



**New Acre
Project**

ALUS Year 1 Progress Report to

Bruce Power

with the cooperation of the Nuclear Innovation Institute

Powering Grey-Bruce Farmers for Climate Action

June 2023

BrucePower™

Innovation at work

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EXECUTIVE SUMMARY

ALUS is a ground-breaking environmental program that supports farmers and ranchers to steward environmental projects through community partnerships to produce cleaner air, cleaner water and wildlife habitat. ALUS' innovative, community-developed, farmer-delivered model is changing the dynamic between private landowners and conservation, while raising awareness about the vital role farmers can play in building a healthy environment for all Canadians.

New Acre™ Project, delivered by ALUS, helps purpose-driven corporations invest in nature-based solutions on agricultural land that generate positive environmental, economic and social outcomes in the communities where they operate—one acre at a time.

New Acre Project investments enable ALUS to support more farmers and ranchers in establishing and maintaining ALUS projects. These investments fund the provision of technical support and annual payments to ALUS farmers and ranchers for ongoing project maintenance and project monitoring. Funding also supports ALUS in providing resources to ALUS communities to deliver programming, community outreach and education, and to ultimately produce more ecosystem services to benefit Canadian communities.

Bruce Power and the Nuclear Innovation Institute (NII)'s multi-year, \$910,500 New Acre Project investment will support ALUS farmers in Grey and Bruce Counties in creating and managing 600 acres of nature-based projects on their land to enhance biodiversity, improve watershed health and capture carbon.

In March 2021, Bruce Power hosted a workshop to brainstorm opportunities between nuclear and agriculture sectors, with representatives from ALUS and ALUS Grey-Bruce participating. The following October, ALUS was invited to submit a proposal to participate in Bruce Power's Carbon Offset Coalition, funded by Bruce Power's \$1M Carbon Accelerator Fund. In June 2022, after a successful proposal review, Bruce Power, the NII, ALUS and ALUS Grey-Bruce officially launched this partnership.

In Year 1, Bruce Power and the NII have supported 20 participants to deliver 220 acres of nature-based projects in Grey and Bruce Counties. The Bruce Power/NII Leadership Group have collaborated with ALUS on the development of robust carbon quantification methods using emerging technologies to support the delivery of carbon credits alongside the existing suite of ecosystem services.

HIGHLIGHTS

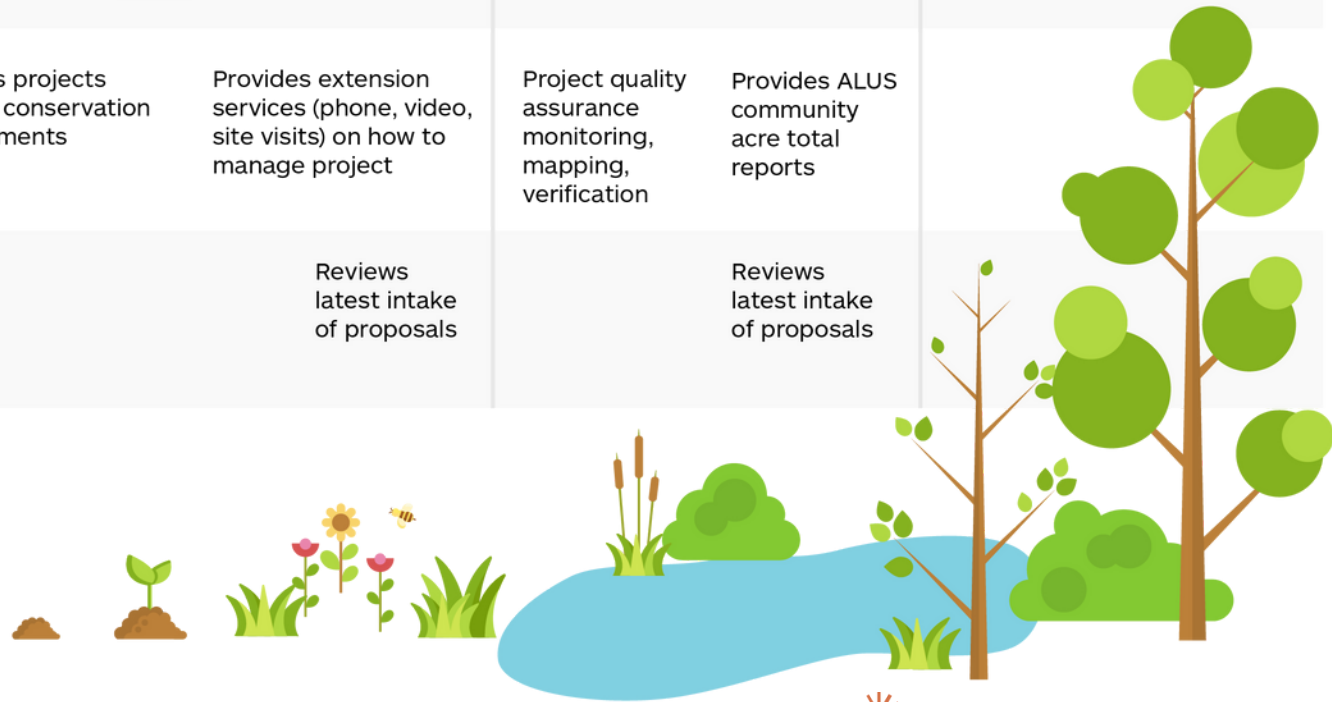
What We've Achieved

In Year 1 of this partnership, here's what we've achieved together:

- Provided farmer outreach and scientific guidance and worked with the local Partnership Advisory Committee (PAC) to review proposed farmer-led projects
- Supported 20 participants in Grey and Bruce Counties to establish and maintain PAC approved nature-based projects on their land
- Established 200 acres of nature-based projects to sequester carbon, enhance biodiversity and improve water quality
- Established 20 additional acres to be held as an assurance pool to manage the risk of potential project losses
- Developed an ArcGIS map of theoretical incremental soil carbon sequestration of agricultural lands in Grey and Bruce Counties
- Established methodology for measuring carbon reductions from nature-based projects
- Built a historical land use classification scheme for baseline metrics for all ALUS nature-based projects
- Launched a technology pilot with Albo Climate to use remote sensing and machine learning to estimate carbon sequestration from trees and shrubs in Grey and Bruce Counties.

Seasons of New Acre - Process Diagram

	WINTER / PLANNING		SPRING / PLANTING		SUMMER / GROWING		FALL / HARVEST
Corporate Sponsor	Meets with ALUS to discuss specific sustainability & stakeholder needs	Approves proposal and approves deliverables		Collaborates on announcements & public relations			Shares outcomes metrics/narrative with key audiences
ALUS	Develops proposal for potential sponsor to address needs		Communicates deliverables to ALUS communities	Executes on announcements & public relations		Issues acre payments	Drafts sponsor outcomes reports
Farmer / Rancher / Farm family	Submits an Expression of Interest to local ALUS coordinator		 Establishment of nature-based projects		Management of nature project to ensure success (ongoing)		
ALUS Community Coordinator	Conducts site visit to discuss the potential project, provide advice, helps craft proposal		Enrolls projects under conservation agreements	Provides extension services (phone, video, site visits) on how to manage project	Project quality assurance monitoring, mapping, verification	Provides ALUS community acre total reports	
Partnership Advisory Committee (PAC)		Reviews latest intake of proposals, evaluates; approves some or provides feedback		Reviews latest intake of proposals		Reviews latest intake of proposals	





Generating Local Climate Action in Grey-Bruce

Through a multi-year, \$910,500 New Acre Project investment, Bruce Power and the NII are demonstrating the power corporations, farmers, and rural communities can play in building and sustaining a healthy environment for all Canadians.

By investing in New Acre Project, Bruce Power and the NII are supporting ALUS' efforts to empower farmers in Grey and Bruce Counties to raise awareness about local voluntary environmental stewardship efforts. Farmers lead environmental stewardship in their community, resulting in greenhouse gas (GHG) reductions, water quality improvements, and habitat creation and species protection to build landscape resilience.

Over three years, support from Bruce Power and the NII will expand the efforts of ALUS Grey-Bruce and engage local farmers to establish 600 acres of nature-based projects.

In the first year of this investment, 20 farmers were supported to establish 220 acres of nature-based projects. ALUS and ALUS Grey-Bruce swiftly rolled out this sponsorship through outreach to local farmers and expedited efforts to process Expressions of Interest to enroll projects. Accelerated outreach efforts early in the year were successful in meeting the Year 1 target of 200 acres of nature-based projects in the ground.

In 2022, ALUS Grey-Bruce celebrated their 10th anniversary, marking a decade of creating nature-based solutions and lasting local impact. Throughout the summer and fall of 2022, local outreach efforts, supported by this investment, continued generating a groundswell of interest. There is now a waitlist of projects to be onboarded for the 2023 season. ALUS Grey-Bruce is on track to enroll an additional 200 acres annually in 2023 and 2024.

Powering Local Action

Bruce Power and the NII have demonstrated their commitment to the enhancement, restoration and ongoing maintenance of Canada's natural spaces by investing in ALUS' New Acre Project. As part of this agreement, ALUS committed to delivering 200 acres of nature-based solutions (plus 10% additional acres to maintain an assurance pool) annually.

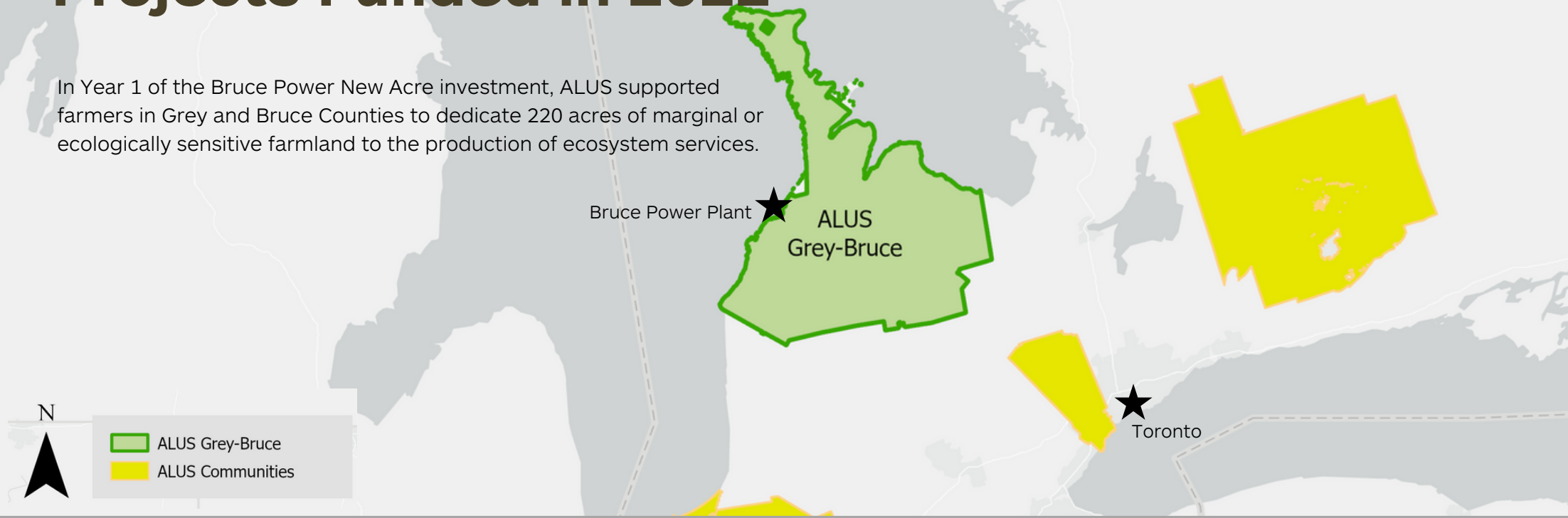
In 2022, ALUS supported farmers in Grey and Bruce Counties to dedicate 220 acres of marginal or ecologically sensitive farmland to the production of ecosystem services.

Projects funded in Grey and Bruce Counties deliver the following outcomes:

- Build local landscape resilience to the impacts of climate change
- Improve soil health
- Support biodiversity including plants, beneficial insects, birds, bats and beneficial soil micro-organisms
- Improve water quality and aquatic habitat
- Reduce erosion and prevent harmful nutrients from entering waterways and Lake Huron
- Foster pride in local environmental stewardship amongst the agricultural community

Projects Funded in 2022

In Year 1 of the Bruce Power New Acre investment, ALUS supported farmers in Grey and Bruce Counties to dedicate 220 acres of marginal or ecologically sensitive farmland to the production of ecosystem services.



60

acres of grassland that provide habitats for pollinators and Species at Risk



43

acres of wetlands and riparian buffers that improve the health of watersheds and Lake Huron



117

acres of trees and shrubs that sequester carbon above and below ground



20

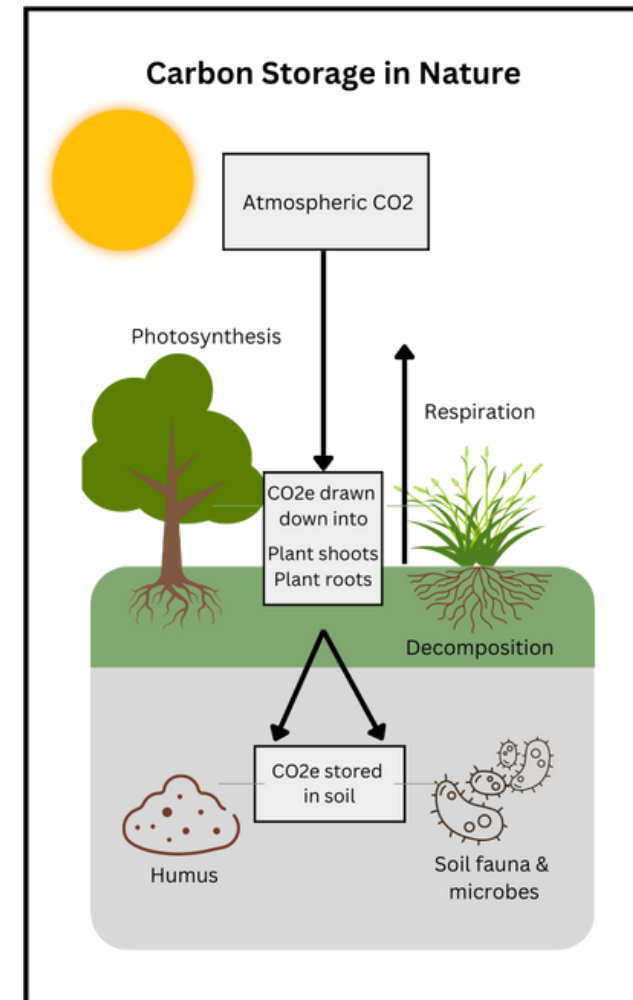
participants engaged

Storing Carbon through Nature-based Solutions in Grey-Bruce

Agriculture is the leading industry in Grey and Bruce Counties and is a way of life for residents. As the single largest group of land holders in the region, farmers are uniquely positioned to play a significant role in producing nature-based solutions to enhance air quality, water quality and biodiversity, and for capturing and storing carbon.

By implementing a variety of land management changes, including planting native trees, shrubs and grasslands, farmers can take excess carbon out of the atmosphere and store it in plants and soil. Farmers in Grey and Bruce Counties can use their energy, skills and knowledge of the land to identify and convert marginal, uneconomic and ecologically sensitive parcels of land into nature-based projects that store carbon.

Through New Acre Project, ALUS generates environmental outcomes for corporate investors through its network of farmers building nature-based solutions on their lands.





Carbon Workplan and the Bruce Power/NII Leadership Group

Bruce Power and the NII are collaborating on the ALUS-led workplan to enhance the quantification and validation of carbon credits associated with New Acre Project. Since June 2022, ALUS has met with the Bruce Power/NII Leadership Group for four technical working group meetings to gain feedback on the New Acre Project Carbon Quantification Workplan.

To further enhance the accuracy of carbon estimates provided to funders, ALUS launched a technology pilot with Albo Climate to use remote sensing and machine learning techniques to measure carbon sequestration from tree and shrub projects.

At Bruce Power's request, ALUS drafted a New Acre Tonne Explainer outlining tonne-year accounting, and its relationship to using New Acre Tonnes as carbon offsets.

The Bruce Power/NII Leadership Group recommended ALUS work with the Canadian Standards Association (CSA) group of standards to explore options for project registration. ALUS has initiated exploratory discussions with the CSA and will share outcomes with the Bruce Power/NII Leadership Group. Finally, a draft of New Acre Project: Carbon Quantification and Credit Issuance Methodology has been shared with the Bruce Power/NII Leadership Group for review.

Refer to [Appendix A](#) for detailed update on the New Acre Project Carbon Quantification Workplan.



Delivering a Suite of Ecosystem Services

Nature-based solutions delivered by ALUS farmers for New Acre Project produce a full suite of ecosystem services beyond carbon sequestration, such as habitat restoration and water filtration. These services generate measurable positive environmental impacts.

In addition to developments on the New Acre Project Carbon Quantification Workplan with technical advice from the Bruce Power/NII Leadership Group, New Acre Project collaborates with The MacDougall Ecology Lab at the University of Guelph to study biodiversity and water quality outcomes of ALUS projects.

Carbon Sequestration Impact

ALUS estimates the total carbon sequestration attributed to the target acres delivered in Year 1 is 547 TCO₂e per year, with a projected total of 2,737 TCO₂e over 5 years of land management agreement with each ALUS participant.

Biodiversity Benefits

Research from the MacDougall Lab, which involved surveys of New Acre projects and reference sites (2013-2020) in Ontario, indicated the following biodiversity benefits would accrue to Bruce Power's nature-based projects:

- 300% increase in the abundance of native pollinator species¹
- 2x increase in native pollinator diversity¹
- 25% more bird species than non-ALUS farms²

Water Quality and Quantity

Nature-based solutions enhance water quality and quantity by contributing to the following:

- Reduction in nutrient pollution entering local waterways in summer
- Recharge and replenishment of groundwater through on-farm wetland projects

1. Paterson, C. et al. (2019) Restored native prairie supports abundant and species-rich native bee communities on conventional farms. *Restoration Ecology*, 27-6.

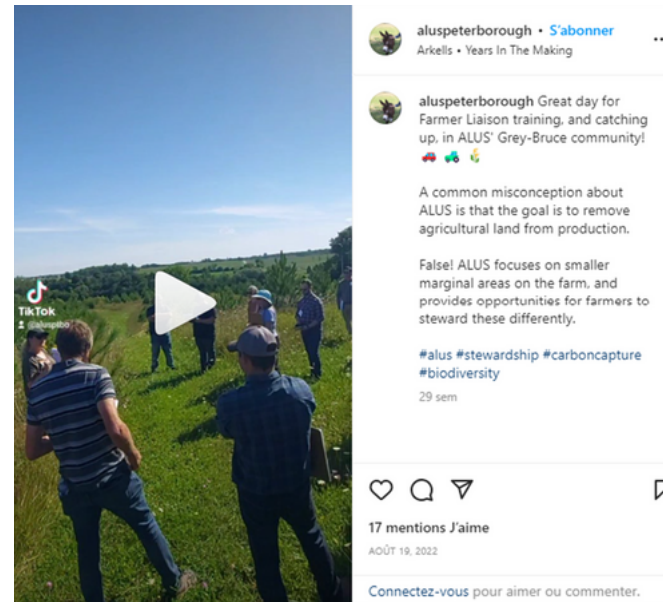
2. Brynn, V. (2023) *The impacts of agricultural habitat heterogeneity and ecosystem restoration on avian diversity*.

Community Engagement and Partnerships

Bruce Power and the NII are supporting efforts on the working landscape with important opportunities to engage farmers in meaningful ways to create local climate resilience. Community engagement and partnerships are integral components of ALUS and New Acre Project.

Outreach and engagement activities create positive spaces where farmers can connect, share knowledge and celebrate their accomplishments. In 2022, ALUS Grey-Bruce participated in 14 events and engaged over 950 people. Among the 14 events was the ALUS Farmer Liaison Training held in August, where ALUS and ALUS Grey-Bruce hosted Bruce Power team members along with farmers, PAC members and coordinators from Ontario. This event offered an in-field, hands-on training opportunity to farmer liaisons from across Ontario and enabled the cross-pollination of ideas and approaches to unique in-field activities.

Bruce Power and the NII's investment supports ALUS Grey-Bruce in fostering and maintaining partnerships at the local level. ALUS Grey-Bruce partners with over 20 organizations including Climate Risk Institute, Stewardship Grey Bruce, Forests Ontario and Grey Bruce Sustainability Network, fostering community and maximizing local impact.



PARTNERING TO ADVANCE TECHNOLOGY

Technology has an important role to play in improving the way we measure the value of nature. ALUS has recently begun several new partnerships with organizations that share carbon quantification interests to advance our common goals. In 2022, Sustainable Development Technology Canada (SDTC) announced an investment of \$5M to scale the ALUS program and expand the New Acre Project Carbon Quantification Workplan. This grant, combined with funding from New Acre Project and \$1.5M from the RBC Foundation, are enabling ALUS to pursue the use of several technologies and ground truthing pilots.

As part of Bruce Power's New Acre Project investment, ALUS launched a technology pilot with Albo Climate, a technology startup headquartered in Tel Aviv, Israel, to use a remote sensing-based platform for identifying carbon stocks and sequestration in tree and shrub projects. Albo Climate provides state-of-the-art remote sensing solutions to quantify and monitor carbon both above ground and below ground (soil organic carbon), making the technology deployable in any ecosystem.

By applying proprietary artificial intelligence algorithms to satellite radar and multispectral images, Albo Climate precisely quantifies carbon stock changes at high accuracy and resolution, creating a new level of transparency and scalability for nature-based projects. Specifically, Albo created above ground carbon maps for all ALUS tree and shrub projects planted between 2008-2019 across Canada at 50 cm pixel resolution. This Albo Climate pilot with ALUS in Grey and Bruce County represents the first ever application of the technology in Canada.

In the next phase of technology pilots, ALUS will deploy EarthOptics' machine-learning technologies that aim to transform soil measurement and analysis approaches to provide an accurate view of soil health, compaction and carbon content. EarthOptics' GroundOwl sensor suite greatly minimizes the number of manual samples required and can be mounted on a UTV to deploy ground-penetrating radar and electromagnetic induction sensors with no soil contact or speed limitation.

COMMUNICATION AND RECOGNITION

Summary

To date, Bruce Power's commitment was recognized and acknowledged, in English and French, through the [NewAcre.org](https://www.newacre.org) and [ALUS.ca](https://www.alus.ca) websites, ALUS' 2023 National Conference, and the ALUS 2023 Spring Newsletter.

We look forward to announcing this sponsorship in 2023 through a formal press announcement and social media amplification.

RECOGNITION

New Acre Project and ALUS Websites

Bruce Power is featured on the [NewAcre.org](https://www.newacre.org) homepage and on the [ALUS.ca](https://www.alus.ca) Supporters page.

New Acre Project Sponsors

TD READY COMMITMENT LAUNCH SPONSOR, ACW, Cargill, Silk, beq, Coors SELTZER, BrucePower, TC Energy, ecobc

Foundational Supporters

DELTA, Ontario, Weston Family Foundation, NATIONAL CONSERVATION PLAN, CANADA

TD READY COMMITMENT, ACW, Cargill

"TD is proud to be the first sponsor of ALUS' New Acre Project through our corporate engagement platform, 'The Ready Commitment'."

"We believe that through harnessing the power of regenerative agriculture, Canadian ranchers can help mitigate climate change and restore our grasslands."

"We believe that many of the solutions to the challenges we're facing can be found in the very place our food system begins: agriculture."

Let's talk about how you can create shared value for your business, your customers and your communities.

Katherine Baljastak, Director of Corporate Partnerships

BOOK A MEETING

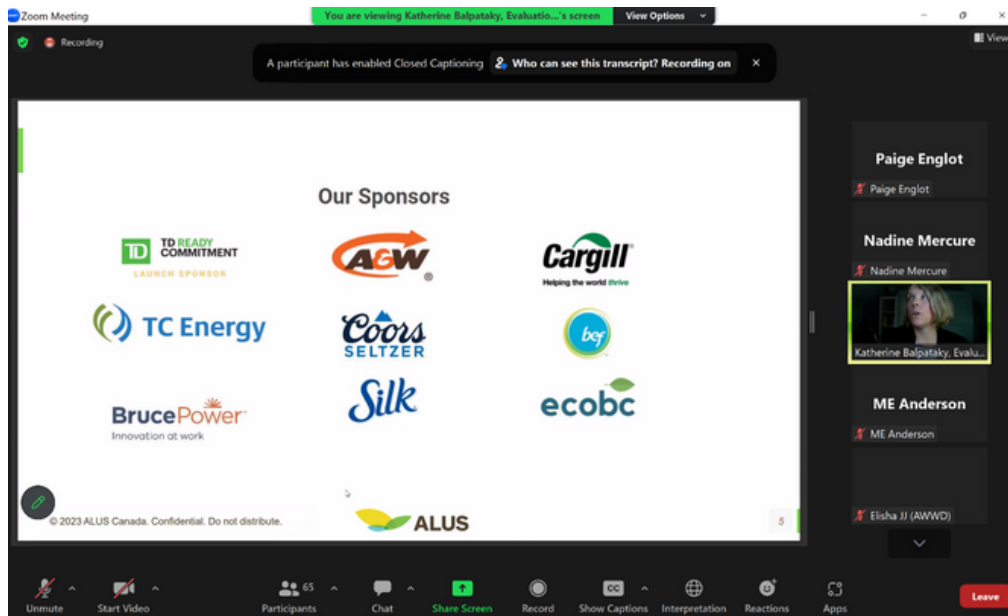
Our Sponsors

TD READY COMMITMENT LAUNCH SPONSOR, ACW, Cargill, TC Energy, Coors SELTZER, beq, BrucePower, Silk, ecobc

Highlights

2023 National Conference

During ALUS' 2023 virtual National Conference convening 65 ALUS coordinators, PAC members and ALUS national team members, Katherine Balpataky presented New Acre Project and its sponsors, including Bruce Power.



ALUS Newsletter

Funding from Bruce Power was recognized in our Spring 2023 newsletter which goes out to an audience of 2,633 people.

Thank you to these sponsors who made a significant contribution to farmer-delivered nature-based solutions in 2022.

- A&W Canada
- Alberta Professional Outfitters Society
- BASF Canada
- BEF
- Bruce Power
- Cargill
- Coors-Seltzer
- Enel Group
- General Mills
- Government of Alberta-Watershed Resiliency and Restoration Program
- Government of Canada
 - Environment and Climate Change Canada-EcoAction Community Funding Program
 - Environment and Climate Change Canada-Species at Risk Partnerships on Agricultural Lands
 - Natural Resources Canada-Two Billion Trees Program
- Government of Ontario-Ministry of the Environment, Conservation and Parks
 - Species at Risk Stewardship Program
 - Wetlands Conservation Partner Program
- Grassland Stewardship Initiative
- Greenbelt Foundation
- Nutrien
- RBC Foundation
- Results Driven Agriculture Research
- Silk
- Simplot
- Sustainable Development Technology Canada
- TC Energy
- TD Bank Group
- Weston Family Foundation
- WWF-Canada

COMMUNICATION AND RECOGNITION



ALUS Grey-Bruce in the Media

ALUS Grey-Bruce was mentioned in Canadian media on more than 65 occasions in FY2022-23 for a total reach of 1.9M users.

In June 2022, Bruce Power announced its commitment to net-zero emissions from site operations by 2027. The press release was shared by 21 media outlets and contributed to ALUS Grey-Bruce media mentions.

The announcement from Bruce Power, as well as the Farmer Liaison Training Event mentioned earlier in this report, were well received on social media. For example, this tweet from James Scongack, Chief Development Officer & Executive Vice-President Operational Service at Bruce Power, was retweeted by Martin Bohl, with 5K followers.



NEXT STEPS



What's Next

Over the next 12 months of collaboration with Bruce Power and the NII, ALUS will continue to deliver nature-based projects, advance the New Acre Project Carbon Quantification Workplan, and support the ongoing local efforts of ALUS Grey-Bruce.

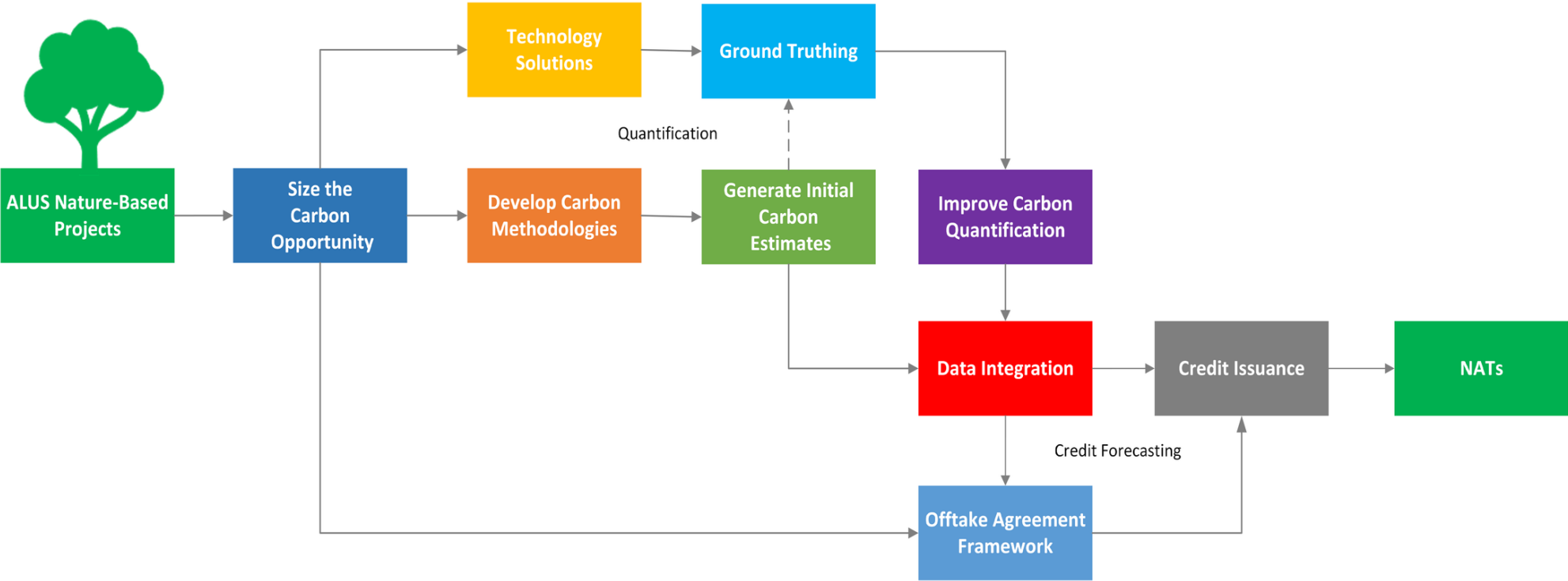
ALUS Grey-Bruce will be working on additional educational material to enhance information on local nature-based projects and learn about environmental and social benefits produced by Bruce Power and the NII's investment.

Together in 2023-2024, we will:

- Continue farmer outreach and support for Grey-Bruce farmers
- Work with the local PAC to review and approve more projects
- Establish 200 more acres (+ 10% assurance pool) in the 2023 season
- Finalize results of Albo Climate technology pilot and update carbon estimates for tree and shrub projects
- Launch soil stratification and sampling plan
- Conduct a peer review of carbon quantification methodology and credit issuance process with Bruce Power/NII Leadership Group and other experts
- Publish carbon quantification methodology
- Explore opportunities for participation in upcoming community events

APPENDIX A: NEW ACRE PROJECT CARBON QUANTIFICATION WORKPLAN

NEW ACRE PROJECT - CARBON QUANTIFICATION WORKPLAN



SIZING THE CARBON OPPORTUNITY:

Build a digital carbon map of theoretical incremental potential to store carbon in soil

Over the past two years, ALUS has been collaborating with Canadian carbon expert, Aldyen Donnelly, to build and refine its Carbon Quantification Workplan based on input from researchers, funders and community partners.

As illustrated in the New Acre Project Carbon Quantification Workplan diagram, the first step is to size the carbon opportunity by verifying the potential impact of ALUS' nature-based projects. To do so, it is important to understand the current carbon stock and theoretical sequestration potential of the soil. Carbon stocks can increase rapidly after a change in management regime, until values eventually reach an equilibrium (i.e., soils have a unique limit to carbon saturation) (Johnston et al., 2019).

The United States has a wealth of data and tools to examine baseline carbon sequestration potential; however, in Canada, these resources are limited. Therefore, ALUS is drawing upon a U.S. reference evaluation tool, COMET-Planner, as the basis of our methodology for initial estimates. To better understand the current carbon stock and theoretical sequestration potential of agricultural soils in Canada, ALUS has developed a dynamic ArcGIS map that estimates annual theoretical incremental carbon sequestration potential of agricultural lands where the ALUS program and New Acre Project are active.

The map collates multiple data sets including:

- Canadian and US soil maps with the current best estimate of background soil organic carbon (SOC) stocks (minimum, maximum, mean, standard deviation) using the current best estimate for total tonnes of soil organic carbon (TSOC/acre) in the top 30 centimetres of the soil.
- Historic land use maps, including Census division, Census consolidated subdivision and Census agricultural regions metrics from the Census of Agriculture.

ALUS is also completing an in-depth retrospective analysis of all ALUS project metrics stored in its proprietary database application to better understand the baseline scenarios for carbon opportunities by geography and different conservation scenarios (e.g., trees planted in riparian soils versus former croplands, etc.). This analysis will support refinement and recalibration of annual estimates across multiple carbon methodologies and emerging technology solutions.

DEVELOPING CARBON METHODOLOGIES:

Define methodologies to generate high-level estimates of carbon sequestration from ALUS nature-based projects (Grasslands, Trees & Shrubs, Wetlands, and Rotational Grazing)

ALUS' Carbon Quantification Workplan (page 17) illustrates two paths toward quantifying carbon sequestration from nature-based projects established by participating farmers and ranchers.

The first path, focuses on identifying existing methodologies or developing a new methodology to calculate initial estimates of carbon sequestration for each type of nature-based project.

After an extensive review, the following methodologies are currently being piloted in select ALUS communities:

- **Tree Canada Methodology:** a formula-based approach to produce initial high-level estimates for above-ground biomass in tree planting projects. This approach will be used for the first three years after planting until the trees are large enough for remote sensing technologies and machine learning platforms to detect and quantify above-ground biomass for trees and shrubs more accurately.



- **COMET-Planner Method:** COMET-Planner is a U.S. carbon evaluation tool designed to provide approximate greenhouse gas mitigation and carbon sequestration potentials for regionally specific conservation management practices and agricultural land use changes. This tool allows conservation planners to source carbon sequestration values for different conservation management practices (e.g., planting trees in riparian areas).

The COMET-Planner Evaluation tool will enable ALUS to determine project-specific carbon sequestration projections. This process manually assigns multiple proxy US counties for each ALUS community, based on soil carbon sequestration indicators (i.e., dominant soil type, land use history, temperature zone, precipitation zone, etc.). ALUS then applies the best corresponding USDA/NRCS COMET-Planner annual average CO₂ sequestration estimates (derived from 10-year projects), for above-ground biomass and soil, based on project type for each ALUS community. ALUS is currently pilot testing the automation of COMET-Planner estimates to support timely inquiries and low-cost verification.

IDENTIFYING TECHNOLOGY SOLUTIONS:

Leverage technology to generate higher resolution carbon values for ALUS projects

The second path, “Technology Solutions,” focuses on sourcing and piloting new technology to develop more exact and higher resolution values of carbon sequestration in a cost-effective and efficient way.

New Acre Project's carbon quantification work received a crucial boost of funding in 2022 thanks to a \$5M, three-year grant from Sustainable Development Technology Canada (SDTC).

As Canada's largest funder of cleantech start-ups, SDTC has traditionally funded tech companies. Recently, SDTC expanded their mandate to include a whole-business approach to building sustainable development solutions, while looking to achieve economic and environmental benefits for Canadians.



IDENTIFYING TECHNOLOGY SOLUTIONS:

ALUS - Albo Climate Carbon Quantification Pilot

The funding from SDTC allowed ALUS to pilot Albo Climate's remote sensing solution to quantify the carbon sequestered in the above-ground biomass of Trees & Shrubs projects.

Albo's solution trains artificial intelligence (AI) to analyze satellite imagery to estimate the number of trees by species, height, and diameter at breast height. These values are then input into Albo's deep learning algorithm to determine how much carbon is stored in above-ground biomass per acre for each project.

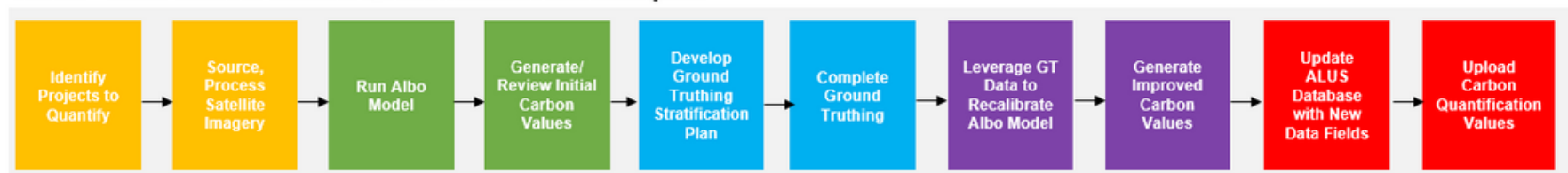
Albo combines geospatial monitoring and AI expertise to produce high resolution maps displaying carbon stocks on a per-pixel basis. In contrast to manual, hardware-dependent in-field measurements, Albo's solution automatically monitors and maps historical and ongoing carbon sequestration, offering a cost-effective solution with an unprecedented degree of transparency and scalability.

Headquartered in Tel Aviv, Israel, Albo Climate is currently working on nine projects across five continents in forestry, habitat analysis, and agriculture, including quantifying croplands in the US for Bayer, who has also invested in the flourishing startup.

Phase 1 of the Albo pilot, to be completed in June 2023, will quantify carbon sequestration in above-ground biomass of more than 900 trees & shrubs projects (or about 4,000 acres) established prior to 2018.

Phase 2 of the Albo pilot kicked off in early 2023 to quantify all trees & shrubs projects established in 2019. ALUS is currently working with Albo to develop a pilot to recalibrate their remote sensing solution to quantify soil organic carbon from ALUS grassland projects.

ALUS – Albo Climate Carbon Quantification Pilot Workplan



IDENTIFYING TECHNOLOGY SOLUTIONS:

ALUS - EarthOptics Carbon Quantification Pilot

ALUS has an agreement in principle with EarthOptics to leverage its sensor technology to quantify soil organic carbon from adaptive multi-paddock grazing projects in western Canada and will leverage the results to determine how to strategically deploy the technology in other regions.

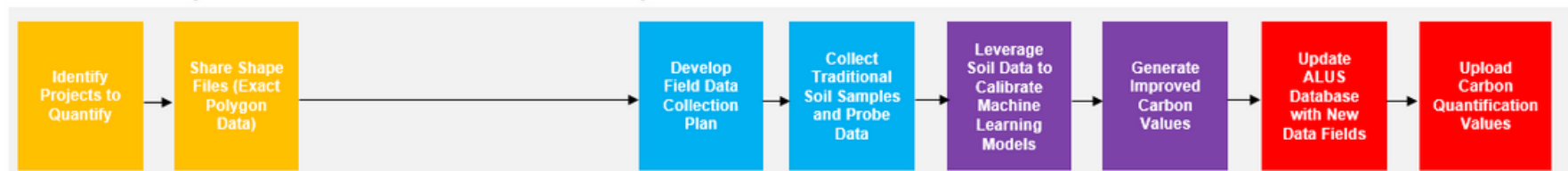
EarthOptics patent-pending sensor technology and mapping methodologies deliver consistent, accurate soil carbon measurements depicting year-over-year changes per acre.

Using ground-based sensors, satellites, physical soil samples, machine learning models and agronomic expertise, EarthOptics estimates total carbon stored within a half-tonne CO₂e accuracy.

EarthOptics is recognized as one of the leading technology providers for quantifying grasslands, and has received investments from Bayer and the Bill and Melinda Gates Foundation.

In January 2023, EarthOptics secured \$27.6M in Series B funding led by Conti Ventures to further build out its GroundOwl sensor suite capabilities, accelerate acreage growth and scale service providers to meet growing customer demand.

ALUS – EarthOptics Carbon Quantification Pilot Workplan



GROUND TRUTHING:

Develop a statistically relevant process for verifying carbon quantification values using ground data gathered from representative sample plots

In all pathways towards carbon quantification, it is essential to collect field data through ground truthing to validate initial results and help refine methodologies or technological models and their associated algorithms.

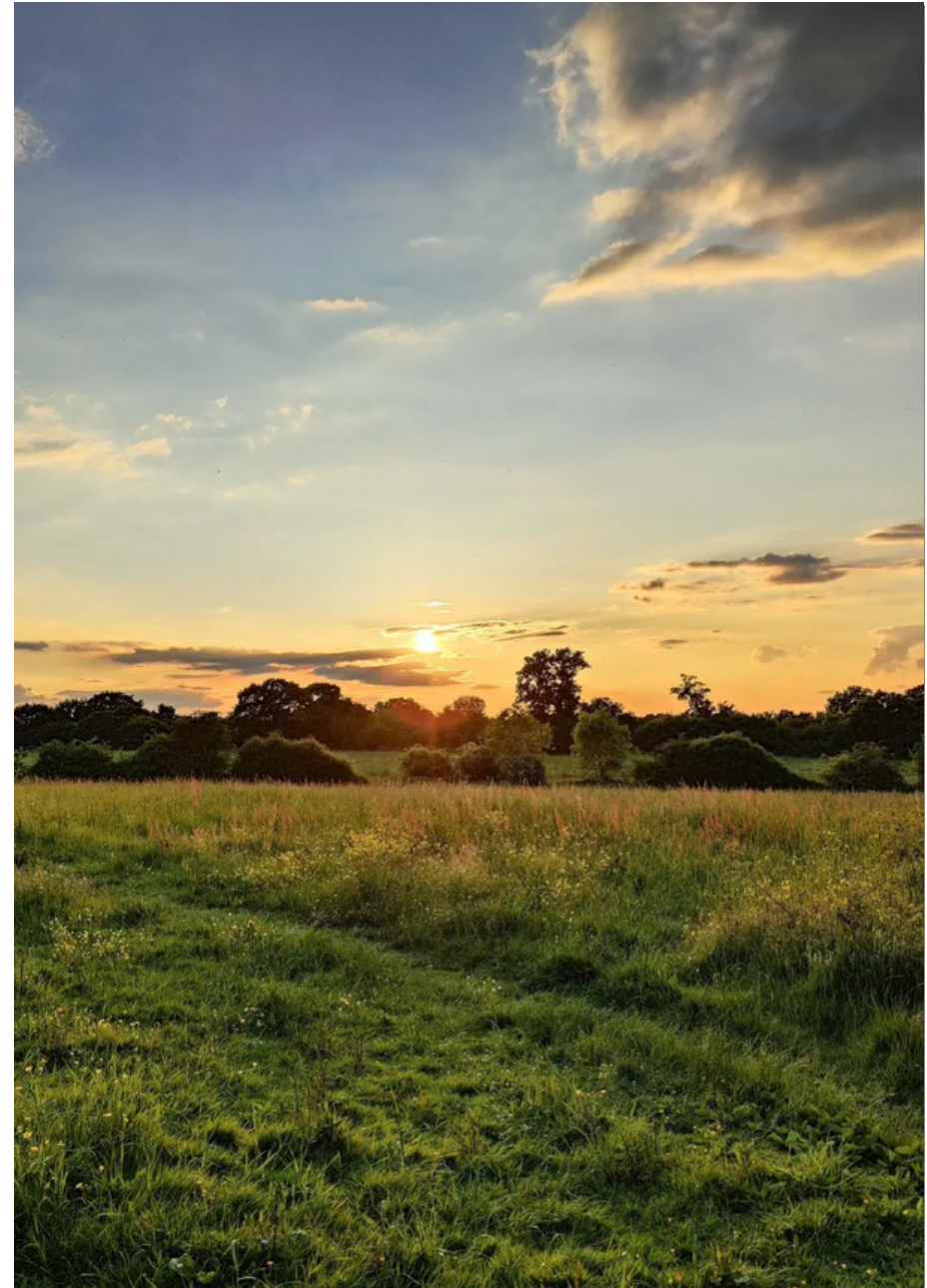
As part of the first phase of the Albo pilot, ALUS completed ground truthing on target properties in the fall of 2022. Field teams in Alberta and Ontario established 10m by 10m plots, recording the number of trees by species found in each plot as well as tree height and diameter at breast height (DBH).

The data collected was verified and shared with Albo who will compare field measurements with initial modelling results to help refine their algorithm to produce more exact carbon sequestration values of above-ground biomass.

ALUS aims to gather as much ground data as possible to continuously improve and test the feasibility/practicality of carbon methodologies, models, AI, and associated algorithms.

To facilitate this process, ALUS is currently working to develop a standard to specify the criteria required for the collection of above-ground biomass and soil samples to ensure consistency of ground truthing across all ALUS communities.

ALUS will launch its soil stratification and sampling strategy in sample plots across Canada in 2023-2024.



DATA INTEGRATION:

Integrate carbon sequestration estimates and for each ALUS project into proprietary database application

ALUS is using the COMET-Planner Evaluation Tool to correlate soil carbon sequestration potential of U.S. projects with Canadian ALUS projects. COMET-Planner was developed by the United States Department of Agriculture (USDA) and National Research Council Service. This is part of a larger effort to integrate tailored and regionally specific value-added data into the ALUS database.

This approach leverages ALUS' project classification scheme and incorporates external datasets (e.g., soils, ecoregions, climate zone, historical land use,) to source estimates of annual mean CO₂ emissions reductions from soil. Estimates are based on conservation scenarios.

The decision support tool is currently being piloted within a few ALUS communities to validate proxy matches before full integration into the ALUS proprietary database. This stage also includes other components and testing, as required by the various datasets to be aligned with the COMET Planner data (and other models as needed to support cross-validation).

The goal is to have carbon estimates automatically generated in the database for each New Acre, in addition to metrics for the entire suite of potential ecosystem services that each project delivers (water and biodiversity).



Work is also progressing on identifying regional tree survival rates and other carbon indicators to support the integration of the Tree Canada formula method and enable automatic calculations for above-ground biomass for trees. Additionally, ALUS is also mapping out a new data inventory scheme in the database to support the tracking and issuance of carbon credits.

CREDIT ISSUANCE:

Develop net CO2 reduction protocol framework and process to offer carbon credits via the New Acre™ Tonne (NAT) as one ecosystem benefit of New Acre Project

A market for farm-based, voluntary carbon and ecosystem service credits is needed to serve the demands of corporations and to assist Canada to meet its net-zero and Paris Agreement 2030 ambitions in an equitable and efficient way.

The New Acre Carbon Quantification Workplan includes the development of a farmer-friendly methodology and framework for quantifying carbon sequestration in soils and above-ground biomass for ALUS nature-based projects. The outcomes of the workplan will inform a protocol used for future New Acre Project corporate collaborations.

Through New Acre Project, ALUS is currently developing a standard methodology that would eventually be part of credit issuance that bridges the gap between buyers needs and what farmers can deliver.

New Acre Project delivers a full suite of ecosystem services, including water filtration and retention, biodiversity support, landscape resilience, and carbon sequestration. Although markets all these ecosystem services market may emerge, it is recognized that most are in a nascent stage. A national carbon market may emerge in the next 1-5 years in Canada. Therefore, we are developing the terms of carbon credit issuance that are aligned with investors' and farmers' interests to maximize shared value and most importantly, to ensure farmers receive fair value from these markets.

New Acre™ Tonne (NAT):

A warranty-backed carbon credit representing one (1) tonne CO₂e removed from the atmosphere.

ALUS includes an assurance pool of acres delivered and held in trust to account for any lost projects or carbon.

APPENDIX B: CARBON SEQUESTRATION ESTIMATES



APPENDIX B: CARBON SEQUESTRATION ESTIMATES

Table: Estimated carbon sequestered in New Acre projects.

Project Type	Carbon Stock	Number of Acres ¹	Number of Surviving Trees ²	Carbon Factor ³	TCO ₂ e Sequestered in Year 1 <i>(Number of Acres/Trees X Carbon Factor)</i>	TCO ₂ e Sequestered in Year 1 <i>(Discount 20%)⁴</i>	Projected TCO ₂ e Sequestered Over 5 Years <i>(Discount 20%)⁴</i>
Grasslands – Non-riparian soils	Soil organic carbon (SOC) stock	10.23	n/a	0.64 TCO ₂ e / acre / year	7	5	26
Grasslands – Riparian soils	Soil organic carbon (SOC) stock	44.03	n/a	0.71 TCO ₂ e / acre / year	31	25	125
Trees and shrubs	Above-Ground Biomass	106.83	43,401	0.015 TCO ₂ e / tree / year	647	517	2,586
Wetlands	Soil organic carbon (SOC) stock	38.92	n/a	0			
	Total	200.00	43,401		684	547	2,737

1. To manage the risk of carbon stock losses, ALUS has created an assurance pool of acres, 10% above the original target of 200 acres that will be held in Bruce Power's name for the duration of the retention period.
2. Tree and shrub projects were calculated with community tree data (number of trees planted) and Tree Canada factors (approved by the Government of Canada), using Tree Canada's low estimates of above-ground biomass per-tree carbon sequestration. Grasslands projects were calculated using COMET-Planner U.S. estimates by assigning a proxy U.S. County that shares similar attributes to Grey and Bruce Counties.
3. Because of the variability in soil carbon sequestration associated with planting trees and shrubs in wetland areas, we have assigned zero value for carbon sequestration of soil for these projects. When we collect ground truth data, actual results are likely to prove greater than zero, for some (not all) wetland recovery projects. Planting trees and shrubs to recover pockets of wetlands delivers very high relative value in improved water quality, landscape resilience and biodiversity ecosystem services.
4. A 20% discount has been applied to manage the potential for quantification error risk.



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**THANK YOU FOR YOUR GENEROUS SUPPORT OF
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