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capital naturel

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

LANDSCAPES | PAYSAGES acknowledges that the head office of the CSLA is in unceded Algonquin, Anishinabe territory, and that this magazine is developed, distributed, read and enjoyed by people from coast to coast to coast, on the lands of First Nations, Inuit and Metis people and their governments. On behalf of L|P magazine and the members of the CSLA, we are thankful to work and live on these lands. We recognize the harms inflicted on Indigenous peoples by colonialism and the residential school system and we are all working to reconcile the damage done.

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 invites contribuent bénévolement. Nous attendons, en français ou en anglais, vos propositions d'articles.

LANDSCAPES | PAYSAGES reconnaît que le siège social de l'AAPC se trouve en territoire Algonquin et Anishinabe non cédé, et que ce magazine est conçu, distribué, lu et apprécié par des gens d'un océan à l'autre, sur les terres des Premières nations, des Inuits et des Métis et de leurs gouvernements. Au nom du magazine L|P et des membres de l'AAPC, nous sommes reconnaissants de travailler et de vivre sur ces terres. Nous reconnaissons les préjudices infligés aux peuples autochtones par le colonialisme et le système des pensionnats, et nous nous efforçons tous de réparer les dommages causés.

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GUEST EDITOR | RÉDACTEUR INVITÉ
RASMUS ASTRUP

NATURAL CAPITAL: TRAP OR TOOL?

WE ALL KNOW the moment. You're presenting your best design to your client – a beautiful yet bold project that, you argue, will transform the community, support biodiversity and mitigate some of the serious climate impacts our cities are facing. The project is layered and meaningful. Rooted in place, inspired by people.

But then it comes. The question: *"But…why are the costs so high?"*

In other words, while they liked what they were getting, *they didn't understand what it was worth.* And by *worth,* no clients have ever meant emotionally, ecologically or culturally. Or asked you to document the joy the project brings, the late afternoon shade it provides or the birdsong it attracts. They mean, invariably, the project's worth in *dollars.*

Welcome to the age of natural capital. A time when the values we have long worked with as landscape architects – clean air, biodiversity, social cohesion, human well-being – are being monetized, plotted in spreadsheets and used to argue for or against our work.

It's a paradigm shift, yes. But it's also a battleground. Do we reduce nature to numbers? Or do we find ways to use those numbers to amplify the things we know matter?

At our design studio, SLA, we've been navigating this frontier for years, not by leading with the data, but by making it work *with* our design goals. We see natural capital not as a trap, but as a tool: one that, when used transparently and critically, can help secure the cities and landscapes we dream of creating. But it demands new skills. And most of all, it demands a new language – one that merges ecosystems with economics, poetry with policy.

Let's be honest: there are real dangers in putting a price on nature. When you reduce a wetland's value to its ability to filter water or raise nearby property prices, you risk sidelining the very things that make it irreplaceable: its quiet, its mystery, its myriad lives, its capacity to nurture awe.

In the process of putting together this issue, we received many submissions from landscape architects who fear that natural capital will turn our profession into a numbers game – that it will erode our creative agency and force us to speak a language not our own. To speak *developerish.*

That fear is not unfounded. Many natural capital frameworks still fail to capture complex, systemic, long-term benefits. They overlook cultural heritage, joy or the fundamental right to a wildflower meadow from which nobody profits. Natural capital is still in its infancy – and if it becomes purely instrumental, a way to "offset" destruction elsewhere, then we've failed.

But what if we take that same language and turn it inside out? What if we use it not just to quantify what we can already see – but to protect, legitimize and expand what we deeply value?

We hope this issue can be a guide to using natural capital in your practice. But more than that, we intend it to be a call to action: Learn the language. Master the tools. Question the assumptions. And then use all of it – not to make landscapes that are merely efficient, but landscapes that are truly alive.

Because in the end, what we're pricing isn't just nature. It's *life itself.* Let's make sure we value it accordingly. **LP**

CAPITAL NATUREL : PIÈGE OU OUTILS ?

NOUS CONNAISSONS TOUS la situation. Vous présentez une conception détaillée au client. Un projet magnifique, mais audacieux qui, selon vous, transformera le milieu, valorisera la biodiversité et atténuera certains impacts climatiques urbains. Le projet est complexe et porteur de sens pour les citoyens.

Puis vient la question : « *Mais… pourquoi les coûts sont-ils si élevés?* »

Autrement dit, il apprécie le concept, sans être conscient des coûts pour le réaliser. L'aspect financier est la seule « valeur » qui déclasse les aspects émotionnels, écologiques et culturels d'un aménagement. Avez-vous déjà documenté la joie que procure un aménagement, l'ombre qu'il offre en fin d'après-midi ou le chant des oiseaux qu'il invite?

Bienvenue dans l'ère du capital naturel. Une époque qui monétise l'air pur, la biodiversité, la cohésion sociale et le bien-être humain. Ces aspects, valorisés au sein de notre profession, sont simplement reportés dans un chiffrier pour justifier ou rejeter un projet.

C'est un changement de paradigme, certes, mais également un champ de bataille. Il ne s'agit pas de réduire la nature à des chiffres, mais plutôt de chiffrer les biens faits d'un projet!

Depuis des années, notre Studio (SLA) explore cette frontière. Nous utilisons les données financières, sans contraintes, pour justifier les objectifs du projet. Le capital naturel n'est pas un piège, mais un outil qui nous permet d'analyser les différents aspects d'un aménagement urbain dans un esprit pérenne. Mais cela exige de nouvelles compétences. Et avant tout, un nouveau langage qui intègre les écosystèmes à l'économie et la poésie à la politique.

Soyons honnêtes : attribuer une valeur monétaire à la nature est périlleux. Réduire la valeur d'une zone humide à sa capacité de filtrer l'eau ou d'augmenter la valeur immobilière environnante, c'est omettre ce qui la rend irremplaçable… son calme, son mystère, sa vitalité organique et l'émerveillement qu'elle suscite.

En préparant ce numéro, nous avons reçu de nombreux articles d'architectes paysagistes craignant que le capital naturel transforme notre profession en chiffrier, qu'il érode notre créativité et qu'il nous impose un langage à la « développeur » qui n'est pas le nôtre!

Cette crainte n'est pas infondée. La gestion du capital naturel ne tient pas compte des bienfaits transcendants, systémiques et à long terme des aménagements. Elle omet le patrimoine culturel, la joie et la simple présence d'un pré fleuri dont personne ne tire des bénéfices. Nous en sommes qu'aux premiers pas, mais si le capital naturel est instrumentalisé, qu'il devient un simple moyen de « compenser » ce qui a été détruit, alors nous aurons échoué.

Mais que se passerait-il si on assimilait ce langage pour non seulement quantifier le visible, mais également le bien-fondé, afin de légitimer ce que nous valorisons?

Nous espérons que ce numéro alimentera votre réflexion professionnelle sur le capital naturel. Qu'il soit un appel à l'action : assimiler le langage et maîtriser les outils, remettre en question les hypothèses, puis concevoir, au-delà de l'efficacité, des aménagements véritablement vivants.

Car, ce que nous évaluons ne se limite pas au cadre naturel, *mais à la vie elle-même*. Sachons alors l'évaluer conséquemment! **LP**

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OUR WRITERS | NOS COLLABORATEURS

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RASMUS ASTRUP

Rasmus Astrup is Senior Partner and Design Principal at the renowned Danish nature-based design studio SLA. Rasmus is a leading specialist in "City Nature" and is currently spearheading some of Canada's most forward-looking landscape projects: From the 520-acre Downsview Framework Plan and the Pickering Rouge National Urban Park to Quayside and Ookwemin Minising on the Toronto Waterfront. Rasmus was the Keynote speaker at the 2024 CLSA Congress in Winnipeg.

ANDREAS SIGSGAARD + KRISTOFFER HOLM PEDERSEN

Andreas Sigsgaard (left) is an R&D Officer at SLA. A philosopher specializing in perceptions of nature, Andreas especially works with the transformative potential of nature in architecture. Kristoffer Holm Pedersen (right) is the Communications Director at SLA. With a background in journalism, Kristoffer leads the studio's global PR, communications and branding.

KIM STATHAM

Providing strong, responsible and authentic leadership for the municipal government for over twenty-five years, Kim is the Director, Urban Forestry for the City of Toronto. In this position, Kim is responsible for leading the largest municipal strategy in the country to plan, protect and expand Toronto's tree canopy. She earned a Master of Environmental Studies from York University and an Honours Bachelor of Environmental Science from the University of Guelph.

JANE WELSH

Jane Welsh, OALA, FCSLA, is the Project Manager for Environment, Toronto City Planning, responsible for creating innovative solutions to address climate change, resilience and biodiversity in land use planning, including the Toronto Green Standard and Green Roof Bylaw and the first Ravine Protection Bylaw, Ravine and Biodiversity Strategies for Toronto.

CINDI L ROWAN

Cindi L Rowan, OALA, CSLA, ASLA, is the Director of the Landscape Architecture Studio at FORREC in Toronto, ON. Originally from the US, she operated her own award-winning firm there before moving to Canada in 2010. Over the years, she has led multi-disciplinary teams on projects ranging from landscape architecture, master planning and urban design to environmental design, heritage consultation and downtown revitalization, always with a focus on visitor experience and storytelling in the built environment. In her "spare" time, she enjoys the outdoors and is an avid camper, bushcrafter and forager. Cindi is passionate about ecological design and the integration of urban and natural places. She leads FORREC's Sustainability Task Force.

SONJA VANGJELI

Sonja Vangjeli, OALA, CSLA, is a landscape architect and urban designer with experience in private and public sector multidisciplinary planning and design and trained as MArch and MLA. At the City of Toronto Urban Design, she works at the intersection of research, design and policy and is an advocate for nature-based infrastructure and ecological urbanism.

ALEXANDRA STEED

Alexandra Steed is a passionate landscape architect with a deep commitment to art, sustainability and the transformative power of landscapes. As a Fellow of the Landscape Institute (FLI) and the Royal Society of Arts (FRSA), she has made a lasting impact on urban environments globally over her two-decade career. In 2013, she founded URBAN with a vision to create landscapes that bring joy and enhance well-being. Steed's designs aim to foster meaningful connections with the natural environment and enrich people's lives. Beyond her practice, Steed actively advises and serves on expert panels for organisations such as the Design Council UK and the Government's Office for Place. She shares her knowledge as a lecturer at The Bartlett, UCL, and volunteers her time to empower communities and develop inclusive public spaces through neighbourhood plans and landscape visions. Steed has earned her prestigious awards, including the WAFX Award for innovative solutions to global challenges. She has also received The LI Award for Excellence in Tackling Climate Change and won the Best Landscape Architecture Project in the UK. She is also the author of *Portrait to Landscape: A Landscape Strategy to Reframe Our Future.*

PATRICK MINARDI

Patrick Minardi is an MLA candidate at the University of Toronto, Daniels Faculty of Architecture, Landscape and Design, completing his final year of study, and a Research Assistant at the Green Roof Innovation Testing Laboratory (GRIT Lab). He holds a bachelor's degree in Civil Engineering with a specialization in Environmental Engineering, also from the University of Toronto. With a career background rooted in green and municipal infrastructure, Patrick integrates technical systems expertise with creative design thinking. He is particularly interested in how landscape architecture can shape more climate-resilient cities by weaving environmental performance with meaningful social impact and long-term ecological thinking.

GEORGIA POSNO

Georgia Posno is an MLA candidate at the University of Toronto, Daniels Faculty of Architecture, Landscape and Design, entering her third year of study, and a Research Assistant at the Green Roof Innovation Testing Laboratory (GRIT Lab). She holds a bachelor's degree in Environmental Studies and Women's and Gender Studies, also from the University of Toronto. Georgia's interdisciplinary academic background, combined with professional experience in community-engaged organic farming on Canada's West Coast, informs a design approach that is both ecologically attuned and socially engaged. Grounded in a deep respect for plant, soil and animal systems, Georgia's work emphasizes the interdependence of living communities and the landscapes they inhabit.

LIAT MARGOLIS

Liat Margolis, is an Associate Professor at the University of Toronto, Daniels Faculty of Architecture, Landscape and Design. She is the founding director of the GRIT Lab / Green Roof Innovation Testing Laboratory (https://academic.daniels.utoronto.ca/gritlab/), an internationally renowned research facility at the U of T dedicated to research and training on living green infrastructure. The lab includes two rooftop facilities with over 6,000 sq. ft. of experimental green roofs equipped with hundreds of sensors that collect data in real-time. Liat is an advocate for interdisciplinary research, with long-standing collaborations in the Environmental Sciences and Engineering fields, and for partnerships with industry, government, and institutional organizations. She has provided guidance on a range of City of Toronto programs, including the Green Streets Technical Guidelines, Pollinator Protection Strategy, Toronto Green Standard, and Eco-Incentive Program, and played a key role within the University of Toronto Presidential Committee on Environment, Climate Change, and Sustainability (https://sustainability.utoronto.ca/ceccs-home/).

RAJJI DESAI

Rajji Desai is Lead Researcher at CBT Architects, with a Master in Design Studies from Harvard GSD and a Bachelor of Architecture from KRVIA. At the nexus of data, design, and dialogue, she embeds climate risk into urban planning through nature-based solutions and science-driven storytelling, turning complex climate data into accessible tools for equitable, resilient cities.

ZINA FRASER

Zina Fraser, BArch, MLA, graduated from the MLA program at the Harvard GSD in 2023 where her master's thesis focused on climate grief and nature-based solutions. After graduating, she spent a year working in London, UK. She is now part of the team at Hapa Collaborative in Vancouver. As a designer, Zina is motivated by the potential of stronger urban ecosystems to support climate resilience, social equity, mental health, and a cascade of further benefits. She loves the process of translating abstract ideas into actionable forms.

JOANNA EYQUEM

Joanna Eyquem, PGeo, ENV SP, CWEM, CEnv, is an internationally recognized leader in climate adaptation and nature-based solutions, with 25 years' experience in Europe, North America and Western Africa. Her work at the Climate Risk Institute focuses on managing climate risk, including flooding, erosion and extreme heat, in particular working with nature and the financial sector. As part of this work, Joanna leads the development of national guidance and tools for climate resilience and nature-based solutions, including disclosures of natural assets and the ecosystem services they provide in financial statements and sustainability reporting. In addition, Joanna serves on over 30 boards and committees, including the Canadian Infrastructure Council, the Canadian Sustainable Finance Network, the National Research Council of Canada, the Government of Quebec's Expert Group on Adaptation, and as Chair of the Board for the Natural Assets Initiative. She is a bilingual British-French-Canadian, professionally qualified in both Canada and the UK, and typically featured in over 150 media features a year (in English and French).

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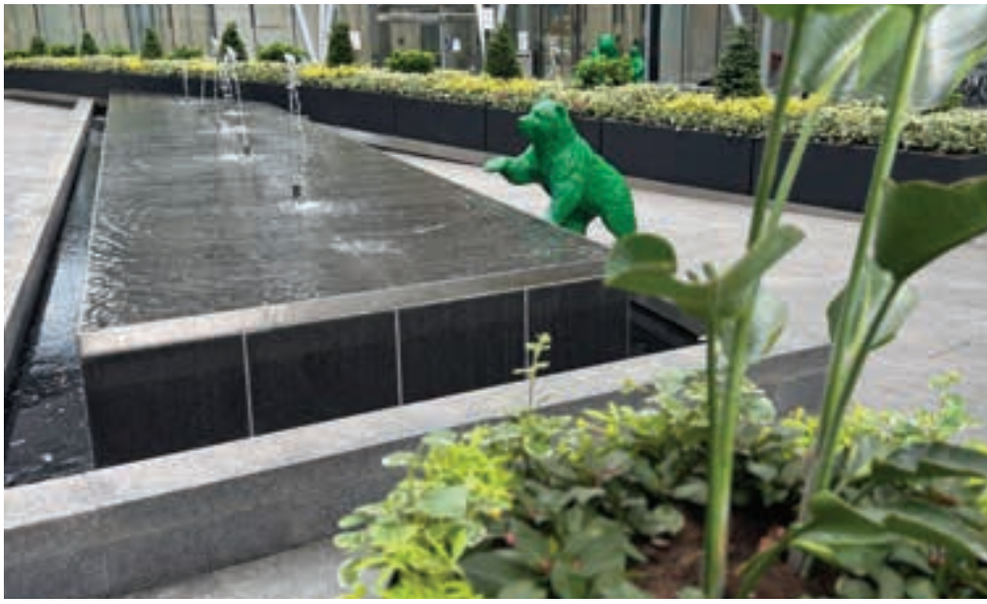

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01_A TALE OF TWO CITIES AND THEIR WETLANDS

LAURA KEIL

IN COLOMBO, SRI LANKA, wetlands weave through the city like quiet protectors – absorbing floodwaters, providing livelihoods and offering respite from urban sprawl. Their conservation is deeply tied to community engagement, with public awareness campaigns and wetland park development reinforcing their value. In Seattle, United States, wetlands serve a similar purpose, yet their integration into urban planning is shaped by a strong regulatory framework that prioritizes conservation through policy and mitigation. Through my work in Colombo and Seattle, I've had the opportunity to explore how wetlands contribute to natural capital in very different contexts. Each city approaches wetland protection in a unique way that offers valuable lessons for landscape architects.

Colombo's wetlands are framed as cultural and ecological assets, recognized through Ramsar Wetland City accreditation. This distinction is given to cities that deliberately value and protect the wetlands upon which they are built and provides an opportunity for governments to further invest in policies and practices that restore and protect wetlands. In Sri Lanka, wetlands are not only conserved for their ecological importance but also for the economic and social services they provide – critical elements of natural capital.

Seattle's wetlands also serve as natural capital, offering flood resilience, habitat for wildlife and carbon sequestration. Mitigation plans are a way to ensure these services are not just recognized but preserved and protected in the face of urban growth. Seattle's approach to wetland mitigation is tied to policy and regulation, often viewed through a compliance lens. The focus is on technical assessment and permitting rather than cultural integration.

Colombo's focus on connecting people to wetlands as natural capital taught me the importance of cultural context, while Seattle's policy-oriented perspective demonstrates the power of regulatory frameworks. Different regions approach wetland conservation differently, but the core principle remains the same – wetlands provide essential ecosystem services that must be recognized and protected.

Wetlands aren't just passive landscapes – they provide measurable benefits like flood mitigation, biodiversity support and carbon sequestration. Landscape architects have the tools to make wetlands visible – not just as landscapes, but as essential assets to our cities and ecosystems. By combining storytelling, data-driven tools, and policy engagement, we can ensure wetlands are recognized for their full ecological and economic value.

2

Laura Keil *is a landscape designer passionate about blending nature-based research and impactful communications. Her work synthesizes a breadth of information to create climate adapted spaces. She practices at Facet, an interdisciplinary environmental consulting firm in Seattle, US, and was previously a Princeton in Asia Fellow at the International Water Management Institute in Colombo, Sri Lanka.*

1 A COUPLE ENJOYING THE BOARDWALK IN BEDDAGANA WETLAND PARK, ON THE OUTSKIRTS OF COLOMBO.
2 A WETLAND IN GOLDEN GARDENS PARK, SEATTLE.
PHOTOS LAURA KEIL

02_DATA-SCRAPING:
A study of "natural capital" trends in landscape architecture through LACF-funded projects

HEATHER BRAIDEN + VINCENT LARIVIÈRE + CAROLINA PRADIER

EN_

SINCE 1989, THE LACF has awarded $1.125 million (CAD) in funding for research by and for landscape architects and related disciplines in Canada. However, the trends and impacts of these funded projects have not been tracked.

Research influences building practices, and vice versa; therefore, by understanding ongoing research, we can enhance our knowledge and practice of design and construction methods. Vincent, Carolina and I are studying the grants to better understand what, who, how and where we research landscape architecture in Canada. We are doing this by using "bibliometrics," which involves entering the titles and descriptions of all past projects into a database, quantitatively analyzing topic trends, and measuring the impact of the projects based on their scholarly output. This means we can account for a wide range of topics; however, the impact is measured by the number of scientific articles published in our field. Scholarship builds a knowledge base that informs design decisions, strengthens advocacy and prevents repeated mistakes in built work. While we recognize that this approach neglects podcasts, websites and artistic works such as sculptures, the published works help us understand areas of focus.

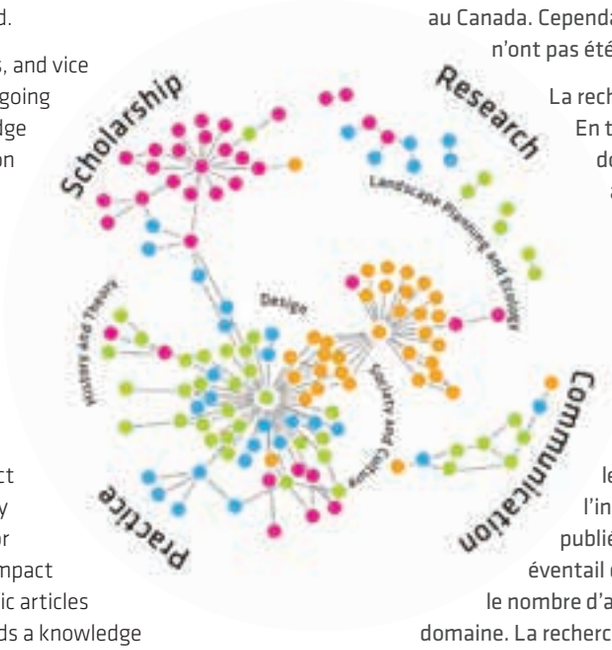

IMAGE RYAD BENZERZOURA

EXTRACTION DE DONNÉES :
Étude tendancielle du « capital naturel » en architecture paysagère dans le cadre des projets financés par la FAPC

FR_

DEPUIS 1989, LA FAPC a versé 1 125 000 dollars (CAD) en subvention de recherches à des architectes paysagistes et des disciplines connexes au Canada. Cependant, les répercussions des projets financés n'ont pas été suivies.

La recherche influence la pratique, et vice versa. En tenant compte des recherches en cours, il est donc possible d'améliorer nos connaissances ainsi que nos méthodes de conception et de construction. Notre étude (Vincent, Carolina et moi-même) vise à définir la situation (qui, quoi, comment et où) de la recherche en architecture paysagère au Canada. Nous utilisons la « bibliométrie », qui consiste à saisir les titres et les descriptions des projets antérieurs dans une base de données en vue de définir les tendances thématiques et mesurer l'incidence des projets en fonction des articles publiés. Ainsi, nous tenons compte d'un large éventail de sujets, et l'incidence est mesurée selon le nombre d'articles scientifiques publiés dans notre domaine. La recherche établit une base de connaissances qui oriente les décisions conceptuelles et promotionnelles, et prévient les erreurs récurrentes dans le domaine de l'aménagement. Certes, cette approche néglige les balados, les sites web et les œuvres artistiques, comme les sculptures, mais les travaux publiés nous aident à définir les domaines d'intérêt.

THREE KEY DATA POINTS | TROIS POINTS CLÉS :

- Over the last 36 years, the LACF has awarded $1.125 million (CAD) in research funding. | **Au cours des 36 dernières années, la FAPC a accordé 1 125 000 $ canadiens en financement de recherche.**
- Over the past two years, it has allocated $80,000 to research closely related to "natural capital." | **Au cours des deux dernières années, elle a versé 80 000 $ à des projets de recherche liés étroitement au « capital naturel ».**
- Jenny Hill, Jennifer McWhirter, Corey Dawson, and Tyler Bradt are recipients of the 2025 grant, with upcoming projects focused on "natural capital" research that everyone must follow. | **Jenny Hill, Jennifer McWhirter, Corey Dawson et Tyler Bradt sont les bénéficiaires de la subvention 2025. Les projets porteront sur les principes du « capital naturel » à respecter.**

FOUR KEY CONCEPTUAL NOTES | QUATRE NOTES CONCEPTUELLES :

- Research on research will help LACF and CSLA track trends and support for future research in landscape architecture in Canada. | **L'étude sur la recherche permettra à la FAPC et l'AAPC de suivre les tendances et de soutenir les recherches novatrices en architecture paysagère.**
- Tracking the impact of research in landscape architecture will highlight strengths and help us identify and better understand understudied spaces or regions. | **Le suivi des tendances en recherche précisera les points forts et nous aidera à déterminer les espaces ou les régions sous-étudiés.**
- Valuing research involves understanding and safeguarding our disciplinary knowledge, developing landscape archives, and preparing the next generation to utilize them. | **Pour valoriser la recherche, nous devons synthétiser et sauvegarder nos connaissances disciplinaires, développer des archives paysagères, et transmettre ce savoir à la prochaine génération.**
- Supporting research involves recognizing significant scholarship within the CSLA and tracking LACF grant outcomes. | **Soutenir la recherche c'est reconnaître les bourses d'études de l'AAPC et assurer le suivi des subventions de la FAPC.**

LACF Grant Trends: Natural Capital

None of the LACF grant titles or descriptions since 1990 explicitly mentions "natural capital" as a primary focus (see, lacf.ca/grants-portfolio). However, from the outset, the LACF supported research related to the study and rehabilitation of natural spaces, including Grant #1 for the Beluga Whale Fund to the AAPQ and Grant #9 for Water Edge Habitat Design to Colleen Mercer Clark. Furthermore, over 80% of the grants awarded in the last two years, totalling $80,000, focus on various elements associated with the value of our natural assets, including land, water, air and renewable and non-renewable resources.

The 2024 and 2025 subjects include common landscape research areas such as landscape planning and landscape ecology (covering landscape change, fragmentation and measurement: Grants #188; #192; #194; #200; #204) and conservation/restoration ecology (addressing climate change, invasive species, biodiversity protection and low-impact development: Grants #189; #193; #195; #197; #198; #202; #205). Additionally, some projects explore topics related to public health, leisure sciences and planning (focusing on physical activity and health: Grants #199; #201; #203). Interestingly, we have seen a rise in "digital" projects utilizing remote sensing and AI over the past two years, potentially signalling future research trends. The results of our project, Grant #196, will be available this fall. **LP**

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Tendances des subventions de la FAPC : Capital naturel

Depuis 1990, aucun titre ni aucune description des subventions de la FAPC ne mentionne le « capital naturel » comme principal objectif (voir FAPC.ca/grants-portfolio). Toutefois, l'étude et la réhabilitation des milieux naturels intéressent la FAPC depuis le début : subvention n° 1 – Fonds pour les bélugas à l'AAPQ, et subvention n° 9 – Conception d'habitats riverains à Colleen Mercer Clark. Plus de 80 % des subventions accordées depuis deux ans (soit 80 000 $) portent sur la valeur de nos actifs naturels, notamment la terre, l'eau, l'air et les ressources renouvelables et non renouvelables.

Les sujets de recherche pour 2024 et 2025 portent notamment sur l'aménagement et l'écologie des paysages (dont l'évolution, la fragmentation et les mesures d'aménagement : subventions nos 188, 192, 194, 200 et 204), et la conservation/restauration écologique (changement climatique, espèces envahissantes, protection de la biodiversité et développement à faible impact : nos 189, 193, 195, 197, 198, 202 et 205). De plus, certains projets explorent des thèmes en santé publique, en récréologie et en planification des loisirs (centrés sur l'activité physique et la santé : subventions nos 199, 201 et 203). Fait intéressant, depuis deux ans, nous constatons une augmentation des projets « numériques » utilisant la télédétection et l'IA. Possiblement une nouvelle tendance en matière de recherche. Les résultats de notre projet, subvention n° 196, seront disponibles cet automne. **LP**

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RASMUS ASTRUP

PUTTING A PRICE ON WHAT WE LOVE

How natural capital can help – and hinder – landscape architecture's future

> FR_LP+
DONNER UN PRIX À CE QUE NOUS AIMONS
Comment le capital naturel peut-il favoriser « ou entraver » l'avenir de l'architecture de paysage?

IN THIS ISSUE'S editorial, I asked the question – is the use of natural capital a trap or a tool for landscape architects? I suggested we need to turn the discussion around and use natural capital frameworks not only to quantify what we see, but to protect, legitimize and expand what we value. That's what we at SLA have tried to do in projects across Scandinavia, UK, UAE and Canada. Let me show you how.

Stigsborg – A park that pays

On the surface, Stigsborg Nature Park in Aalborg, Denmark, is a 15-hectare public park along a deindustrialized waterfront. It is green, recreational, biodiverse – a classic, aspirational SLA nature park. But thanks to The City of Aalborg's pioneering collaboration with senior researcher Toke Emil Panduro from Aarhus University, it's also something more: a measurable economic asset.

Using hedonic pricing models – calculations based on how access to green space affects housing prices – we were able to demonstrate that once fully developed, the park would deliver 314 million DKK ($67 million CAD) in increased property value to the surrounding area.

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Why does that matter? Because it changed the conversation. Suddenly, the park wasn't a "cost center" in the city's new waterfront development. It was an economic driver – on par with infrastructure, schools and transit. More important, it became harder to compromise. Changing the park's layout or cutting its budget now had a measurable welfare cost. Green wasn't "nice to have"; it was fundamental.

Natural capital didn't change the park's design. But it defended it – against short-term cuts, against political hesitation. It put a number on life quality. And in doing so, it protected the intangibles that matter most.

Sankt Kjelds – Turning asphalt into assets

In Copenhagen's Sankt Kjelds neighborhood, we replaced two-thirds of the asphalt with City Nature – stormwater gardens, microhabitats and lush green public space – to protect the area against thunderstorms, turning a grey traffic-heavy roundabout into a veritable urban forest for all.

As a result, the area is cooler now by eight degrees Celsius on hot days. It absorbs nearly four tonnes of CO_2 annually. And it has sparked a bloom of biodiversity: 12 times more trees, 30,000% more flowers and bushes.

But again, the real surprise came in the hard economic numbers: Local property values increased by 428 million DKK ($91 million CAD) from an initial investment of just 10 million CAD. Business followed: From one lonely Thai take-away, the area now boasts eight cafés, bakeries and small shops. Footfall has increased by more than 300 percent.

Of course, we didn't only design for real estate returns. We designed for all life. But because we were able to document the economic effects – effects we always suspected but now could prove – we were able to scale up. The city took notice. Politicians took notice. And soon, more projects in Copenhagen and elsewhere followed. One of our latest Canadian projects – the Ookwemin Minising development in Toronto – draws huge inspiration from the Sankt Kjelds approach.

1 LANDSCAPE PLAN OF STIGSBORG NATURE PARK IN AALBORG. **2** RENDER OF STIGSBORG NATURE PARK. **3** FIELD STUDY ON THE SITE OF STIGSBORG NATURE PARK. **4** AERIAL PHOTO OF SANKT KJELDS SQUARE IN COPENHAGEN. **5** SITE PLAN OF SANKT KJELDS SQUARE. **6** BICYCLES ON PROTECTED PATHS IN SANKT KJELDS SQUARE. **7** SUDS IN SANKT KJELDS SQUARE.
PHOTOS 1-5 SLA **6, 7** MIKKEL EYE

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This is what I mean when I say that we don't lead with data – we lead with design. But we use data to get our foot in the door. And to create an ever-bigger impact.

Earls Court – Designing in real time

Perhaps the most advanced use of natural capital in our practice comes from our ongoing work at Earls Court in London, England. Here, we're part of a multidisciplinary team reinventing a 40-acre former exhibition site into a new urban neighborhood.

Early in the planning process, we – in a collaboration led by the amazing engineers Hoare Lea – introduced a live computational tool that continuously calculates key natural capital indicators – such as air quality, biodiversity net gain, rainwater runoff retention and property value – while we design. Not afterwards. Not as an add-on. But as an integrated part of the design process.

This means we can test and optimize the effects of our ideas in real time. How many trees do we need to reach a specific air purification target? What happens to thermal comfort if we widen a canopy? Can we reduce stormwater loads by 30% just by adjusting topography?

But more than a design tool, it's a communication tool. I remember visiting the local community and being able to say: "We have measured your air pollution. We know our trees will reduce it. And here's by how much." That level of transparency changes trust. It makes the process democratic. And for once, it means green space doesn't shrink during "value engineering" – it grows.

104 Neighbourhood Parks – Redefining everyday excellence in Abu Dhabi

In our recent project designing 104 neighbourhood parks across Abu Dhabi, natural capital wasn't just an argument – it was the entire premise.

Devised on a tight budget and an even tighter timeline, these parks weren't designed to be a "starchitect's" ego-boosting icons. They were every day, hyperlocal, deeply contextual public spaces designed for the everyday life of hundreds of thousands of residents. They were about how a park feels on a hot day, how it cools the street and how it invites a child to play or a grandmother to sit in shade – not how it would look on the cover of Architectural Digest.

To make this ambition real, we developed SLIM – our own SLA Landscaping Information Modeling system. This computational design tool lets us model, adapt and evaluate every aspect of the parks in real time, from biodiversity and shading to construction cost and maintenance efficiency.

The result: 740,000 m^2 of new public space. 22,571 trees; a 500% biodiversity increase; 946 new social programs – from basketball courts to picnic tables to wildflower gardens. And a shift in planning culture: from top-down spectacle to bottom-up livability. We also created new life grounds for 148 new animal species.

This is what natural capital enables when done right. It shifts the question from "How does it look?" to "How does it feel? And

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8 AERIAL RENDER OF EARLS COURT, LONDON. **9** NATURE-BASED PLAYGROUND IN EARLS COURT. **10** WATERPLAY AND SOCIALIZING IN AL FAY PARK, ABU DHABI. **11** PICNIC AND SOCIAL GATHERING IN BAYNOUNAH PARK, ABU DHABI. **12** NATURE-INTEGRATED PLAYGROUND IN AL MAJARAH PARK, ABU DHABI. **13** THE EXISTING DOWNSVIEW AIRPORT IN TORONTO. **14** NATURE AND PUBLIC TRANSIT WEAVE THE DOWNSVIEW FRAMEWORK PLAN TOGETHER. **15** CITY NATURE IS THE DEFINING CHARACTER OF DOWNSVIEW'S URBAN DESIGN.
PHOTOS 8, 9 EARLS COURT DEVELOPMENT COMPANY
10-12 JON WALLIS **13-15** SLA, HENNING LARSEN, KPMB

how does it perform?" That's a vital shift. Especially in regions like the Middle East, where heat, drought and urbanization demand new tools, new processes – and new languages of value.

Downsview Toronto – A framework for city nature

But what do you do when you do not have data? When the scale of the project is simply too big to calculate?

For the past six years, SLA has been working on the transformation of 520 acres of the former Downsview Airport in Toronto – once an active airfield, now set to become one of Canada's largest development sites. With scale comes responsibility, and we aimed to create one big, shared nature gesture rather than isolated green patches across nine districts and countless development plots.

Our solution was a blue-green infrastructure network that supersedes the conventional street grid, establishing a new hierarchy of nature in city planning. This network of "City Nature" – SLA's term for nature that is at once urban, sensory, biodiverse and infrastructural – weaves together social connections, rainwater management, biodiversity corridors and active mobility routes, linking creeks, parks and trails from the surroundings across the entire site.

The result is a plan with nearly 100 acres of new public green space, a two km green spine repurposing the former runway, and an extensive blue-green infrastructure system that threads nature through every block, street and rooftop. Every home and workplace is within five minutes' walk of a park. And all of it is stitched together by an "inconvenient" network of nature corridors.

Was it a hard sell? Of course. Nature on this scale always is. But because we could show – through precedent, through diagrams, through performance logic – that City Nature improves livability, resilience and long-term value, we gained consensus. Architects embraced it. Planners codified it. Our clients, Northcrest Developments and Canada Lands Corporation, chose it. And the City stood behind it.

Now, as the plan is translated into specific district plans, that shared vision is holding. What began as high-level design principles is becoming real-world performance targets, with natural capital KPIs and ecological metrics being developed for each phase.

This is natural capital before the numbers. It's about creating a framework so compelling, so clearly beneficial to human and ecological life, that it carries its own internal logic. And it proves a vital point: When done right, nature and landscape architecture do not need to beg for space. It becomes the structure everything else must follow.

Expanding our language

Demonstrably, then, natural capital is not the enemy. But it must not be our master, either. Used blindly, it risks commodifying the very systems it hopes to protect. Used wisely, it can be a lever: not for extraction but for transformation.

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At SLA, we've never aspired to be data leaders. We don't have supercomputers in our basement. We are happy to leave the most complex data crunching to our collaborators and engineers. But I believe we are leaders in using data to support what we believe in: public life, sensory richness, resilience, human and more-than-human flourishing of life. All life.

As designers, we are, at our core, also storytellers. And natural capital gives us a new set of characters: numbers, graphs, computational feedback, predictive models. We don't need to abandon our language – we need to expand it. Not to conform to the systems around us, but to change them from within.

Only by speaking both poetry and policy can we give nature the value it deserves. **LP**

RAJJI DESAI

THE LIVING LEDGER

Embracing dynamic ecologies in natural capital accounting

> FR_LP+
LE GRAND LIVRE DU VIVANT
Intégrer l'écologie dynamique dans la comptabilisation du capital naturel

IN AN ERA of overlapping crises, from the climate emergency to the collapse of biodiversity, the urgent imperative to value and protect the planet's intricate life-support systems has never been more acute. Landscape architects occupy a pivotal position on the frontlines of this effort, tasked with shaping environments that nurture both ecological integrity and planetary well-being within the crucible of a rapidly shifting climate. This work is bound to a challenge of translation: how to build a language capable of bridging the chasm between ecological realities and the impoverished lexicon of policy and finance. Natural Capital Accounting (NCA) has emerged as one such translation tool, offering a framework to convert the profound, inherent worth of ecosystems into economic terms that resonate within decision-making spheres.

Through frameworks such as the United Nations' System of Environmental-Economic Accounting (SEEA), which establishes global standards adapted into national pilots, NCA makes a compelling case for the economic valuation of nature. This has the potential to unlock investment for vital green infrastructure in domains traditionally dominated by GDP-centric and financial return metrics. Yet this promising mechanism feels both radical and insufficient. It is radical in forcing

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A forest's carbon ledger seldom accounts for the migratory birds whose droppings fertilize understory plants, fostering resilience against disease outbreaks and invasive species.

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decision-makers to see nature as more than an object of sentiment, as something worthy of preservation by virtue of its quantified contribution to human welfare. But it is insufficient because these accounts, however rigorously constructed, risk flattening a dynamic, breathing planet into static abstractions that do not fully reflect its living complexity.

Assessment tools such as InVEST and ARIES have gained significant traction in recent years, providing valuable data to strengthen arguments for nature-based solutions. However, these tools remain largely anchored in metrics centered on plant-based carbon sequestration. The carbon sequestered in a mangrove swamp, for instance, is counted in a moment of time, but rarely is it measured how that mangrove might die back under saltwater intrusion, or how its carbon flows could shift after the scouring winds of a cyclone. A forest's carbon ledger seldom accounts for the migratory birds whose droppings fertilize understory plants, fostering resilience against disease outbreaks and invasive species.

By prioritizing what is most easily quantifiable, current NCA methodologies risk sidelining the mobile, dynamic and hidden forces that are the true architects and custodians of resilient landscapes. Understanding these omissions is not a mere academic exercise; it is essential for constructing richer ecological narratives and achieving a more robust and truthful representation of landscape value. Before fully integrating NCA into practice, landscape architects must deploy their unique perspective to insist upon accounting methodologies that genuinely reflect the dynamic interplay of species and processes, transforming NCA from a static ledger into a living narrative of the world as it is.

Ecological tapestries

Embracing NCA without broadening its scope risks turning vibrant, pulsating ecological tapestries into mere balance sheets of commodified assets. Ecological inheritance is inherently dynamic: journeying species weave together distant habitats, sustaining flows of energy, nutrients and genetic material across continents and oceans. Migratory birds, marine creatures that traverse

1 CONCEPT IMAGE: COMMON AFRICAN WILDLIFE ANIMALS TOGETHER AROUND A TREE IN KRUGER NATIONAL PARK. **2** FLYING BLACK STORK AGAINST A BLUE SKY. THE BLACK STORK (CICONIA NIGRA) IS A LARGE BIRD IN THE STORK FAMILY CICONIIDAE.
PHOTOS 1 ISTOCK.COM/ADOGSLIFEPHOTO
2 ISTOCK.COM/ANDYWORKS

NATURAL CAPITAL OUTCOMES / MEASURABLE INSIGHTS

- ***Dynamic Carbon Flux Resilience Index:*** Track changes in ecosystem carbon stocks over time, measuring both sequestration capacity and resilience to disturbance events such as storms or saltwater intrusion.
- ***Habitat Connectivity Resilience Score:*** Evaluate the degree to which landscape networks maintain functional links for species movement under changing land-use and climate pressures.
- ***Indigenous Knowledge Integration Score:*** Measure the number of co-created indicators, governance agreements and stewardship actions involving Indigenous partners.

DESIGN APPROACHES / GUIDING PRINCIPLES

- ***Design for Ecological Connectivity:*** Create habitat networks and movement corridors that support the life cycles of mobile species by linking breeding, feeding, and stopover sites at multiple scales.
- ***Embed Subterranean Infrastructure:*** Incorporate soil-health zones, bioturbation monitoring plots, and organic-matter injection features into landscape plans to foster and measure soil fauna activity.
- ***Enable Co-Governance and Narrative Integration:*** Partner with Indigenous and local communities in valuation processes and weave their ecological knowledge and place-based stories into metrics and stewardship frameworks.

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ocean basins, and terrestrial mammals undertaking epic journeys are not confined assets but dynamic agents in a planetary web. Migratory birds, for example, act as critical nutrient vectors, transporting nitrogen and other elements through their droppings, enriching otherwise nutrient-poor islands and forest soils. The East Atlantic Flyway illustrates this beautifully, as millions of birds traverse between Europe and Africa each year, fertilizing impoverished soils and sustaining local productivity. Their role is so profound that their disappearance could destabilize entire regional food systems.

Yet a bird in flight does not appear on a place-based ledger; its benefits disperse beyond a single hectare, challenging the tidy boundaries of natural capital. Forest birds, too, disperse seeds tirelessly, fostering the regeneration and diversification of plant communities far beyond their nesting sites. Species such as the black stork (Ciconia nigra) and the white-tailed eagle (Haliaeetus albicilla), dependent on mosaics of mature forests and fertile wetlands, embody the profound interconnectedness of ecosystems. They challenge any accounting system that treats ecosystem services, such as carbon storage, as geographically fixed and temporally static.

Large herbivores, likewise, hold a complex and often overlooked position within ecological and carbon cycling systems. Bison, deer, elephants and their kin are frequently framed through the narrow lens of grazing pressure or disturbance. Yet their ecological contributions are far more intricate and beneficial, shaping vegetation structure, influencing soil health and redistributing nutrients across entire landscapes. Grazing animals can prevent woody encroachment in grasslands, maintaining open habitats rich in carbon-sequestering grasses. The dramatic trophic cascade observed in Yellowstone National Park (and in Banff National Park) after the reintroduction of wolves, which reduced excessive elk grazing and permitted riparian vegetation to recover, vividly demonstrates how fauna and flora co-create carbon dynamics and landscape structure. Despite these critical roles, these itinerant beings often remain invisible within NCA frameworks, which tend to impose static, site-specific boundaries on ecological processes. Such omissions are consequential, particularly in the context of ambitious rewilding and restoration efforts, where the true scope of ecological recovery may be gravely misunderstood or undervalued by incomplete accounting methodologies.

Beneath the visible surface, another realm of vital ecological work often goes unrecorded: the teeming world of soil fauna. Earthworms, beetles, ants and a constellation of microscopic organisms serve as subterranean engineers, orchestrating decomposition, facilitating nutrient cycling, stabilizing soil carbon. Earthworms, as tireless burrowers, contribute directly to humus formation and long-term carbon storage. Research by Tan and colleagues in cold forest environments showed that soil fauna significantly amplified the accumulation of humic substances beyond what abiotic processes alone could explain. Further, Filser and colleagues argue that bioturbation, the mixing and processing of soils by organisms, fundamentally alters soil organic matter dynamics. Despite their essential contributions, these organisms remain largely absent from NCA because they do not lend themselves to easy measurement. Overlooking their work risks underestimating not only the potential for carbon sequestration but also the fundamental resilience conferred by subterranean biodiversity.

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3 HERD OF ELK STAMPEDE ACROSS DUSTY HILLSIDE IN YELLOWSTONE NATIONAL PARK'S BACKCOUNTRY. **4** WILD WOLF PHOTOGRAPHED IN YELLOWSTONE FORESTS, MONTANA.
PHOTOS 3 ISTOCK.COM/KELLYVANDELLEN
4 LUCIANA TANCREDO/SHUTTERSTOCK.COM

There is, however, a harder question that lurks behind these technical challenges: whose nature is being valued, and to whose benefit? Transforming ecosystems into tradable assets risks repeating the old patterns of enclosure, taking what was collectively held and placing it under private control. This is no hypothetical threat. In East Africa, carbon credit schemes have displaced traditional land users while handing forest management to international investors. Valuation without a commitment to equity risks dispossession. An accounting system that does not ask who controls, who benefits, and who bears risk cannot claim honesty. Here, landscape architects have the power to convene communities and design fair processes, embedding these hard questions into every valuation to ensure that nature's value serves people rather than exploiting them.

Responding to critical gaps – collaboration + adaptive governance

What, then, is the essential role of landscape architects in responding to these critical gaps? Rather than passively accepting NCA as a static accounting tool, they must embrace it as an evolving practice, one demanding continuous refinement and radical expansion to align with the dynamic, interconnected reality of ecological systems. Practically, this demands deep collaboration with ecologists, soil scientists, conservation biologists and Indigenous knowledge holders to weave ecological complexity and cultural wisdom into valuation frameworks.

Expanding the ledger of Natural Capital Accounting is not a sentimental gesture; it is a fundamental act of respect for nature's inherent complexity, its ceaseless change, and its intricate interactions. It requires a conscious decision to incorporate the hidden labour of microbes, the vast movements of migratory animals and the agency of communities into the frameworks that guide landscape decisions. However, such a ledger cannot be designed by economists alone.

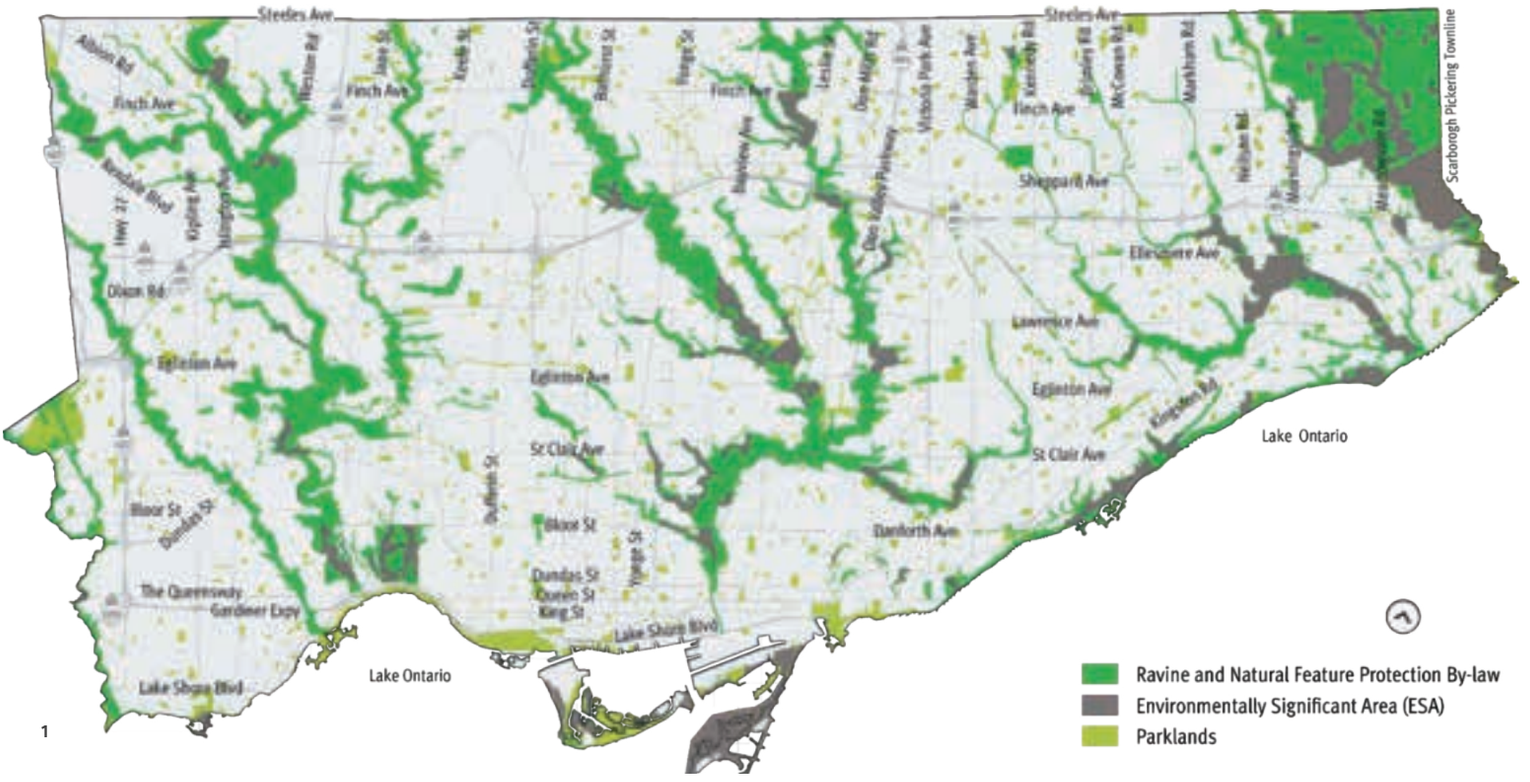
Integrated Landscape Management (ILM) provides one scaffolding through which this transformation can unfold. Unlike NCA, which is a tool, ILM is a practice, a way of seeing and negotiating the full spectrum of landscape processes. ILM brings together diverse voices – farmers, Indigenous communities, businesses, conservationists – to manage trade-offs and synergies across a territory. It honors multifunctionality, the principle that landscapes perform many functions simultaneously, and that these functions must coexist. By perceiving landscapes as living social-ecological systems, and by insisting on collaboration and adaptive governance, ILM supports a shift from static measurements to dynamic, negotiated stewardship. For instance, Indonesia's Low Carbon Development Initiative provides a compelling model, where planners combined national ecosystem accounts with local consultations to align forest protection, farming livelihoods, and climate goals. In Rwanda, integrated catchment management employed NCA data on water resources, then structured local dialogues so farmers could adapt planting and grazing practices to protect eroding hillsides. These examples illustrate how pairing NCA with ILM can unlock long-term, equitable solutions.

Ultimately, if valuation is a form of storytelling, then the question emerges: what story should be told? Expanding valuation frameworks beyond static measures and including the full spectrum of non-human actors will not only improve their ecological accuracy but also enrich the narrative capacities of landscape architecture. Narrative itself remains one of the discipline's most powerful tools.

Through the deliberate crafting of spatial stories, landscape architects can reveal the intricate interdependencies within ecosystems, highlighting dimensions of value that sterile numbers alone cannot capture. Stories have the power to engage communities, compel policymakers and rally stakeholders with a resonance that data alone cannot achieve, nurturing a collective appreciation of landscapes as dynamic, living entities rather than static assets to be harvested or preserved.

Landscape architects have long worked between worlds. They are trained to notice what others overlook, to ask what a place might wish to become and to help it thrive. If they step forward, if they bring narrative power and systems literacy to the conversations around NCA and ILM, they can help shape a new grammar of care. One that measures what matters but also remembers why it matters. Embracing this essential complexity positions landscape architects not merely as practitioners of green infrastructure but as stewards of a more inclusive, ecologically truthful vision, capable of guiding society toward a more resilient, respectful, and wonder-filled relationship with the living world that sustains all.

Ultimately, Natural Capital Accounting must transform into a living ledger that honors flux as well as form, justice as well as yield and wonder as well as utility. In this way, NCA transcends its role as a financial veneer and evolves into a narrative practice that measures what matters and remembers why it matters. By developing this richer accounting grammar, landscape architects position themselves not only as designers of green infrastructure but as stewards of an inclusive, ecologically truthful vision, capable of guiding society toward a more resilient, respectful and awe-filled relationship with the living world. **LP**



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KIM STATHAM + JANE WELSH

WILD, CONNECTED + DIVERSE

The role of Landscape Architecture in protecting and enhancing Toronto's natural capital

> FR_LP+
NATURE CONNECTÉE ET DIVERSIFIÉE
Le rôle de l'architecture paysagère dans la protection et la valorisation du capital naturel de Toronto

***"AFTER ALL, OUR** own health and ultimately our very survival is linked to the species and natural spaces that share the planet with us. Without plants, there would be no oxygen; without the life of the soil, there would be no plants; without unpolluted water, we would die."* Margaret Atwood and Graeme Gibson, City of Toronto Biodiversity Series, 2011

It may come as a surprise that for a dynamically growing city of almost three-million people, Toronto has a robust and extensive natural ecosystem, based on the Humber, Don and Rouge Rivers and a network of smaller creeks and urban forests. This natural capital covers 17% of the land base and is the heart of an ecological community that spills out of the natural ravine lands into the city's urban fabric of parks, streets and neighbourhoods.

Urban nature is critical in creating livable, well designed and resilient cities

The United Nations forecasts that by 2050, two-thirds of the world's population will live in cities. This is tracking at the same time the United Nations Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services found that nature is declining at unprecedented rates never seen before in human history.

While cities and the actions that take place in these urban centres, such as development and transit expansion, are understandable culprits of this biodiversity loss, these urban centres are also a major driver for biodiversity conservation, protection and promotion.

Cities also hold the key to fostering, preserving and restoring the relationship between nature and people, a synergy known as biocultural diversity. The value of meaningful engagement and communications in building capacity and social capital in the service of biodiversity protection for climate resilience and quality of life cannot be underestimated.

Cities benefit from a village of professions and traditional knowledge to plan, design, execute and promote nature throughout their urbanscapes, and landscape architecture has played a key role in Toronto's success.

An enduring wilderness: Toronto's ravine system

"The ravines are to Toronto what canals are to Venice, hills are to San Francisco and the

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Thames River is to London. They are the heart of the City's emotional geography, and understanding Toronto requires an understanding of the ravines." Robert Fulford, Accidental City, 1995

Prior to European settlement, Tkaronto (the Mohawk word for Toronto, meaning where there are trees standing in the water) was home to a rich diversity of plants and animals. The combination of habitat types, a temperate climate and Toronto's settlement on the north shore of Lake Ontario helped to support a wide range of species. So, too, did the stewardship and care of these lands by Indigenous peoples, who lived in right relations with the land, water and all inhabitants since time immemorial. But after a few hundred years, much of the original biodiversity was lost as settlement and urbanization displaced most of the original forest, filled in ravines and blocked waterways.

The ravines were once seen as the biggest challenge to Toronto's growth, but their value has been increasingly recognized. In 1909, the ravines were identified as needing protection for their "picturesque beauty" by the Toronto Guild of Civic Art, and in 1943 for their value as part of a larger system connecting the Niagara Escarpment to the west and the Oak Ridges Moraine to the north in the *Master Plan for the City of Toronto and its Environs.* In 1954, after Hurricane Hazel and the resulting loss of lives and homes, the Metro Toronto Planning Board set aside funds for acquisition of a 2,700-hectare park system based on the major river valleys by the Metro and Region Conservation Authority.

Today, Toronto's ravines define the structure of the city – and serve as the backbone of the City's natural infrastructure and ecology. They contain most of Toronto's natural Parklands, the majority of our Ecologically Significant Areas, as well as extensive grey infrastructure, cultural heritage and recreational assets.

Landscape architects have been at the forefront of this work. In the 1976 report *Environmental Resources of the Toronto Central Waterfront,* landscape architects Anne Whiston Spirn and Narendra Juneja (Wallace McHarg Roberts & Todd), articulated the value of the natural ecosystem stating the need to "ensure that environmental concern be given at least as much due as social, political and economic concerns". (WMRT report 1976). Landscape architect Michael Hough's 1991 paper Bring Back the Don included a vision of a naturalized mouth of the Don River that has

1 TORONTO'S RAVINES, NATURAL AREAS AND PARKLANDS. **2** DON VALLEY BRICK WORKS PARK.
PHOTOS 1, 2 CITY OF TORONTO

been realized 30 years later by landscape architects at Michael Van Valkenburgh and Waterfront Toronto.

Technology and tools now exist to quantify the ecological services that ravines provide in managing flooding, heat and air quality and providing the foundation for the diversity of flora and fauna found in the city. A 2018 study placed the value of the ecosystem services they provide at more than $822 million dollars annually (Ecosystem Service Values of the City of Toronto Ravine System, Green Analytics 2018). based on recreation services, physical and mental health, air quality, carbon sequestration, food provisions, aesthetic appreciation, habitat and refugia.

The urban forest

If Toronto's ravines are the backbone, then the urban forest is the lungs.

Toronto's urban forest is a critical component of the city's natural capital and contributes to the quality of life required for a growing and intensifying city. Similar tools to evaluate and measure the benefits of trees and forests in a municipal setting have been used to quantify the ecological services that Toronto's urban forest provides, such as energy savings, carbon sequestration, avoided stormwater runoff. The 2018 Tree Canopy Study quantified the structural value of the urban forest as $7 billion dollars, providing benefits of $55 million annually. With the use of iTree, as well as other technologies to analyze the impacts of a decade of urban forest management, Toronto saw a 2% increase in its tree canopy cover overall, from roughly 28% to 31% between 2008 and 2018.

To achieve its target of 40% canopy cover by 2050, Toronto has prioritized canopy expansion and community engagement with a tree equity focus – which means providing the right amount of trees to the right amount of people so that there is equal opportunity to benefit from all of the services they provide. Toronto has used an approach created by American Forests – where socio-economic factors are layered on top of existing tree canopy data to better understand inequities of access. These include population density, race, income, age, employment status and mean surface temperature.

Shifting thinking on the importance of trees and natural areas as critical natural capital starts with ensuring staff across different divisions and sectors share that understanding. Forest management staff are sharing this information with colleagues across disciplines and tree equity is now being used to inform planning and public health exercises and parkland and growth strategies.

4

Ecosystem service physical flows and monetary benefits for the City of Toronto ravine system

Ecosystem Service	Indicator	Unit	Physical flow 2017	Indicator	Unit	Monetary flow benefit 2017 ($ Millions)
Recreation	Users of ravines for cycling and biking Users of ravines for walking and hiking	# of users # of users	398,240 924,486	Value of welfare benefit received by biking in ravines Value of welfare benefit received by walking and biking in ravines	$ per year $ per year	$111 $473
Physical health	Population meeting physical health guidelines by accessing greenspace	# of people	753,812	Value of physical activity supported (avoided health care costs of dealing with ill health due to inactivity)	$ per year	$217
Mental health	Reduced number of people experiencing depression	# of people	5,297	Value of improved mental health, avoided foregone GDP due to depression	$ per year	$5
Gas regulation (air quality)	Air pollution removed (CO, NO_x, O_3, PM_{10}, SO_2)	metric tonnes	CO=3.2; NO_x=94.3; O_3=374.4; PM_{10}=113.0; SO_2=19.8	Value of cleaner air (avoided health care costs of visits to hospital for respiratory and other related health issues)	$ per year	$7
Carbon sequestration	CO_2e sequestered	metric tonnes	14,542	Value of carbon sequestered (avoided social damages that are anticipated to result from climate change)	$ per year	$2
Food provision, urban agriculture	Fruit and vegetable production occuring in ravine area	metric tonnes	34.7	Value of hood from urban agriculture sites in ravines (replacement cost of equivalent produce)	$ per year	$0.04
Aesthetic appreciation	Area of natural cover	hectares	6,000	Value people place on the aesthetic enjoyment of the area	$ per year	$2.67
Habitat and refugia	Area of natural cover	hectares	6,000	Value people place on knowing natural areas exist	$ per year	$2.47

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Innovative approaches to protect, restore and enhance the ravines and urban forest

Toronto's continued growth (anticipate 700,00 new residents over next 30 years)

3 ECOSYSTEM SERVICE PHYSICAL FLOWS AND MONETARY BENEFITS FOR THE CITY OF TORONTO RAVINE SYSTEM. **4** OPEN PLANTERS AND STREET TREES LOWER SHERBOURNE **5** FORKS OF THE ROUGE RIVER AND LITTLE ROUGE CREEK, ROUGE PARK.
PHOTOS 3 JANE WELSH, CITY OF TORONTO **4** *ECOSYSTEM SERVICE VALUES FOR THE CITY OF TORONTO RAVINE SYSTEM* (CITY OF TORONTO AND TORONTO AND REGION CONSERVATION AUTHORITY, GREEN ANALYTICS, 2018) **5** ROBERT BURLEY, *AN ENDURING WILDERNESS TORONTO'S NATURAL PARKLANDS* (2017)

will put pressure on the natural system. The number of people using the ravines is increasing; invasive species are displacing native plants and animals; and a changing climate is affecting the life cycles of many species and negatively impacting the ability of our natural areas to provide ecosystem services.

In recent decades, Toronto has made gains in protecting, restoring and enhancing the natural environment. Restoration projects within the ravine system and along the waterfront are improving habitat, the urban tree canopy is being expanded, and biodiversity considerations are being integrated into planning decisions in the built environment. Official Plan policies identify and protect the Natural Heritage System, including significant natural areas. These policies recognize the importance of ecosystem services provided by biodiversity in supporting resilience and sustainability.

This is complemented by strong municipal by-laws that protect trees and natural areas from negative impacts, and where impacts are acceptable, tree replacement and natural areas restoration is required.

The Ravine Strategy (2016), led by landscape architects Garth Armour and Jane Welsh, was the first intentional and coordinated framework to align investment across city divisions to maximize the management, use, enhancement and protection of this natural infrastructure. The vision of Toronto's Ravine Strategy is a ravine system that is a natural, connected sanctuary essential for the health and well-being of the city, where use and enjoyment support protection, education and stewardship. The implementation plan was adopted in 2020 and includes a massive capital program, as well as a vibrant coordinated operating program covering invasive species management, litter control, student internships, and inclusive community led engagement and hands on stewardship with a focus on equity-deserving communities. Through political championing, this workplan leveraged $47 million in federal and provincial funding over the last 4 years.

Another important tool is the sustainable performance requirements for new development in the Toronto Green Standard (2010). For areas within or adjacent to the natural heritage system

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the Standard requires a Stewardship Plan and 100% native plant material. It also requires adequate soil be provided on site to support a healthy tree canopy (30 cm of soil per tree), reflective of the ground-breaking work of landscape architect James Urban. The Toronto Green Standard is just one of the tools to meet directives in Toronto's Biodiversity Strategy (2019), which aims to improve the quality and quantity of natural habitat through design of the built environment to support biodiversity and increase access to and awareness of nature in the city.

In 2023, Toronto (along with Montreal) was selected as one of 16 global cities as a Role Model City for the Generation Restoration project, a project led by United Nations Environment Programme that aims to accelerate nature-positive development respectful of the Kunming-Montreal Global Biodiversity Framework (GBF), through actions at the subnational (city) level. Further, Toronto has recently achieved its sixth consecutive Tree Cities of the World Award from Arbor Day Foundation and Food and Agriculture Organization (FAO) of the United Nations, in part because of the city's commitment to planning, investing and monitoring its urban forest and sharing and educating people about its importance to climate resilience, equity and quality of life. Involvement in this international community and building a network of cities who are protecting and growing their natural capital has huge benefits to biodiversity and biocultural diversity preservation and restoration across cities, countries and the globe.

Final thoughts

The roughly three million residents of Toronto benefit daily from the ecosystem services that the ravines and urban forest provide, valued at $822 million and $55 million dollars respectively. The monetary valuation of these natural assets for their critical contribution to air quality, carbon sequestration, avoided stormwater runoff, energy savings, recreation, physical and mental health, food provisions, aesthetic appreciation and habitat provide direct evidence that supports the continued protection and investment in restoration and enhancement.

Toronto's natural capital has been shaped by innovative and influential landscape architects, just a few that have been highlighted above. As Toronto continues to grow, the role of the next generation of landscape architects in both the public and private sectors is to ensure that natural capital is protected, restored and enhanced through investment, planning regulation and policies, master plans, stewardship and sensitive design. Nature belongs in natural areas but also needs to be weaved through the urban fabric, which is directly influenced by landscape architects who value and understand its critical role in cities. **LP**

ALEXANDRA STEED

1

FROM AN ENGLISH ESTUARY TO AN ARABIAN DESERT

Designing natural capital at scale

> FR_LP+
D'UN ESTUAIRE BRITANNIQUE AU DÉSERT ARABIQUE : CONCEVOIR LE CAPITAL NATUREL À L'ÉCHELLE

WE LIVE IN a time of intersecting crises: ecological collapse, climate disruption, public health inequality, and social fragmentation. Though planetary in scale, these forces manifest locally – in the landscapes we walk, build, and often overlook. The land is where exploitation leaves its scars, and where healing must begin.

As landscape architects, we are uniquely positioned to respond. We work with the connective tissue of place. We understand how water, soil, biodiversity, and culture braid together. We don't just design with nature, but possess the skills to reveal the quiet logic of living systems and translate their value into policy, investment, and spatial strategies that govern how we live.

Our economic structures, though often blind to it, are built on nature's foundations: clean water, fertile soils, breathable air, pollinated crops, and the cycling of carbon. These gifts make life possible, yet our financial and political systems have long treated nature as an externality: something to extract from, tame, or ignore. GDP, our dominant metric of national prosperity, accounts for productivity but not depletion, extraction but not regeneration. That narrow metric conceals the true cost of our actions.

To reframe this, we must give nature agency – not only ethically, but economically and politically. Two recent projects attempt to do this by placing landscape at the centre of large-scale regeneration: the South Essex Green and Blue Infrastructure Study in the UK, and the AlUla Framework Plan in Saudi Arabia. Though separated by climate, culture, and context, both begin with the land itself – as a guide, a structure, and a source of value.

South Essex: Reimagining a Landscape of Extraction

For centuries, South Essex has absorbed London's overflow: its waste, its industry, its sprawl. Marshlands were drained and filled. Estuaries severed. Farmland depleted. Yet this region still holds extraordinary potential – a mosaic of habitats, communities, and latent landscapes waiting to be reassembled, and significantly, a regional buffer to absorb storm surges and sea-level rise that protects the Thames Estuary, including London.

1 SEEPARK. **2** SEEPARK PROPOSED REGIONAL PARKLAND. **3** SEEPARK BENEFITS WHEEL.
PHOTOS 1,2,3 ALEXANDRA STEED/URBAN

2,3

The South Essex Green and Blue Infrastructure (GBI) Study, commissioned by South Essex Councils, set out to reshape the future of this 70,000-hectare region through a landscape-led lens. The environment wasn't treated as a constraint, but as the framework for growth.

The vision is bold: to create the South Essex Estuary Park (SEEPARK), a 24,000-hectare network of working farmland, tidal marshes, industrial edges, rail corridors, woodlands, and wetlands. Not a park in the traditional sense, but a living system of green and blue infrastructure that transforms fragmented parcels into a unified ecological and social asset.

The strategy is anchored by six key moves:

1. Establish regional parkland
2. Connect habitats
3. Restore water systems
4. Optimise land use
5. Celebrate landscape character
6. Align growth and development with ecological opportunity

DESIGNING NATURAL CAPITAL AT SCALE

3 Natural Capital Outcomes

- **£7.2 billion** in existing natural-capital value across South Essex (biodiversity not yet monetised), *prior* to planned GBI enhancements.
- **30 percent of South Essex** designated for nature recovery, pre-empting UK Environment Act targets for Local Nature Recovery Strategies and Biodiversity Net Gain.
- **>80 percent of AIUla County** allocated for protection through IUCN-aligned conservation zones, one of the world's largest coordinated ecological restoration strategies.

3 Design Takeaways

- **Think regionally:** Landscape-led planning at scale enables habitat connectivity, watershed resilience, and joined-up policy implementation.
- **Quantify wisely:** Pair natural-capital and biodiversity metrics with compelling narratives and spatial strategy to mobilise investment and public support.
- **Design policy as well as place:** Landscape architects can craft enforceable frameworks and lead cross-sector governance, not just physical interventions.

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The plan supports 90,000 new homes and 52,000 jobs, while enhancing biodiversity, access to nature, climate resilience, and community well-being.

The process was rigorous: GIS-based mapping, baseline assessments, spatial and ecological analysis, economic valuation, policy review, and extensive engagement. Natural Capital Accounting identified more than £7.2 billion in existing value (with biodiversity excluded due to current valuation limits), exposing the immense, often overlooked value of functioning ecosystems and reinforcing the economic rationale for nature-based investment.

Most importantly, the strategy is already taking root. The SEEPARK Pathfinder project, funded by National Highways, is delivering on-the-ground interventions like habitat restoration, sustainable water management, immersive public spaces. These are not only physical shifts, transforming places – they are transforming governance, partnerships, expectations, and power.

This is landscape as blueprint, not background. As economic engine, public health infrastructure, climate defence, and spatial strategy. It is the beginning of a new regional identity, where landscape is central, not peripheral.

AlUla: regeneration in a fragile desert ecosystem

If South Essex is a landscape of loss and latent potential, AlUla is one of awe and fragility. In northwest Saudi Arabia, ancient canyons, wadis, volcanic fields, and palm-filled valleys record millennia of human and ecological memory. But here too, the land is under siege – overgrazing, groundwater depletion, and rapid urbanisation have fractured ecosystems and left indigenous species under threat.

As the landscape architects on this monumental project, we worked with a multidisciplinary team of experts in ecology, hydrology, heritage, agriculture, engineering, and planning. Our task was to translate the Royal Commission for AlUla's Vision and Charter into spatial principles, design policies, and guidelines that protect AlUla's ecological integrity while enabling sustainable development. A landscape-character framework across 18 territorial units guides decisions by geology, ecology, culture, and resilience. All plans across tourism, agriculture, infrastructure, and community development, are integrated within this ecological matrix.

More than 80% of AlUla County is now protected through IUCN-aligned conservation zones. Development in this region is required to deliver on biodiversity-net-gain principles. Specific strategies include the reintroduction of keystone species (like the Arabian leopard and sand gazelle), restoration of native habitats, water harvesting, and the repair of degraded wadis.

AlUla is a masterclass in bioregional planning. It recognises the land as both archive and future, an inheritance and a responsibility. It also proves that even in arid, extreme environments, nature-based planning can shape economic transformation.

Shared lessons across distinct landscapes

- Despite their differences, both South Essex and AlUla share a set of core insights:
- Start with the landscape. Let the land – its patterns, limits, and potentials – shape growth.
- Zoom out. Regional scale is where ecology, infrastructure, and policy intersect.
- Make nature visible. Through numbers, stories, and maps.

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4 ALULA WADI. **5** ALULA SCENIC ROAD. **6** ALULA WADI PLAN.
PHOTOS 4,5,6 ALEXANDRA STEED/URBAN

- Embed biodiversity net gain as baseline. Not a bonus, but the norm.
- Bridge disciplines. Landscape architecture links ecology and economy, planning and culture, past and future.

In both projects, landscape architects mapped priorities and helped shape and influence policy. By designing spatial frameworks and aligning them with emerging environmental legislation, our work is becoming more embedded in the regulatory fabric.

In South Essex, the GBI strategy helped guide Joint Strategic Planning policy and contributed 30% of the land area in alignment with forthcoming Local Nature Recovery Strategies and the Biodiversity Net Gain requirements introduced through the Environment Act 2021. Habitat condition mapping and the Biodiversity Metric informed spatial priorities, while Natural Capital Accounting quantified ecological and social benefits, translating environmental function into an economic case for investment.

In AlUla, the Landscape Framework Plan has been adopted as binding regional policy for an area the size of Belgium, drawing on IUCN guidance to ensure that ecological protection, restoration, and sustainable development are implemented to global standards. A spatial database and monitoring framework ensures the integration of policy and practice. The discipline has moved beyond consultation into authorship – demonstrating how landscape architects can lead at the intersection of planning, ecology, and governance. Leading with landscape as the generative source that supports, guides, and sustains all development.

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Reframing value

Natural capital is not just a way to put a price on nature – it is a way to shift perception. When used with care, it reveals interdependence. It allows us to see land not as commodity, but as commons. Not as resource, but as relationship.

This tool comes with ethical risk. Valuation can empower; however, it can also flatten. It's possible to reduce a wetland to a number while losing sight of its magic, its memory, its meaning. Our task is to use metrics as another layer, to reveal, to make space for multiple ways of knowing the land.

We are at a profound moment of opportunity. For the first time, we can clearly trace the links between ecological decline and human vulnerability. Global citizens are demanding change. And we have the tools to make radical transformation.

We can reimagine a world where every person is seen as part of nature, not apart from it. Where landscapes are planned for care, not control. Where development is guided not by extraction, but by reciprocity.

South Essex and AlUla reveal what's possible when we begin with the landscape – when we see it, not as an asset to exploit, but as a gift, as kin, a first teacher.

As I wrote in my book, *Portrait to Landscape*, the land is our canvas and our responsibility. Let us shape it with care, restore it with knowledge, and advocate for it with vision and conviction. The truth is, we are nature; it is time we lived that truth by repairing the fabric of the Earth one region, one watershed, one story at a time. **LP**

PATRICK MINARDI, GEORGIA POSNO, LIAT MARGOLIS

STACKED LIVING, SHARED GROWING

Rooftop agriculture and the social enterprise of natural capital

> FR_LP+
VIVRE EN COMMUN ET CULTIVER SON JARDIN
Les toits cultivables et l'entreprise sociale du capital naturel

AS TORONTO CONTINUES to grow vertically, the city faces a pressing challenge: how to balance the quality of life and environmental resilience in dense high-rise living. One solution gaining traction is rooftop agriculture – not just as a method of food production, but as a new paradigm of green infrastructure that prioritizes human connection and social capital alongside ecological benefits.

The Missing Piece in Toronto's Green Infrastructure

Despite the City of Toronto's Green Roof By-law and Eco-Roof Incentive Program, the role of rooftop agriculture in Toronto's green infrastructure network remains under-acknowledged. This is partly due to the multi-departmental approach to policymaking, where different branches address interconnected issues such as climate action, building regulations and community development. As a result, rooftop agriculture is often not formally measured, regulated or prioritized in planning documents – reflecting a broader need for coordination across city divisions.

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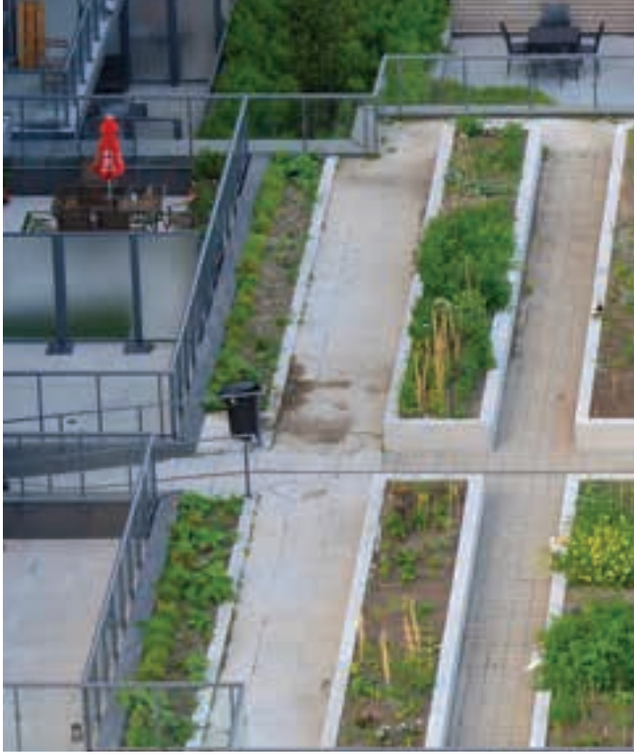

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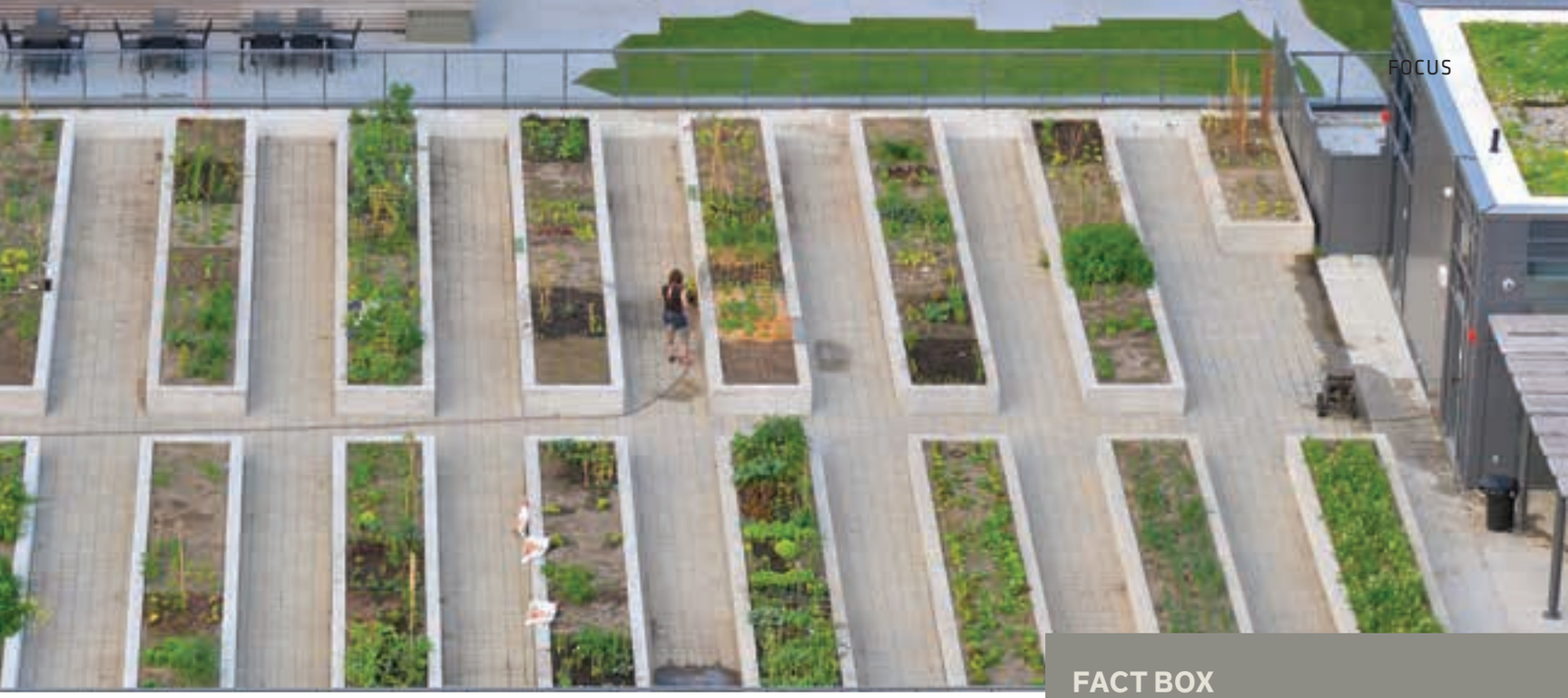
There is also a conceptual distinction between green roofs and rooftop agriculture. While some green roofs include social amenity spaces, their primary value within the context of sustainability lies in their environmental benefits – specifically stormwater management, urban cooling and providing habitat for pollinators. Agricultural rooftops are social and operational by nature with interactive growing spaces requiring human maintenance, often tied to community functions. Growing vegetables is permitted under the City's green roof bylaw, but these roofs are not recognized unless they are first constructed using conventional green roof construction assemblies (root barriers, drainage boards and filter cloths). Of the nearly 1,000 green roofs built since 2009, only one – at Toronto Metropolitan University's (TMU) Daphne Cockwell Health Sciences Complex – was designed specifically for food production under the green roof by-law.

This reveals a larger flaw in how green infrastructure is currently evaluated: the overemphasis on environmental metrics while ignoring the equally critical social pillar of sustainability with respect to their aesthetic and cultural relevancy to good city building. Communities are not moved solely by the measured success of green infrastructure; they are driven by how spaces can make them feel and improve their wellbeing. In contrast, rooftop

1 EVOLV ROOFTOP GARDEN PLOTS (2021). **2,3** ONE PARK PLACE ROOFTOP GARDEN PLOTS (2015).
PHOTOS 1 THE DANIELS CORPORATION, HOFFMAN HAYES
2 HOFFMAN HAYES, NICOLA BETTS **3** HOFFMAN HAYES



agriculture reintroduces a value for nature through social engagement.

Rooftop Agriculture as a Social Amenity

Toronto's rooftop agriculture has evolved over the past two decades, supporting a wide range of uses including gardens connected to restaurants, educational facilities and non-profits serving community groups. Despite their differences, all these spaces have one major commonality - they are not profit-driven. Instead, their motivations speak to community wellbeing, education and circularity, reflecting a commitment to social and environmental objectives over financial gain.

One of the latest rooftop agricultural typologies appearing in the City is on residential condominiums where developers provide rooftop garden plots for residents. These plots – typically constructed as raised concrete planter boxes – are more akin to a rooftop community garden, where participants are assigned a specified plot for the growing season and are responsible for managing these plots with their fellow neighbours.

Dense vertical urban living often leads to a disconnect from nature and overall isolation, with residents sharing a building but not forming a community. The engagement required for the residential garden plots fosters stronger emotional ties to the space and deeper social bonds among residents. In contrast to traditional green roofs, rooftop food gardens can foster a sense of collective stewardship and social wellbeing.

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FACT BOX

Key Challenges:

- Despite Toronto's green roof programs, food-growing rooftops remain overlooked; of the 1,000 green roofs built since 2009, only one purpose-built food producing roof was constructed under the green roof bylaw while more than 40 others have not been tracked.
- Building-integrated food production falls between the cracks of siloed city departments and requires a comprehensive approach.
- Toronto's development pipeline expects over 500 new high-rise towers in the next six years – a major opportunity for scaling up rooftop agriculture, particularly in the residential industry.

Design Opportunities:

- Rooftop agriculture introduces a value for nature through social engagement which in turn improvers the building's upkeep through a shared sense of ownership and care.
- Architects need to determine early in the design process the infrastructure and design considerations necessary to support food growing and community programming.
- Various financial models can be developed to support the staffing of urban agricultural expertise, including an initial investment by the developer after which costs are shared by the building's residents.

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Daniels Corporation: A Case Study in Socially Driven Design

The Daniels Corporation has fostered a reputation for embedding rooftop agriculture into the social fabric of their residential developments. Since 2009, Daniels has heavily invested in urban agriculture, incorporating what they consider to be rooftop community food gardens into 21 of their residential buildings, with a high concentration of these in Regent Park developments.

The long-term success of the rooftop gardens depends heavily on the culture of the building community which can fluctuate over time. To ensure these gardens thrive, Daniels partners with Hoffmann Hayes, a consultancy specializing in community-based urban agriculture and the long-term sustainability of urban agriculture projects. This collaboration ensures that residents receive guidance on gardening practices, seasonal planting and community programming. Daniels' model involves an initial two-year investment in garden infrastructure and programming, after which costs are absorbed by the building's residential association and oftentimes the gardeners through plot fees.

According to feedback from Adam Molson, a vice president of Daniels Corporation Rental Communities and Sustainability Department, the driving force behind these roofs is not environmental such as stormwater management or biodiversity – it's the cultivation of social capital that is woven into their company's identity. Even if the rooftop garden plots conformed to the technical specifications of the City of Toronto's Green Roof By-law – which their current assembly does not – this would still not be the primary driver for their inclusion in Daniels developments. Despite Daniels' comprehensive decarbonization strategy, these rooftop plots are not factored into the program, as their potential carbon impact is relatively minor compared to larger-scale opportunities within the building systems and technologies. Instead, the corporation highlights its urban agriculture efforts through annual social impact reports, where the number of allocated garden plots is tracked as a measure of community engagement and social infrastructure.

Daniels views rooftop gardens as an opportunity to reconnect people with food systems, and support physical and mental well-being of their residents. In fact, the majority of growers in these spaces have little to no previous gardening experience. For potential renters and buyers downsizing from homes with yards, these rooftop plots offer a meaningful alternative that retains a connection to gardening. There is also improved community engagement with strengthened social ties – improving the overall retention rates of their buildings. The co-founder of Hoffmann Hayes, Jane Hayes, believes that the garden plots help with the overall collective success of Daniels' buildings. In fact, the physical maintenance of the building is often improved because residents develop a shared sense of ownership and care.

These residential rooftop agricultural spaces bleed into the broader social life of the building itself, enhancing community identity and cohesion. As Daniels' Senior Manager of Social Impact, Fatima Saya

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notes, “If we are going to ask people to live in small boxes in the sky, we must provide them with spaces that offer joy, connection, and a sense of purpose.” Rooftop agriculture does just that, reintroducing the shared commons into high-rise living.

Scaling Up: Policies and the Role of Designers and Developers

Toronto’s development pipeline expects over 500 new high-rise towers in the next six years. This presents a major opportunity for scaling up rooftop agriculture, particularly in the residential industry. Rising construction costs have led some developers to opt for cash-in-lieu rather than meeting the requirements of the Green Roof By-law, revealing a key limitation of relying solely on regulation to implement green infrastructure. Investment in nature is vulnerable to economic downturns and shifting political priorities. A more resilient approach would embed nature into the cultural and physical fabric of communities – creating spaces people value not just for utility, but for meaning and connection. In tandem, a fail-safe approach would sew nature into the very fabric of the community, such that it sets up a cultural expectation and norm. Perhaps the fact that rooftop agriculture is not recognized and quantified as part of the City’s green infrastructure portfolio, but instead as social capital, is operating as an advantage at this moment in time.

While current regulations may lack specific guidelines or incentives for rooftop agriculture, design professionals can bridge this gap through advocacy and innovation. Architects and landscape architects have an opportunity to take the lead in promoting and creating “agriculture-ready” buildings. This means designing rooftops with suitable structural load capacities, water access and thoughtful layouts that support food growing and community programming. By recognizing rooftop agriculture as a vital component of urban design, we can create natural capital with community value beyond the typical metrics measured by green infrastructure policies and frameworks. **LP**

4 ONE PARK PLACE ROOFTOP GARDEN PLOTS (2015). **5,6** EVOLV ROOFTOP GARDEN PLOTS (2021). **7** LIGHTHOUSE WEST TOWER (2020).
PHOTOS 4-7 HOFFMANN HAYES

7

CINDI L. ROWAN

THE NIGHT SHIFT

While we sleep, nocturnal pollinators keep the world turning

> FR_LP+
LE QUART DE NUIT
Pendant que nous dormons, les pollinisateurs nocturnes font tourner le monde

AS NIGHT FALLS and most of us settle into rest, the world quietly transforms. Unnoticed by human eyes, a dedicated workforce of nocturnal pollinators emerges, tirelessly maintaining the delicate ecological balance essential for biodiversity and our food supply. Among these silent heroes, moths lead an ensemble of night-active pollinators – bats, beetles, flies, birds and even rodents – that together represent an invaluable yet often overlooked aspect of our natural capital.

Historically, pollinator conservation has primarily spotlighted daytime species like bees and butterflies. Yet, recent research increasingly reveals that the creatures working the "night shift" are equally vital. It's time for landscape architects, planners and conservationists to broaden their focus, recognizing the critical role nocturnal pollinators play in sustaining ecosystems and economies around the globe.

Moths: Stars of the Night

Moths are remarkable yet underappreciated pollinators. Emerging after dusk, these nocturnal insects diligently pollinate numerous crops such as apples, strawberries and blueberries, as well as countless wildflowers and native plants. Studies from the UK and Canada demonstrate that moths may account for up to one-third of all pollinator visits in certain ecosystems, highlighting their significant ecological contributions (wired.com, pmc.ncbi.nlm.nih.gov).

Economically, the contribution of nocturnal pollinators – especially moths – is striking. A global meta-analysis from 2025 found that in 90% of 139 plant species studied, nighttime pollination was equally effective as daytime efforts, underscoring their importance (phys.org, agriculture.canada.ca). In the U.S., pollination by moths and other nocturnal insects significantly contributes to an annual valuation of approximately US $3.44 billion for non-honeybee insect pollination. Worldwide, insect pollination, including substantial contributions from nocturnal species, supports global agriculture valued between US $235 billion to $577 billion annually.

Despite their clear value, moth populations face alarming declines. In the UK alone, moth populations have dropped by about 33% over the past 50 years due to habitat loss, pesticide use, climate change and artificial light at night (wired.com, en.wikipedia.org). These pressures jeopardize not only moth populations but the broader ecosystems dependent on their nocturnal activities.

Moths possess unique adaptations tailored to their nocturnal role. For instance, the elephant hawk moth has specialized night-color vision, enabling it to effectively locate pale, fragrant, night-blooming flowers – a beautiful example of plant-pollinator co-evolution (en.wikipedia.org). Protecting moth habitats by reducing artificial lighting and promoting moth-friendly native plantings is essential to support their critical ecological roles.

Canadian Context: A Local Night Shift

In Canada, research from British Columbia confirms moths' critical roles in pollinating economically significant crops such as blueberries and strawberries (piee-lab.landfood.ubc.ca, wiki.ubc.ca). On the Prairies, nocturnal moths and flies help pollinate key crops such as canola – a crop valued at billions of dollars annually – as well as native wildflowers. However, development and human activities increasingly threaten these nocturnal pollinators and the valuable services they provide.

Though detailed economic assessments remain limited, initial estimates suggest nocturnal pollinators contribute tens to hundreds of millions of dollars annually to Canadian agriculture, underscoring their significance as essential natural capital assets worthy of urgent conservation action.

Beetles and Flies: Unsung Nighttime Allies

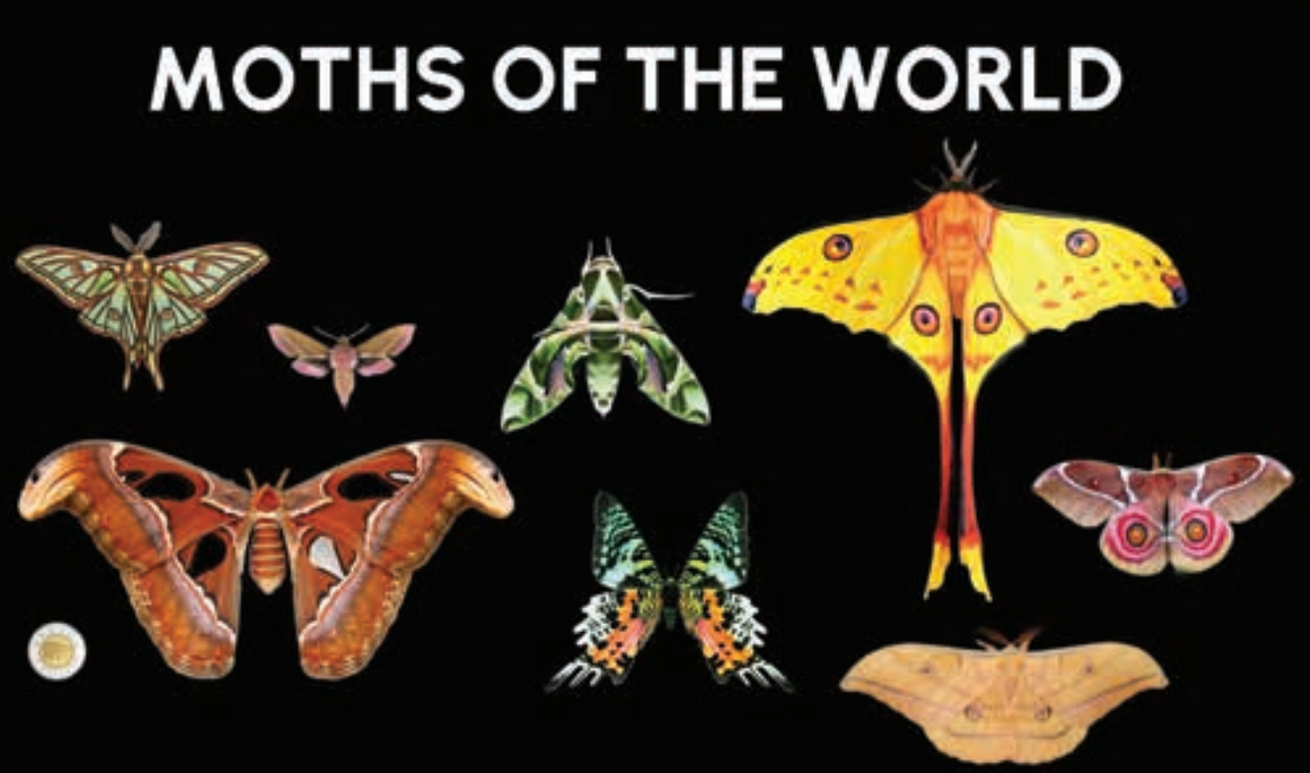
Although less visible, beetles and flies also significantly contribute to nighttime pollination. Beetles frequently pollinate ancient plant groups, such as magnolias and water lilies, while nocturnal flies support diverse plant communities, particularly in cooler climates. These insects enhance the resilience and connectivity of pollination networks, strengthening overall ecosystem robustness and modularity (nature.com).

Bats and Other Vertebrate Pollinators

Bats also provide essential nocturnal pollination services. Worldwide, bats pollinate over 500 plant species, including economically crucial crops such as agave (valued at approximately US $195 million annually) and durian (a market worth

1 MOTHS OF CANADA. **2** MOTHS OF THE WORLD.
ALL IMAGES FORREC DESIGN, MODELLING AND IMAGERY WITH AI-ASSISTED RENDERING.

Top Row: Rosy Maple Moth, Io Moth, Luna Moth, Great Tiger Moth, Isabella Tiger Moth.
Middle Row: Cecropia Moth, Giant Leopard Moth, Virgin Tiger Moth, White-Fringed Emerald Moth, Regal Hickory Moth.
Bottom Row: Twin-Spotted Sphynx, Polyphemus Moth, Hummingbird Moth.



Top Row: Spanish Moon Moth, Elephant Hawk Moth, Oleander Moth, Madagascan Comet Moth, Isabella Tiger Moth.
Bottom Row: Giant Atlas Moth, Madagascan Sunset Moth, Japanese Silk Moth, Bullseye Moth.

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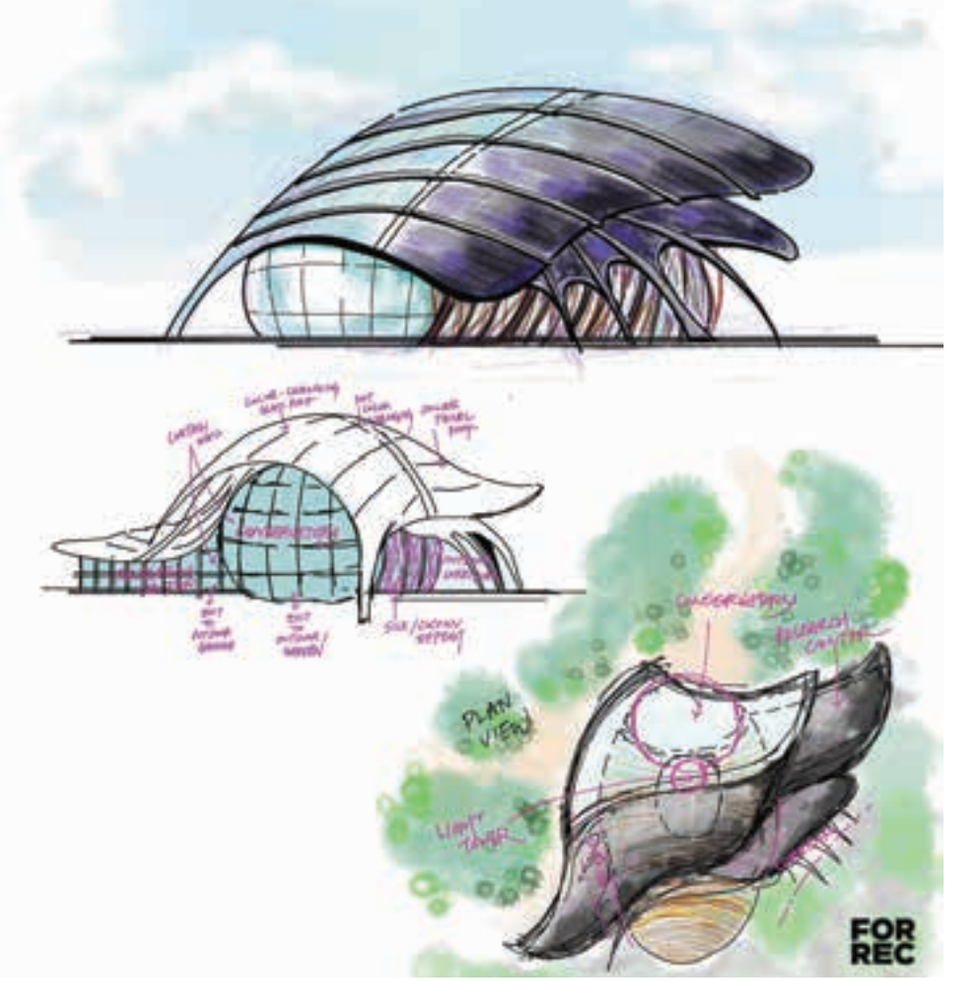
A global meta-analysis from 2025 found that in 90% of 139 plant species studied, nighttime pollination was equally effective as daytime efforts, underscoring their importance.

US $17.6 billion annually). Additionally, bats' nocturnal hunting substantially benefits agriculture by controlling pests, saving farmers between US $3.7 billion and $53 billion annually through reduced pesticide use and improved crop yields.

Rodents and nocturnal birds fulfill specialized pollination roles as well, particularly in niche ecosystems. For example, rodents are primary pollinators for certain ground-flowering bulbs like South Africa's Massonia depressa, illustrating the unique ecological niches occupied by these vertebrates.



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Natural Capital: An Investment in the Future

Protecting nocturnal pollinators safeguards biodiversity, economic stability, and food security. Recognizing their roles and addressing threats through thoughtful landscape design and conservation practices can significantly bolster ecosystem resilience.

Landscape architects in Canada and globally are uniquely positioned – and have a critical responsibility – to champion nocturnal pollinator conservation. Practical strategies include selecting native, night-blooming plants, minimizing artificial nighttime lighting and creating diverse habitats that actively support nocturnal biodiversity.

By acknowledging and supporting the night shift of pollinators, we ensure a thriving natural world that never truly sleeps.

Designing for Nocturnal Pollinators – A Landscape Architect's Responsibility

Moths are among the most diverse and enchanting creatures in the insect world, with more than 160,000 known species – far outnumbering their more celebrated butterfly relatives. Often cloaked in velvet hues, with wings that shimmer in moonlight, moths are essential players in nighttime ecosystems. Their extraordinary range of sizes, shapes and ecological niches makes them a symbol of nature's quiet resilience – and an urgent conservation priority.

Landscape architects are uniquely positioned to support these unsung heroes. First, we can raise awareness of the vital role moths and other nocturnal pollinators play in global food systems, biodiversity, and ecosystem health – sharing this knowledge through interpretive signage, public education and design storytelling. Second, we can actively protect these species by reducing artificial light pollution in our landscapes, advocating for native night-blooming plants and preserving habitat corridors that allow nocturnal pollinators to move safely through urban and rural areas.

Finally, designing for nocturnal pollinators means embracing a new design ethic – one that privileges sensory nuance and ecological sensitivity. Gardens and landscapes can be structured to invite nighttime life by incorporating several key strategies:

- **Plant Selection:** Choose native species that bloom at dusk or remain open through the night. Prioritize pale-colored, highly fragrant flowers – such as evening primrose, yucca, or phlox – that attract moths and bats.
- **Habitat Diversity:** Include layered plantings with tall grasses, shrubs and trees that provide shelter, larval food sources and foraging continuity. Avoid over-manicuring; moths often rely on "messy" edges.
- **Lighting Design:** Reduce or eliminate unnecessary lighting. Where lighting is essential, use shielded, low-intensity, warm-spectrum fixtures directed downward to minimize skyglow and disruption to nocturnal navigation.
- **Materials and Microclimate:** Incorporate textured and absorbent surfaces (like bark mulch or stone) to moderate temperature and humidity – factors that influence nocturnal insect activity.
- **Connectivity:** Design with movement in mind. Ensure pollinator corridors link open spaces, allowing safe passage between habitats across fragmented landscapes.

3 FORREC SKETCH DEVELOPMENT OF A PROTOTYPE MOTH GARDEN CONSERVATORY BASED ON THE EMERGENCE OF A MOTH FROM ITS COCOON **4** FINAL RENDERING OF THE MOTH CONSERVATORY WITH ARCHITECTURAL AND LANDSCAPE DESIGN.
ALL IMAGES FORREC

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- **Reduce Pesticide Use and Exposure:** Pesticides pose a major threat to moths and other nocturnal pollinators, particularly broad-spectrum insecticides and systemic chemicals like neonicotinoids. These substances can disrupt foraging behavior, damage nervous systems and kill non-target insects that visit treated plants at night. Landscape architects can help protect these pollinators by sourcing plants that have not been pre-treated with pesticides, advocating for organic and pollinator-safe maintenance practices and promoting integrated pest management (IPM) strategies that prioritize ecosystem health over chemical control. Designing landscapes that support predator species – birds, bats, and beneficial insects – can also naturally reduce pest populations without harming pollinators.

Through these intentional and poetic gestures, landscape architects can reveal the hidden vibrancy of night and help restore the ecological functions that thrive after dark.

The Enchanted Moth Pavilion: A Creative Innovation Lab Concept

As part of FORREC's inaugural Creative Innovation Lab, Cindi Rowan, Director of the FORREC Landscape Architecture studio, collaborated with landscape architects, architects and designers to imagine a Night Pollinator Attraction that would enchant visitors while addressing an urgent ecological story. The *Enchanted Moth Pavilion* – one of three speculative projects developed under the direction of FORREC's Director of Graphic Design, Jessica Vitale – explores the overlooked beauty and ecological importance of moths, proposing a transformative alternative to the conventional butterfly house.

Set within a dramatic glass atrium beneath the night sky, the concept imagines an immersive nocturnal environment where vibrant moths swirl around glowing columns, cascading vines, and beds of fragrant night-blooming flowers. Unlike butterflies, moths are drawn to light – a phenomenon that becomes a central design motif. Moving LED light sources guide the flight paths of moths, creating an ever-shifting, shimmering sculpture of light and motion. As light plays off the glass walls and reflective surfaces, visitors find themselves surrounded by living choreography.

The pavilion's educational layers are equally compelling. Interactive displays follow the moth's life cycle from egg to cocoon to adult, with live cocoons hatching daily. Research from Professor Fiona Mathews of the University of Sussex underscores the ecological urgency: moths pollinate at a faster rate than many day-flying insects, yet their populations are in steep decline.

While many butterfly pavilions include some moth species, this concept calls for deeper research and innovation to safely and sustainably support the diversity of moths in a controlled environment. The pavilion promotes planting for nocturnal pollinators – just as butterfly gardens have done for daytime species – and urges visitors to consider the hidden value of these delicate, often-misunderstood insects. The result is a multisensory journey that is as magical as it is meaningful – an invitation to rediscover the night. **LP**

FORREC *is a Toronto-based multidisciplinary design firm specializing in the creation of public spaces, gardens, and custom attractions that balance experiential design with environmental sensitivity. With a portfolio that spans urban parks, natural areas, and cultural destinations, FORREC brings together landscape architects, architects, and designers to craft places that engage communities and respond to their ecological and cultural contexts.*

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ZINA FRASER

GROWING PROFIT: LESSONS FROM THE TREE NURSERY

> FR_LP+
CROISSANCE DES BÉNÉFICES : LES LEÇONS DE LA PÉPINIÈRE

IN THE FALL of 2023, while working in London, UK, I took an office trip to Bruns Nursery in Bad Zwischenahn, a village in northern Germany. The site expands across nearly 1500 acres of rolling, misty countryside filled with long rows of container trees, sweeps of groundcover and even a large rhododendron park that is dedicated to plant research and habitat preservation. This nursery supplies high-profile projects across continental Europe and the UK, including the iconic plane trees that line the Champs-Elysees in Paris. In 2014, they supplied a 12m tall Pin Oak to Pancras Square in London, which was transported by road from Germany, accompanied by a police escort.

The tree was 63 years old at the time it was transplanted, meaning it would have been planted in Germany in the early 1950s. It sold for tens of thousands of euros. When we arrived at the nursery, we were welcomed by the grandson of the man who would have planted that seed. He explained to us that the business model of the nursery is most successful when it is family-run because it requires continual investment in the next generation. You have to literally sow seeds whose harvest will be reaped by someone else.

The nursery business embodies the concept of Natural Capital Accounting at its simplest: it attributes economic value to natural assets. The rows of liquidambar and rhododendron fluttering in the wind at Bruns Nursery are each listed in a catalogue alongside specific prices. On the one hand, they are beautiful to look at as the light filters through the branches. We can sit in their shade, and a bumblebee might dip in and out of the blooms as a stop on its daily flight. On the other hand, they also sequester specific amounts of carbon, provide aesthetic value to amenity spaces adjacent to commercial retail units, and impact on-site water retention requirements. The combination of many factors, experiential and quantifiable, come together when we decide to plant a tree.

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1 12M HIGH PIN OAK BEING INSTALLED AT TURNHALLE SQUARE, KING'S CROSS. **2** PIN OAK GROWING AT BRUNS NURSERY. **3** RHODODENDRON PARK AT BRUNS NURSERY. **4** CONTAINER PLANTS AT BRUNS NURSERY. **5** SHRUBS AT BRUNS NURSERY.
PHOTOS 1 KING'S CROSS GROUP LIMITED PARTNERSHIP **2-4** BRUNS NURSERY **5** PHOTO BY AUTHOR

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The international success that Bruns Nursery enjoys today is only possible because several generations ago, someone decided to set in motion a business that would benefit his grandchildren more than himself.

But when it comes to justifying the price, we focus on the latter.

The example of the nursery highlights both the benefits and the limitations of attributing economic value to elements of the ecological world. The international success that Bruns Nursery enjoys today is only possible because several generations ago, someone decided to set in motion a business that would benefit his grandchildren more than himself. The motivation had to have been more than economic – otherwise, he could have sold all the trees when they were just a few years or a couple of decades old, or sold the land itself. There was something more than capital value at play – a dream for the future, the vision of a grandchild tending to a larger tree, of the financial stability of future generations. And this investment in someone else's future allowed a tree to grow for many decades so that it was available when a landscape architect wanted to inject inner-city London with a tree that would provide an incredible sense of place, a haven of shade, and the exceptionally rich habitat associated with oak species. Today, the current business owners continue to invest in someone else's future as they tend to the nursery and allow free entry into their rhododendron park.

The timeframes considered for the kinds of projects landscape architects work on vary considerably, depending on scale and scope. For a smaller private development, planning processes might just project ahead a handful of years. Even most comprehensive plans for municipalities only forecast a few decades. These kinds of timeframes limit the monetary value that can be placed on a tree. On the timescale of decades, you can certainly see a return on your investment in planting trees that will frame out commercial retail units and create beautiful spill out spaces, but could you justify leaving space for a tree to grow into something your grandchildren can sit under? Sowing a seed from which we will reap value in 100 years when a blight strikes and the younger trees are all killed, and only the oldest mother trees have the wisdom to carry the species forward?

Ecological agents grow and gain value of many kinds over time, but the timelines across which they operate are much longer than human economic cycles. The trees at Bruns Nursery are just one example – a wetland, a forest or a shoreline have much longer lifespans. The project of attributing monetary value to the natural world requires choosing a length of time over which to calculate returns. This choice forces everyone involved to reckon with their personal view of how we are connected to the people who came before us and what we owe the generations that come after us. **LP**

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MANZURE YARI

THE ULTIMATUM FOR CARBON – AN INTERVIEW WITH NENO KOVACEVIC

> FR_LP+
L'ULTIMATUM DU CARBONE
Entretien avec Neno Kovacevic

1 DAVID CROMBIE PARK, TORONTO, CANADA. **2** DYNAMIC CARBON MODEL WORKFLOW CHART. **3** DAVID CROMBIE PARK CARBON BALANCE CURVE (CONCEPT VERSUS TENDER STAGE). **4** FOUNTAIN AT DAVID CROMBIE PARK, TORONTO, CANADA.
IMAGES 1 RENDER BY NORM LI, DESIGN BY SLA, ARCADIS, TAWAW ARCHITECTURE COLLECTIVE. **2,3** ARCADIS. **4** RENDER BY SLA, DESIGN BY SLA, ARCADIS, TAWAW ARCHITECTURE COLLECTIVE

NENO KOVACEVIC, OALA, FCSLA, Principal and Practice Group Manager of the Placemaking team at Arcadis, Toronto, has spent years tackling the challenges of decarbonizing landscape design. His efforts led to the creation of the Dynamic Carbon Model (DCM), an innovative parametric tool that quantifies, in real time, the carbon footprint of construction material on one side and carbon sequestration of plants and soil on the other side throughout the design process. By integrating material life cycle assessments (LCAs) and environmental product declarations (EPDs), the DCM enables early-stage assessments, allowing designers to make informed choices about materials, construction methods and nature-based solutions to achieve sustainability goals. This approach has already proven impactful, as seen in the David Crombie Park Revitalization project, which is on-track to achieve carbon neutrality within 13 years.

Beyond the DCM, Neno continues to push boundaries in sustainable design, embracing rewilding and nature-based solutions as a key focus for Arcadis Placemaking practice in achieving carbon positive future.

In this interview, Neno reflects on his 30-year career, his innovative methodologies and his vision for addressing carbon and urban resilience in the evolving landscape architecture profession.

Q: What/ when was a turning point for you to start looking into decarbonizing landscape architecture?

NK: Seven to eight years ago, we were working on a competition in Seoul, Korea (Gukhoe-Daero Park), envisioning the transformation of an existing highway into a linear park – our goal was to establish Key Performance Indicators (KPIs) that would measure both the impact of design decisions and the human benefits of certain design moves. As we explored and gathered data, we developed two clusters of KPIs that remain relevant throughout our research and design process: one focusing on carbon footprint and the other on carbon sequestration and the impact of design on social, mental, and physical health. At that time, the only aspects missing were community and economic benefits.

Two years later, we completed a pilot tool for embodied carbon, which we began using on several projects.

Q: Can you give us a brief overview of the methodologies that underpin the DCM's operation?

NK: The embodied carbon of a project is calculated by subtracting the amount of carbon sequestered – based on existing and proposed planting – from the total footprint of construction material used.

The Dynamic Carbon Model tool itself is set up in Grasshopper and Python to extract information from various open-sourced databases and calculate the embodied carbon within a project's landscape scope of work.

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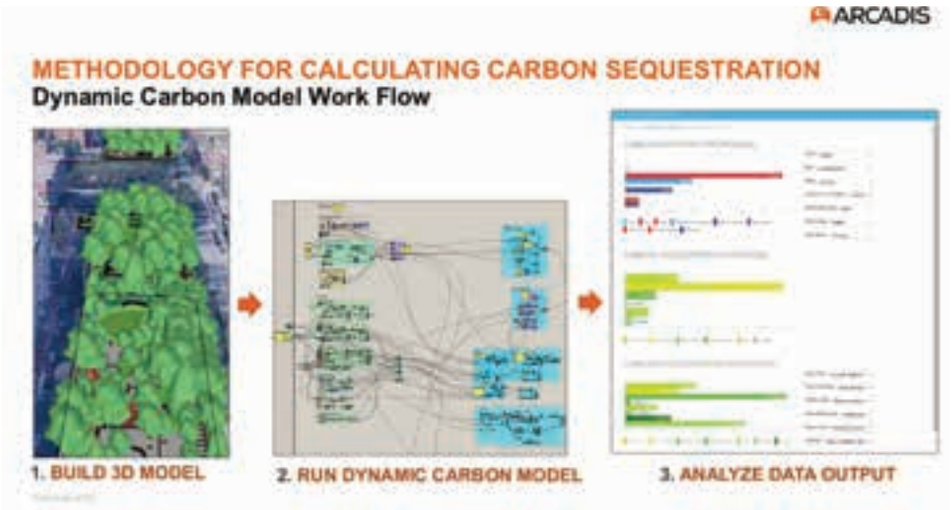
Data for carbon footprint of various material is sourced from Building Transparency (formerly EC3) and locally obtained Environmental Product Declaration (EPD) sheets. For carbon sequestration, in addition to calculating biomass, we use benchmarking data from the USDA Forest Service.

Our database is constantly updated with the latest research; for instance, a study by Oxford University highlights the Tulip Tree, native to Eastern Canada and the US, as having exceptional carbon sequestration capabilities, absorbing ninety-eight kilograms of CO_2 annually.

Furthermore, to better understand how tree biomass impacts carbon sequestration, we have developed an internal database that references the USDA Forest Service Tree Databases. Using non-linear regression modeling, this database allows us to model the carbon sequestration capabilities of specific tree species at any given age. This has enabled us to identify the best-fit tree species for projects based on specific carbon targets and design parameters.

Q: What would you say distinguishes the Dynamic Carbon Model (DCM) from other carbon accounting tools currently available?

NK: Currently, there are many available tools, such as One Click LCA, COVE, and EC3, that measure embodied carbon in construction materials. But, these tools often overlook landscape-specific considerations, such as vegetation, soil impacts and biodiversity. Pathfinder is also a great tool for landscape architects in the early stages of design. Our Dynamic Carbon Model (DCM), on the other hand, provides a much more focused analysis for calculating avoided carbon and carbon sequestration for both existing and proposed vegetation and soils.



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Q: Can you be more specific on how the DCM is tailored for landscape architects' everyday work?

NK: First and foremost, the DCM tool encourages landscape architects to test

the impact of different design options, calculate avoided carbon, preserve, restore and avoid emission and to calculate the impact of nature-based design. Second, DCM is designed to be an interactive tool that allows designers to experiment with various approaches and material, educate clients and instantly assess impacts by comparing different options, such as the carbon impact of proposing a concrete pathway versus a crushed stone one.

The DCM can utilize data from arborist reports, which is a requirement for most projects today, to perform reverse engineering by calculating the biomass of all existing trees, which can then be used to calculate carbon sequestration. This enables pinpointing carbon sequestration for year one, when the arborist report is taken, and predicting potential carbon sequestration for each subsequent year. With these capabilities, we can determine when a project will become carbon neutral by tracking species-specific tree carbon sequestration across all growth stages. The DCM enables landscape architects to calculate and offset embodied carbon and fine-tune designs to maximize the carbon-positive timeline for the project at hand.

Q: Learning from DCM's applications on past projects, what elements would you say are essential to carbon sequestration capacities of a design?

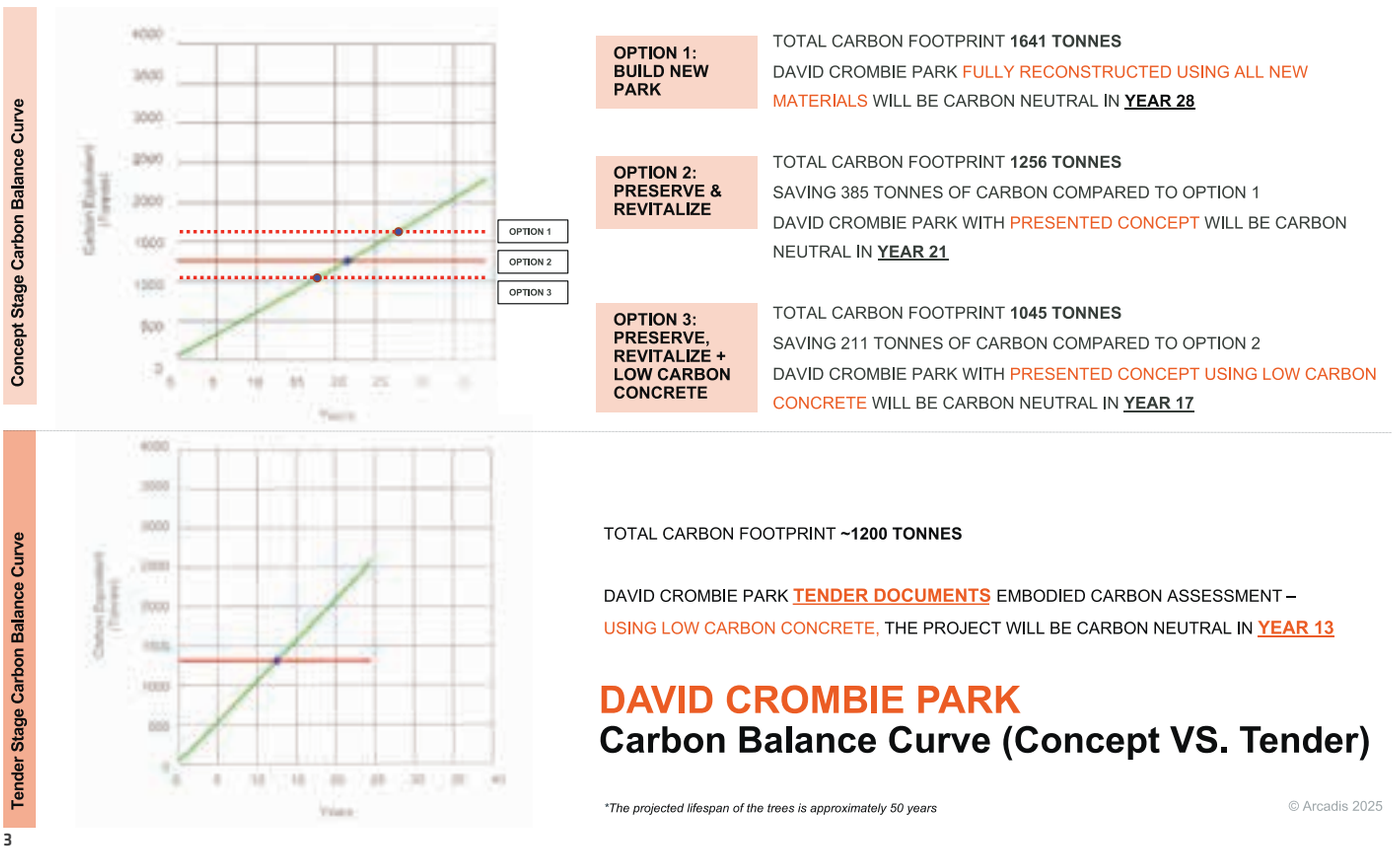
NK: I would say that soil and plant biomass play critical role in the overall Carbon Sequestration capacities of any design. Soil sequesters and store carbon through a process known as soil organic carbon (SOC) accumulation, which is closely tied to plant biomass. Plants absorb carbon dioxide (CO_2) from the atmosphere during photosynthesis, converting it into plant biomass – roots, stems, leaves and other organic material. As plants grow and shed biomass, organic matter is transferred to the soil, where it decomposes and interacts with microorganisms. These microorganisms break down the organic material, transforming it into stable carbon compounds that can remain stored in the soil for decades or even centuries.

Healthy soils, particularly those enriched by diverse plant biomass, act as powerful carbon sinks, reducing greenhouse gas concentrations in the atmosphere. In fact, soil is one of the largest carbon sinks on Earth, and it plays a critical role in regulating climate by sequestering carbon through organic matter accumulation and reducing greenhouse gas emissions when managed sustainably. Aside from sustaining plant growth, healthy soils also support many more organisms, such as fungi, bacteria, actinomycetes, soil fauna, protist and algae, which are all essential elements for cycling nutrients, biodiversity and food production.

In the case of David Crombie Park Revitalization for example, we estimate that over 70% of the total carbon storage is below ground, under the existing and proposed planting material.

Q: Can you further elaborate on the significance of SOC in carbon sequestration and ways to minimize impact on soil?

NK: Landscape architects are often very much focused on plants and overlook the fact that only healthy soils can sustain and provide for healthy plant growth, as well as the fact that carbon cycle is directly related to soil sequestration and climate as a whole. This realization led us to incorporate Soil Organic Carbon (SOC) within DCM for two reasons, first to educate clients and landscape architect on how important it is not to disturb soils, which is often largely neglected within the profession; and



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second to encourage professionals to invest in researching on how to do things differently. We strongly believe there is no other tool that can accomplish this and the importance of this issue should be a top priority for landscape architects.

In conventional practice, landscape architects are asked by many municipalities to achieve soil volume requirements – for example, Toronto mandates 30 cubic metres of soil per tree. To meet this requirement, 30 cubic metres (or more) of existing soil must be excavated and disposed of, and then an additional 30 cubic metres of fresh topsoil must be imported and placed. Excavating soils releases stored carbon, which has a significant impact on the carbon cycle. For 10 trees in a streetscape condition, the excavation, disposal, soil replacement, transportation and installation can create a carbon footprint ranging from 10 to 40 tons of carbon. The lesson learned from this being – it is far more environmentally friendly to amend the soils rather than excavate, dispose, replace and install new soil. Approximately 70% of the carbon footprint from this process is attributed to transportation and excavation.

Q: Reflecting on these lessons, how do you envision the role of landscape architects in contributing to a CLIMATE POSITIVE future?

NK: Our profession is already making significant strides globally, yet I believe there are a few simple steps we can take to elevate our impact and accelerate our progress toward a climate-positive future:

Remain Humble and Respectful Stewards of the Land – We should always approach our work with humility and respect for nature, acknowledging that natural systems often function optimally without human interference. By listening to and learning from the land, we can design spaces that complement rather than dominate the natural environment.

Advocate for a "Rewild or Do Nothing" Approach – Embracing the philosophy of rewilding involves allowing nature to take its course, minimizing human intervention. By creating conditions for ecosystems to thrive naturally, we can encourage processes that enhance biodiversity and carbon sequestration. This approach advocates for setting aside areas where nature can regenerate independently, reducing human impact and supporting natural carbon sequestration mechanisms.

Take Every Measure to Maximize Rewilding and Minimize Hardscape in Design – Designing landscapes that prioritize rewilding while minimizing hardscape is crucial for reducing carbon footprints. By limiting impervious surfaces and integrating green infrastructure, we create spaces that support natural processes such as water infiltration and carbon sequestration effortlessly.

Always Prioritize Repair and Renovate – Preserve and integrate the functional elements of an existing site into the new design as much as possible. We need to work with what already thrives, minimizing unnecessary disruptions and focus efforts on repairing degraded areas to enhance safety and functionality while also restoring ecological functions. If you get to work with an existing site, the focus should be on reducing waste, conserving resources and fostering a harmonious balance between the existing and the proposed elements of the site.

If to Build, Build with Low Carbon Materials – When building new is necessary, we can make significant contributions by choosing low-carbon materials that minimize environmental impact. This involves selecting sustainable, locally sourced, and recyclable materials that reduce emissions associated with construction. Incorporating innovative building technologies and materials that have minimal carbon footprints can help ensure that new developments contribute positively to climate goals.

Q: Looking ahead, what are your aspirations for the further development of DCM – How do you see it evolving to address new challenges or opportunities in designing for a resilient future?

NK: We have made significant progress with the Dynamic Carbon Model (DCM) since its conception – to note a few ongoing efforts, the team is partnering with Center for Built Environment UC Berkeley while concurrently advancing discussion with Autodesk. With that said, one aspect that remains underrepresented is biodiversity, a crucial component of ecosystem services. Our team is currently researching and evaluating available tools, such as the Biodiversity Net Gain (BNG) and Urban Greening Factor tools used in the UK. By integrating these insights with the existing database within our DCM tool, along with plant lists from past projects and their roles in habitat creation, we aim to develop a comprehensive tool that assesses habitat quality, species richness, and other ecosystem services, alongside carbon sequestration and material impact. **LP**

Manzure Yari, *BLA, MUD, OALA, CSLA, is a landscape architect and urban designer with Arcadis. As a key member of the Placemaking team in Toronto, she is recognized for her analytical rigor, nuanced design sensibility, and ability to foster meaningful collaboration across disciplines. She approaches every project with a deep understanding of people, place, and the environment, aiming to develop holistic solutions that prioritize ecological integrity while supporting vibrant communities.*

SONJA VANGJELI

RAVINE RECONNECT:

Restoring landscape connectivity in a growing metropolis

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RECONNEXION DU RAVIN : RESTAURER LA CONNECTIVITÉ PAYSAGÈRE DANS UNE MÉTROPOLE EN PLEINE CROISSANCE

TORONTO'S RAVINE PARKS are arguably the city's most valuable assets. As part of a broader watershed parks system, they connect the Greenbelt to the Waterfront through a network of green-blue ecological corridors and trails. They offer diverse experiences of nature across the city's neighborhoods, and continue to shape its evolving identity. The ravines have sustained Toronto through its transformation from a colonial town founded at the outlet of the Don River to North America's fastest-growing city of three million and rising.

How do we value Toronto's ravine park system in the context of this growing Metropolitan region? Can we account for all the ecosystem services – biodiversity, flood mitigation, air quality, public health benefits, aesthetic beauty and added real estate value to adjacent neighborhoods? While economic valuation methodologies could price the replacement value of climate risk mitigation and infrastructural services these natural assets provide, is it right to equate them with a dollar value?

On one hand, it is helpful to express their value in the common currency of our transactional world. As with infrastructure, natural capital is increasingly being monetized by municipalities as part of asset management. On the other hand, Indigenous communities and conservationists argue for attributing personhood to natural features and seeing them as relations, not economic resources or assets. The ravines are irreplaceable and have intrinsic value that cannot be captured in monetary terms, but understood qualitatively and instinctively. How can you price the feeling of descending into the refreshing shade of a deep forest canopy below the level of busy urban streets, following the sound of a flowing stream through a colourful wonderland of fall foliage, without even having to drive north (Fig.1)? As Prime Minister Mark Carney argues in his book *Values*, just because we *can* price something does not mean we should.[1] Monetization risks turning irreplaceable assets into expendable ones.

Initially serving as ecological corridors facilitating mobility of Indigenous peoples through the area, the city's rivers and ravines disrupted the grid of the early colonial settlement. Over the years of urban growth and infrastructural expansion, the ravines became incrementally disrupted by rail, highways, roads and utilities, and many were buried underground in pipes to make way for development. The distributed ravine park system that remains today is due to a legacy of progressive planning, conservation and community advocacy, which has protected the land in public ownership and conserved and restored sensitive habitats and biodiversity through collaboration by the City of Toronto and Toronto Region Conservation Authority (TRCA). The fortuitous timing of Hurricane Hazel in the 1950s catalyzed the establishment of conservation authorities such as TRCA, which own, maintain, restore and monitor most of the region's

1 EAST DON RIVER RAVINE PARK IN THE FALL.
2 RAVINE PARKS SYSTEM PRIORITY AND GAP AREAS MAP. **3** 2025 10-YEAR CAPITAL BUDGET ALLOCATION.
IMAGES 1 SONJA VANGJELI **2** ANDREW TAYLOR + SONJA VANGJELI **3** CITY OF TORONTO 2025 BUDGET PRESENTATION

2

waterways and floodplains, and have played a key role in ravine conservation.

Yet, the system remains fragmented by urban infrastructure and private land uses. It needs ongoing restoration and connectivity work to ensure it can thrive ecologically and deliver ecosystem services, climate resilience and experiences of urban nature to Toronto's neighborhoods. As the city's natural drainage channels, many ravines need slope stabilization, erosion mitigation, ecological restoration and invasive species control. Gap areas at major transportation infrastructures, utility corridors, roads and private properties such as golf courses require creative solutions to achieve trail continuity, safe crossings and ecological passages for wildlife. Access to the ravines and their environmental and health benefits is not distributed equally, and efforts are being made to invest in priority neighborhoods to address equity.

Ravine Strategy

The Ravine Strategy, approved in 2017, is currently in implementation by the City and TRCA. Its Implementation Plan identified $104.9M of needed capital improvements in 10 priority areas selected through weighted analysis of multiple criteria: ecological significance and vulnerability, infrastructure maintenance, intensification and growth, and access to parks and green space. While this has been a significant step forward toward actionable restoration and connectivity work, implementation funding has been minimal to date; about 75% of the projects remain unfunded. The limited annual funding is stretched between educational programming, ecological stewardship and capital. As a result, capital projects rely on a constellation of federal grants and partnerships with other divisions, as well as philanthropic contributions, which require greater efforts to manage and are not continuously available. *A more significant and stable dedicated annual budget is needed to advance Ravine Strategy work at a pace and scale appropriate to the value of the system.*

The city's parks and tree canopy provide us with an estimated $7.7B annually in ecosystem services such as stormwater management, carbon sequestration and air quality [3, p.3], but like other infrastructure, they need investment in restoration and maintenance to function. The recently published 2025 Corporate Asset Management Plan estimates the replacement value of the services provided by the city's assets and assesses their condition and level of service. It seems to underestimate Natural Environment Services, estimated at $9.5B, relative to Water ($93.3B) and Transportation Infrastructure ($67B), yet shows a shortfall of annual investment required to maintain and improve the level of service for Forest Management [5, p.29]. From the City's overall capital budget allocations, a small portion goes to natural environment work, relative to hard infrastructure (Fig.3) [6, p.28]. Of that, about $45M of the Parks budget, including grants, has been allocated to Ravine Strategy implementation over the next 10 years [4, p.1]. *The natural heritage and parks system disproportionally over-delivers in services for the investment it receives in return.*

2025-2034 Capital Plan

3

Supporting the Potential

Leveraging natural infrastructure grants and partnerships, progress has been made over the past few years with implemented projects such as the East Don, Upper Highland Creek, Don Valley Golf Course, and Duncan Creek Park. These projects have included streambank stabilization, stormwater management, and restoration planting, adding bridges, underpasses, trail improvements, wayfinding signage and seating nodes to enhance the pedestrian experience and accessibility to all users. However, there is still a lot more work to do to address gap areas and opportunity sites, and greater investment is needed to implement the vision for the Loop Trail and the Meadoway to connect the Humber, the Don and Rouge National Urban Park (Fig.2).

To assist the City's efforts in realizing the potential of the Ravine Strategy, public and political support is needed to invest in the city's natural capital. A collective vision of the ravines as a city-wide natural infrastructure system, with tangible ideas for connectivity projects in key gap areas, could engage the community to advocate for implementation. Philanthropy could be strategically directed to gateway projects, and partnerships with adjacent land uses could expand and enhance the system.

Ravine Reconnect Project

Supported by an LACF Annual Grant, the Ravine Reconnect project seeks to cultivate a broader community of advocacy and stewardship for landscape connectivity projects, coordinating with existing initiatives, and building on the City and TRCA's Ravine Strategy work to amplify its impact. With this online ***ArcGIS Story Map (QR code)*** it aims to raise awareness of the value and potential of our neighborhood ravine parks as part of a greater Regional Parks System for the future of our city and Greater Golden Horseshoe region, seeking to inspire and involve the broader public in its realization. The project included a Multidisciplinary Urban Capstone Project course hosted by the University of Toronto School of Cities in 2024-5, engaging a group of undergraduate students from various disciplines in field observation, stakeholder engagement, strategic planning and visioning to improve physical and perceived connectivity with design interventions and wayfinding. Designed to be repeated, the course aims to build capacity by cultivating a new generation of advocates for our ravine system. Its ultimate goal is for the collective awareness and aggregation of many small actions, growing over time, to gradually realize the full potential of a thriving, connected, and accessible Metropolitan Park System (Fig.4).

How much we invest in our natural assets is a key indicator of how much we value them. Perhaps the greatest gift we can give to our ravine system is our time and attention.

4

Acknowledgements

The Ravine Reconnect project was made possible with funding from an Annual Grant from the Landscape Architecture Canada Foundation (LACF). The Story Map content was produced in consultation with Ruthanne Henry, Senior Project Manager at the City of Toronto Parks & Recreation, and with support from Andrew Taylor, Research Assistant. **LP**

References

1 Carney, Mark, Value(s): *Building a Better World for All.* Public Affairs, 2021.
2 Ravine Strategy. City of Toronto, 2017. www.toronto.ca/city-government/accountability-operations-customer-service/long-term-vision-plans-and-strategies/ravine-strategy/
3 2025 Budget Notes: Parks, Forestry & Recreation. City of Toronto, 2025. www.toronto.ca/legdocs/mmis/2025/bu/bgrd/backgroundfile-252540.pdf
4 2025 Capital Budget Briefing Note: Ravine Strategy & Meadoway. City of Toronto, 2025. www.toronto.ca/legdocs/mmis/2025/bu/bgrd/backgroundfile-252544.pdf
5 2025 Corporate Asset Management Plan. City of Toronto, 2025. www.toronto.ca/legdocs/mmis/2025/ex/bgrd/backgroundfile-255042.pdf
6 2025 Budget TO Budget Highlights Presentation. City of Toronto, 2025. www.toronto.ca/legdocs/mmis/2025/bu/bgrd/backgroundfile-252133.pdf

RAVINE RECONNECT
ARCGIS STORY MAP
https://arcg.is/1DCyOO2

4 REGIONAL PARK SYSTEM MAP
IMAGES SONJA VANGJELI
DATA SOURCES: ONTARIO DATA CATALOGUE

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JOANNA EYQUEM

GETTING NATURE INTO FINANCIAL REPORTING – MAKING IT REALLY COUNT

NATURE UNDERPINS CANADA'S economy, and we are lucky to have a wealth of natural assets. But those assets are currently largely absent from financial reports and, as a result, natural capital is often not taken seriously in economic decision-making.

By integrating nature into financial reporting, governments in Canada can plan for sustainable economic growth and get ahead of new international public sector accounting standards that are on the horizon.

And the good news is we already have a step-by-step guide on how to do it…

The guide, Getting Nature into Financial Reporting (scc-ccn.ca/resources/publications/getting-nature-financial-reporting-natural-assets-disclosures-local), supported by the Standards Council of Canada and co-authored by the Intact Centre on Climate Adaptation (University of Waterloo), KPMG LLP and Natural Assets Initiative, was developed with over 120 experts across the country. The guide outlines how governments of all sizes can start integrating nature into their financial reports today.

The need to account for nature

As landscape architects are well aware, natural assets – such as wetlands, rivers, forests and coastal dunes – are not just decoration. They are infrastructure that provides financially valuable services to Canadian communities. These services include soaking up and storing water to limit floods, cooling communities during heat waves and storing carbon to slow climate change.

The absence of natural assets from financial reporting often results in undocumented loss and degradation of critical services. Crown lands and natural resources that have not been purchased are currently excluded from recognition in financial statements in Canada according to accounting standards set by the Public Sector Accounting Board. However, the new guide demonstrates that nature can, and should, be integrated into other sections of the financial reports to accompany the financial statements, demonstrating effective management of these assets.

What are natural asset disclosures?

The guide is designed to support unaudited natural asset-related disclosures made by governments in their annual financial and sustainability reports from 2024 onwards (outside of the financial statements).

Natural asset disclosures can include both physical and monetary attributes. These attributes may relate to:

- Stocks of natural assets
- Flows in terms of ecosystem services that benefit people

Both stocks and flows can vary over time and these changes are an important part of disclosures.

The structure of the United Nations System of Environmental Economic Accounting – Ecosystem Accounts (UN SEEA-EA) provided a basis for the guide and is being used by the federal government to compile Canada's natural capital accounts (see Fig.1).

Assigning financial values to ecosystem services

Nature underpins healthy societies and resilient economies by providing ecosystem services to people. These services are financially valuable.

Ecosystem services may be valued using several well-developed techniques, grouped into three approaches: 1) direct market valuation, 2) revealed preference and 3) stated preference. A fourth category, the

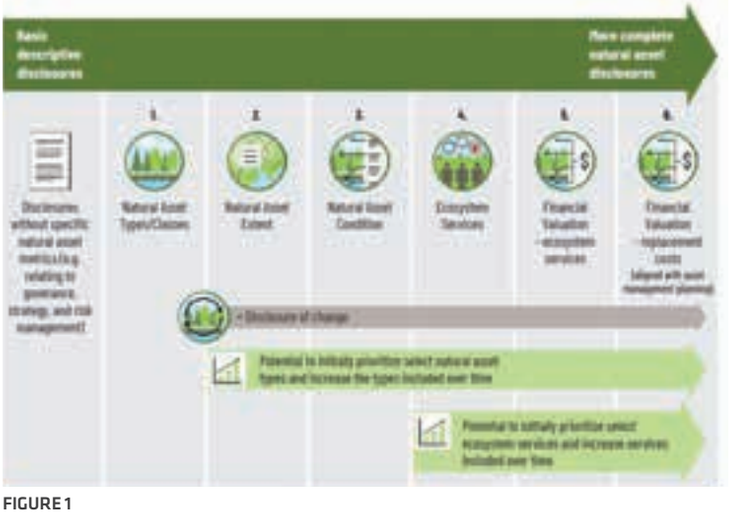

FIGURE 1

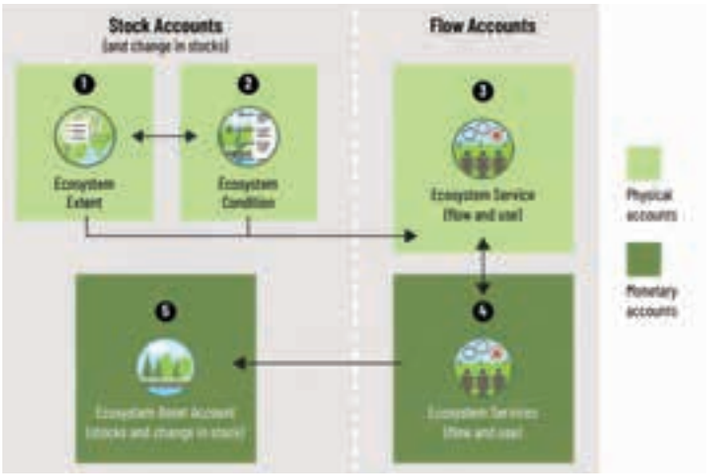

FIGURE 2

benefit-transfer (or value-transfer) method, involves applying the results from prior studies of a specific ecosystem service to a new area of interest. Each of these methods has its strengths and weaknesses, and most can only be applied to a subset of ecosystem services.

Standardization and practical guidance is under development on how to consistently calculate appropriate financial values for ecosystem services – but there is consensus that they exist, are tangible and can be determined.

Guidance on recommended disclosures

While there is significant amount of attention focused on valuation, financial values are only part of the recommended disclosures, which are:

- **Natural asset types and classes:** Identification of ecosystems, such as forests, wetlands and coastal dunes, on which the community depends for services.
- **Natural asset extent:** Detailed location data and spatial extent (including maps), and ownership distinctions between government-held and external assets.
- **Natural asset condition:** Assessment of the ecosystem composition, structure and function.
- **Ecosystem services:** Metrics outlining services provided (e.g., water storage), benefits to the community and associated dependencies.
- **Financial valuation:** Assignment of monetary value to services provided, as well as replacement costs.
- **Disclosure of change:** Changes in the above listed metrics against an established baseline.

For each of these disclosures, the guide suggests what information should be disclosed and highlights existing useful resources and considerations. This includes the existing National Standard of Canada for Specification for natural asset inventories, and the guide

Governments do not need to make a complete set of natural asset-related disclosures covering all of the elements identified at once.

The guide can be used to identify what disclosures can be made now, and incremental improvements that can be made towards more complete natural asset disclosures (illustrated in Fig.2). All governments can start somewhere.

Growing momentum across Canada and beyond

The good news is that local governments are stepping up, with over 160 communities working to identify, assess, value and better manage their natural assets. Forward-thinking communities, including major cities such as Toronto and Montreal, have already included information about natural assets in their financial reports. However, these disclosures are highly variable due to a lack of Canadian standards – a gap the new guide aims to fill.

The guide builds on international guidance and standards, including those from the United Nations, the Taskforce on Nature-related Financial Disclosures (TNFD), and the International Sustainability Standards Board (ISSB). The guide also anticipates new standards from the International Public Sector Accounting Standards Board (IPSASB) relating to "tangible natural resources," (www.ipsasb.org/publications/exposure-draft-ed-92-tangible-natural-resources) and potentially related standards from Canada's Public Sector Accounting Board (PSAB). The guide benefited greatly from insights provided by observers from both of these organizations.

Landscape architects have a key role to play

Landscape architects can actively support improved management and recognition of the value of natural assets. While policies towards reversing nature loss may be made at national and international levels, better local and project-level decision-making is critical to reverse nature loss on the ground.

Landscape architects can champion appropriate accounting for natural assets in several ways:

- Providing services that support inventory, condition assessment, identification and financial valuation of ecosystem services provided, particularly those related to social and cultural services.
- Including the value of existing natural assets and enhanced / restored natural assets in assessment (including economic assessment) of their alternative project design options.
- Encouraging inclusion of natural asset metrics in post-project operation and maintenance, and wider asset management planning.
- Raising awareness of available resources and standards, including the key resources referenced here.

Together we can make nature really count! **LP**

Référence

CSA Group. 2023. CSA W218:23 Specifications for natural asset inventories. National Standard of Canada. Accessed at: https://www.csagroup.org/store/product/2705376

Eyquem, J. L. 2024. Getting nature into financial reporting: Natural asset disclosures for local governments. Intact Centre on Climate Adaptation, University of Waterloo. Accessed at: https://scc-ccn.ca/system/files/2025-01/intactcentre_getting-nature-into-financial-reporting_jan2025_report.pdf

International Public Sector Accounting Standards Board (IPSASB). 2025. Natural Resources. Accessed at: https://www.ipsasb.org/consultations-projects/natural-resources

Natural Assets Initiative (NAI). 2024. Nature is infra-structure: How to include natural assets in asset management plans. Accessed at: https://natural-assetsinitiative.ca/wp-content/uploads/2024/04/NAI-NAM-guidance-docapril-2024.pdf

Statistics Canada. 2025. Census of Environment. Accessed at: https://www.statcan.gc.ca/en/census-environment

United Nations et al. 2024. Systems of Environmental Economic Accounting - Ecosystem Accounting. United Nations ST/ESA/STAT/SER.F/124. Accessed at: https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_f124_web_12dec24.pdf

A Song, a Story and a Poem for Winnipeg

REVIEWED BY RYAN WAKSHINSKI

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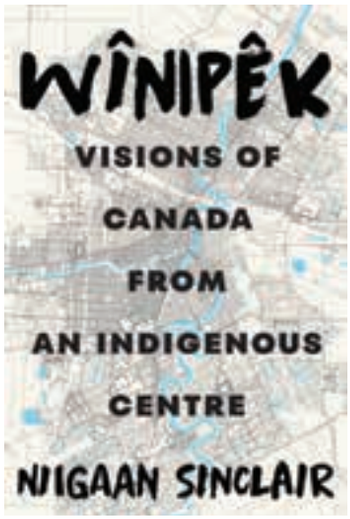


Wînipêk – Visions of Canada from an Indigenous Centre
Niigaan Sinclair

Published 2024
McLelland & Stewart

ON FRIDAY, JUNE 27, 2025, at the centre of Canada, Winnipeg's storied intersection of Portage and Main officially reopened to pedestrians after 46 years of debate over removing the concrete barricades and a very non-inclusive way to cross roughly 28 lanes of traffic. In modern city and urban planning terms, it was a "no brainer." But it took the realization that not opening things back up would be more expensive than keeping the intersection closed to make city hall overturn the 2018 plebiscite in which citizens voted against the reopening.

Winnipeg, it's complicated… As anyone who has read Niigaanwewidam (or Niigaan) Sinclair's book *Wînipêk – Visions of Canada from an Indigenous Centre,* would be able to tell you. This collection of short essays on the history and development of Canada's central city with a complex past is a must read for any landscape architect, or any Canadian for that matter, navigating the turbulent and sometimes muddy waters of Truth and Reconciliation. In many ways, while reconciliation remains a distant and uncertain goal at the end of our journey, this book provides a boat, paddle, sail and rudder to help you navigate the way to your destination.

Niigaan Sinclair is an Anishinaabe writer, editor and activist based in Winnipeg. Originally from Selkirk, MB, Sinclair is the son of judge and senator Murray Sinclair and is Head of the Department of Native Studies at the University of Manitoba where he holds the Faculty of Arts Professorship in Indigenous Knowledge and Aesthetics. He was a keynote speaker at the 2024 CSLA Congress in Winnipeg and will be guest editing the Spring 2026 issue of *Landscapes|Paysages* magazine.

Split into four parts – *The Land, This Place, Streets and Rivers and Gifts – Wînipêk* collates new musings with Sinclair's columns from the Winnipeg Free Press from 2018 to 2023, providing an in-depth investigation of the geological, hydrological and sociological history of the city. A city that started as an Indigenous meeting place at the confluence of two rivers over 700 years ago, where a meeting of 10,000 people from nine Indigenous nations and all four directions led to a consensus – imagine achieving consensus among 10,000 "X" users today, let alone meeting in person? The book delves into how the meeting of Indigenous and Western European cultures led to years of conflicts and controversies that are still being resolved. As he writes, in his folksy, relatable, yet cuttingly truthful manner, Wînipêk is "…ground zero for Canada's violent, oppressive relationship with Indigenous people."

Wînipêk opens with the story of the 2021 removal from Manitoba's Legislative grounds two symbols of colonialization – statues of Queen Victoria and Queen Elizabeth – by peaceful Indigenous activists and protestors, fed up with a lack of action on Indigenous issues in a city and province with the highest percentage of Indigenous persons in Canada. Sinclair contrasts this non-violent act of resistance with the destruction of a streetcar during the 1919 Winnipeg General Strike that caused two deaths but is historically glorified as a character-defining moment in the city.

From there, *The Land* touches on the geology and hydrology of Wînipêk, as well as the creation of the city of Winnipeg and the discrepancies between Indigenous and settler/colonizer relationships with the land. It is an eye-opening section for any person of western-European descent who thinks they know this place. The section addresses several components of history, landscape and culture that have formed Wînipêk – seasons, farming and tobacco, flooding – and the different responses by opposing groups to these phenomena. Sinclair's work leading the design and redevelopment of the Niizhoziibean ("Two Rivers"/South Point) site at the Forks provides a notable example of Indigenous-led planning, while the vignette "A Knock on the Door" is a particularly impactful allegory of the Indigenous experience in Wînipêk and throughout Canada.

This Place provides many perspectives on life as a First Nations person in Wînipêk and social issues facing everyone in the city, where one in five people are Indigenous and face countless systemic injustices and biases that impact day-to-day life. The end of this section closes

1

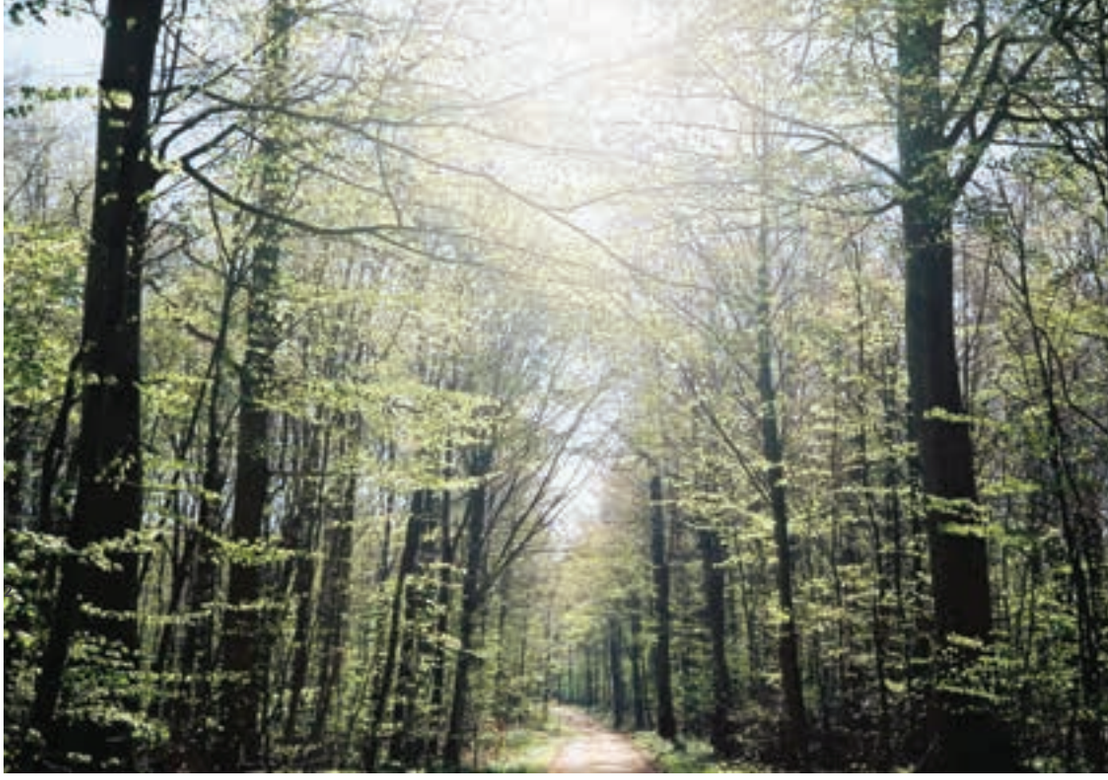
1,2 PORTAGE AND MAIN REOPENING.
PHOTOS 1,2 RYAN WAKSHINSKI

with a discussion of how the previous Manitoba Conservative government sealed its own fate by refusing to search a city landfill for the remains of several Indigenous missing and murdered woman were thought to be buried, in essence attempting to put a monetary value on human life. The section concludes with a heartbreakingly long and, incredibly, incomplete list of names of these and countless other women, whose names Sinclair asserts we must say to honour their legacies. It is a powerful and humbling passage.

Streets and Rivers begins to lift the reader from the darkness of the previous chapter, providing simple ideas and strategies for incorporating Truth and Reconciliation into our lives and our work. Not to simplify things, but the key is to listen. Listen to stories that have been supressed for 150 years and more. Treaties in Canada began with an agreement to meet and listen and cooperate, something that was never honoured. As Sinclair writes, it is not that much to ask, and all that Indigenous leaders have ever wanted – an equal voice.

The *Gifts* section closes with concrete examples of people in Wînipêk and Manitoba doing the work of listening and honouring, and how this troubled place, where growth is painful, is growing and improving itself, day by day, small act by small act...and some a bit larger. From Indigenous Mermen on social media to swearing on eagle feathers instead of the Bible in court proceedings, to the establishment of urban reserves and tourism programs and, ultimately, the election of Canada's first Indigenous Premier Wab Kinew. As someone born and raised in Wînipêk; there is a lot of pride to be gained from the steps taken to improve relations between Indigenous and non-Indigenous peoples. Referencing the 2015 MacLean's article that called Wînipêk "Canada's most racist City," Sinclair points out that because of the population dynamics, racism is a universally Canadian problem seen most clearly in Wînipêk, but it gives Wînipêk the best chance to start righting the wrongs of the past.

As Sinclair writes, "Wînipêk is a centre, a critical and creative expression – a song, story, and poem all at once." **LP**



HOW MUCH DOES A FOREST COST?

Reflections from the landscape in the age of natural capital

ANDRÉS ALBERTO SANÍN HINCAPIÉ

IN THE ERA of global climate change, natural capital accounting has become a roadmap for landscape architects, urban planners and decision-makers. The premise is as simple as it is unsettling: if we can quantify the value of ecosystems – trees that clean the air, wetlands that prevent flooding, soils that store carbon – perhaps we can protect them better. But this promise is fraught with tension. Are we truly willing to measure rain, forests or pollination in dollars?

Landscape architecture is at a turning point. To lead this transformation, we need new technical skills – ecosystem services modeling, spatial data management, environmental accounting – but also a renewed ethical and collaborative capacity. It is no longer enough to design beautiful or functional spaces: we must interpret the ecological complexity of the territory and translate it into arguments that influence public and private decisions.

Various landscape studies around the world show how this can be done without falling into the trap of total commodification. In these projects, biodiversity, human health and climate comfort are interwoven with landscape solutions capable of adapting to climate change without sacrificing the poetic dimension or the intrinsic value of nature. However, by incorporating economic language, we risk turning living systems into "assets," subject to negotiation, speculation or replacement. What happens when the financial value of an ecosystem does not meet the threshold to justify its conservation? Who defines those values? And what is left out of the calculation? What is considered relevant or irrelevant in defining such values and impacts?

The challenge is not whether we should use natural capital accounting, but how to do so without losing sight of the incalculable (the intangible value). This practice can be a powerful tool if built on environmental justice, transparency and interdisciplinary collaboration. But it must be guided by an ethic of care, not just by cost-benefit logic.

In a world that increasingly translates nature into numbers, landscape architects have the responsibility – and the opportunity – to redraw the frameworks of value. Not to put a price on everything, but to remind us that some things, precisely because they are priceless, are worth even more. **LP**

Andrés Alberto Sanín Hincapié *is an urban architect and has been a professor for over 15 years in architecture and industrial design at various universities in Colombia. His practice integrates landscape architecture, construction with wood and guadua (bamboo), and the use of computer-aided design tools. He is passionate about addressing landscape issues through ethical, multidisciplinary approaches that value natural capital in planning and territorial academic design projects. Contact him at andres.alberto.sanin@gmail.com. The photos in the article are courtesy of*

Martine Seedorff, *who graduated in 2019 from the Royal Danish Academy and currently works at Hasløv & Kjærsgaard. Her work has been exhibited at galleries such as Den Frie Udstilling, and her writings have been published in Drawing Matter, among others.*

1, 2 THE PHOTOGRAPHS ARE PART OF A LARGER COLLECTION THAT DOCUMENTS THE NATURAL CAPITAL AND EVOLVING LANDSCAPE ALONG THE DANISH-GERMAN BORDER, STRETCHING FROM THE WADDEN SEA IN THE WEST TO THE LITTLE BELT IN THE EAST. **PHOTOS** ANALOG PHOTOGRAPHS BY MARTINE SEEDORFF, 2019.

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