. Eng. P.Eng.

EDM was technically assisted by:

Dr. Ronald H. Loucks, PhD. of R. H. Loucks Oceanology

EDM also acknowledges the input and critique by members of the Forest Lakes design team, including:

Nicklaus Design

McCallum Environmental Ltd.

SLR Global Environmental Solutions

ABLE Engineering Services Inc.

WSP Canada Inc.



2

1 SUBWATERSHEDS 2 PANORAMA OF FOREST HILLS COUNTRY CLUB

PHOTOS 1 ENVIRONMENTAL DESIGN AND MANAGEMENT (EDM) 2 TERRA FIRMA DEVELOPMENT CORPORATION, WWW.TFDC.CA



A photograph of a swampy forest scene. The foreground is dominated by the dark, textured trunks of several large trees, some leaning and partially submerged in the water. The water reflects the surrounding greenery and the sky. In the background, more trees stand in the water, creating a dense, layered effect. The overall atmosphere is lush and somewhat mysterious.

# COVER | COUVERTURE

PHOTO JEAN LANDRY

