



DIVERSE

Annual Report

Nov. 2023 - Nov. 2024

Year 1





Year 1 of DIVERSE at a Glance:

- Theme 1: The FunTree Field Campaign was completed with more than 1000 wood cores collected across 200 sites. The samples collected will serve to better understand tree species' sensitivity to drought and their regeneration failure.
- Theme 2: A climate projection tool for tree species has been developed.
- Theme 3: The activities of Theme 3 are scheduled to start in Year 2 and will leverage the research results from Themes 1 and 2.
- Theme 4: Fine-scale data is being collected through industry partners to parametrize LANDIS-II
- Theme 5: Several project partner meetings have occurred, primarily across Alberta and British Columbia, with more planned in the short-term across additional DIVERSE sites.
- Theme 6: Experimental designs are being developed with partners to establish field trials.
- DIVERSE has recruited eight MSc students, seven PhD students, and five Post-Doctoral Fellows; accounting for 62% of the total Highly-Qualified-Personnel funded by DIVERSE.
- Two committees were established in November 2024: the Science and Steering committees.
- We launched the DIVERSE website in June 2024, providing a dedicated platform to share our research with the public, researchers and partners as part of our internal communication strategy.
- We have launched a LinkedIn Profile and Page to grow our professional network, which already has 360 followers.
- We published our first triannual newsletter in July 2024 and are currently finalizing the upcoming Fall edition.
- The research team has collaboratively developed seven 2-page fact sheets: one providing an overview of the entire project and one for each of the six research themes.



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THEME UPDATES

Theme 1: Forest Resilience and Vulnerability



Dr. Isabella Aubin, Theme 1 Lead

The overall objective of Theme 1 is to assess the resilience and vulnerability of Canada's forests to global change stressors. This theme is led by Dr. Isabelle Aubin, a Senior Research Scientist at Canadian Forest Service. The Theme will include two post-doctoral fellows, one MSc, and two PhDs, with an additional MSc student set to start in January 2025. The work being completed in this theme will set the foundation of the DIVERSE Project given it will feed research results on the status of Canada's forests. Aubin and her team have already been hard at work in 2023-2024 with a collaborative field campaign, the FunTree Campaign, which ran this summer, building on ecophysiology expertise of colleagues, and involving the work of many partners. The team collected over a thousand wood cores from over two hundred sites across Canada. Root trait data from tree seedlings in Ontario and Québec was also collected.

Theme 2: Identification and Selection of Suitable Tree Species

Theme 2 aims to identify which tree species are potentially better adapted to future local conditions across Canada so that they can be favoured in forest management. This theme is led by Dr. Olivier Villemare-Côté a Professor at the Université Laval. Currently, three MSc students and one PhD student are working on the project, with one more MSc yet to be recruited to start in Year 4 of DIVERSE. The tree species list developed through this theme will include those that are currently present and those that are potentially suitable for projected future climate, as well as new tree species that are not currently present that could fit with future climate.
(continued on next page).



Dr. Olivier Villemare-Côté, Theme 2 Lead



THEME UPDATES

Theme 2: Identification and Selection of Suitable Tree Species (continued)

From this we will receive a species list to assist in the development of a Functional Complex Networks (FCN). This theme will also be using provenance trials to identify which seed sources are better for specific conditions, such as drought tolerance. Theme 2 will really speed up over Year 2 of the project, but Theme 2 researchers have already worked to develop a climate projection tool, which can be utilized by our partners with silvicultural trials for Theme 6. Currently, the Theme 2 team is using climate analogues to project future climates according to multi-model climate projections, to create a spatially explicit list of tree species being used. These lists will be completed by the end of Year 2. Through to the end of the project, the Theme 2 team will create a North American seed source selection and climate envelope tool, as well as identify which seedlots are better for specific conditions, such as drought intolerance.

Theme 3: Functional Complex Network

Theme 3 aims to assess and enhance forest resilience to novel environmental and climatic conditions across the DIVERSE Project sites. Dr. Marie-Josée Fortin, Professor at the University of Toronto, is the Theme 3 Lead. There is currently one post-doctoral fellow as well as our LANDIS-II technician, advancing research under that theme. One more PhD student will be starting in Year 2. The activities of Theme 3 are scheduled to start in Year 2 and will leverage the research results from Themes 1 and 2. Starting in Year 2, Theme 3 researchers will develop rules to reclassify forests into yield stands and conservation areas, and they will identify species functional traits for creating functional forest networks. This will then be taken into the following years of the project to be implemented into LANDIS-II modelling to validate the FCN approach, which will also be tested in LANDIS-II across DIVERSE sites. This theme will undertake knowledge transfer through webinars, workshops, and publications.



Dr. Marie-Josée Fortin, Theme 3 & 4 Lead



THEME UPDATES

Theme 4: Evaluation of Various Forest Management Approaches Under Global Stressors

Theme 4 aims to compare three different forest management strategies in order to determine how these different management scenarios might fare in anticipated future climatic conditions. Like Theme 3, Theme 4 is led by Dr. Marie-Josée Fortin. Theme 4 is set to have a total of six HQPs: three post-doctoral fellows and three PhDs. By January, two of the PhD students involved will have started, as well as one post-doctoral fellow. This theme compares three forest management strategies through simulations using the landscape model LANDIS-II and the PnET-succession module:

1. Business as Usual (BAU): the current or historic forest management approach;
2. Climate-Smart Forestry (CSF): uses silviculture to promote climate-adapted species and maximize carbon storage in forests;
3. Functional Complex Network (FCN): promotes forest resilience through functional diversity of species and enhances connectivity and modularity of forest stands.



Dr. Marie-Josée Fortin, Theme 3 & 4 Lead

Currently, Theme 4 researchers are closely collaborating with project partners to identify their current BAU practices as well as which CSF practices they are either already utilizing or are interesting in implementing. This will continue into Year 2. This data collected from our partners will be used to ensure accurate characterization of model scenarios and simulations and used to parameterize LANDIS-II. Model parametrization has already begun with testing the introduction of intra-specific functional trait variability in the model (PnET Succession/LANDIS-II) Further along the project timeline, LANDIS-II will then be used to develop management scenarios (BAU, CSF, and FCN; see Theme 4) and simulate future conditions. The DIVERSE project will invest time and efforts to conduct more research on this variability, which could result in ground-breaking research as most current models use functional traits averages by species.



THEME UPDATES

Theme 5: Socio-Economic Conditions and Governance

Theme 5 will evaluate the socio-economic conditions required to implement the Climate-Smart Forestry (CSF) and Functional Complex Networks (FCN) approaches. Dr. Harry Nelson, Professor at the University of British Columbia, is the Theme 5 Lead, where two PhDs, three MScs and two post-doctoral fellows are funded. To date, several project partner meetings have occurred, primarily across Alberta and British Columbia, with more planned in the short-term across additional DIVERSE sites. Surveys and engagement sessions to solicit feedback and insights from project partners, stake-, rights-, and landholders active within the DIVERSE sites to better understanding the socio-economic and governance to CSF and FCN forest management approaches are forthcoming. There will also be an assessment of the feasibility of CSF and FCN economically, and they will be looking into governance and policy opportunities as well as restraints.



Dr. Harry Nelson, Theme 5 lead

Theme 6: Implementation of Alternative Silvicultural Treatments and Multi-Species Plantations

Theme 6 aims to explore alternative silviculture and multi-species tree plantations while leveraging research conducted in Themes 1 to 5. Theme 6 is headed by Dr. Brad Pinno, Associate Professor at the University of Alberta. HQP research team. Most graduate students for this project are backloaded to start later in the project, though there is currently one PhD student working on theme 6. Throughout the span of the project, there will be a total of four MScs, one PhD, and two post-doctoral fellows in Theme 6. This theme involves exploring alternative silviculture and multispecies plantation, to establish a subset (10-12 DIVERSE sites) representing different ecological regions and maintain a range of tree species. While most of the research activities associated with Theme 6 are projected to occur in the latter half of the project timeline, planning for field trials has already begun.
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Dr. Brad Pinno, Theme 6 lead



THEME UPDATES

Theme 6: Implementation of Alternative Silvicultural Treatments and Multi-Species Plantations (continued)

Each test site for these trials will evaluate two main experimental treatments: (1) Overstory Harvest (a clearcut (0-5% retention) and partial cut (20-50%) treatment) and (2) Revegetation treatments, which will include four variations:

- Local Revegetation (i.e., control treatment): business-as-usual reforestation strategy using local tree species/genotypes
- Assisted Population Migration: utilize current tree species but planting provenances that are better suited to future climate
- Assisted Range Expansion: Introducing tree species not currently present
- Local Research: aimed at addressing a project partner research question (e.g., vegetation control, site preparation)

Each replicate block will have a pre-harvest assessment of timber attributes (e.g. species composition, tree heights, basal area, volumes, etc.). Specific tree species treatments to be tested will be determined through partner and research consultations that will leverage research findings from DIVERSE Themes 1-2.

Over this past year, Dr. Pinno has been connecting with project partners interested in establishing the field trials and collaborating closely with them in the development of the experimental design. Dr. Pinno thinks of this aspect of Theme 6 as the "legacy" of DIVERSE: long term silvicultural trials to be used for decades to come. The main aim is to have each trial site set up before the project's end in 2028. Research undertaken within Theme 6 will also evaluate existing alternative silvicultural treatments and plantations across Canada.



Highly Qualified Personnel (HQP) Recruitment

DIVERSE is committed to funding a total of 30 Highly Qualified Personnel (HQP). More specifically, thirteen MSc students, nine PhD students, and ten Post-Doctoral Fellows across its six research themes over the term of the project (2023-2028). As of January 2025, 60% of the total HQP projected have been assigned; five MSc students, seven PhD students, and six Post-Doctoral Fellows. See below an overview chart of HQP timelines alongside each theme.

Themes	Supervisor(s)	Location & Affiliation	Year 1	Year 2	Year 3	Year 4	Year 5
			Nov '23- Nov'24	Nov '24 - Nov '25	Nov '25 - Nov '26	Nov '26 - Nov '27	Nov '27 - Nov '28
Theme 1	Audrey Maheu & Julie Messier	UQO	Simon Nadeau - MSc1a				
	Fangliang He	UofA		Andrea Guarino - MSc2			
	Morgane Urli & Audrey Maheu	UQO		Hugo de Lame - PhD1a			
	C. Messier, Isabelle Aubin & Daniel Kneeshaw	UQO		Martina Sanchez - PDF2			
	Christian Messier & Isabelle Aubin	UQO		Morgane Dendoncker - PDF1			
	Morgane Urli & Audrey Maheu	UQO		Zoé Ribeyre - PDF9			
	Robert Froese	UofA				PhD1	
Theme 2	Christian Messier & Isabelle Aubin	UQO	Morgane Dendoncker - PDF1				
	Charles Nock	UofA		Caroline Whitehouse - PhD3a			
	Andreas Hamann	UofA			Nicholas Boyce - PhD3		
	Olivier Villemaire-Côté	ULaval		Etienne Morissette - MSc6			
	Charles Nock	UofA				MSc3	
Theme 3	Fangliang He	UofA		Jun-Long Huang - PDF3			
	Marie-Josée Fortin & Patrick James	UofT			Charlotte Grieve - PhD4		
Theme 4	Marie-Josée Fortin	UQO	Clement Hardy				
	Marie-Josée Fortin	UofT	Jun-Long Huang - PDF3				
	Harry Nelson	UBC	Hugh Scolah - PDF5				
	Christian Messier	UQAM	Catherine Beth Turner - PhD8		Catherine Beth Turner - PhD8		
	Fangliang He	UofA			Zijing Luo - PhD5		
	Marie-Josée Fortin & Patrick James	UofT			PhD6		
	Charles Nock	UofA			PhD7		
	Marie-Josée Fortin & Patrick James	Dalhousie				PDF4	
Theme 5	Christian Messier	UQAM	Catherine Beth Turner - PhD8				
	Harry Nelson	UBC	Hugh Scolah - PDF5				
	Olivier Villemaire-Côté	ULaval	Dieu Merci Lofemba - PhD9				
	Harry Nelson	UBC	Tali Pukier - MSc5				
	Christian Messier	UQO	PDF6				
	Lance Robinson & Bullock	UWinnipeg	MSc4				
	Harry Nelson	UBC				MSc10	
Theme 6	Christian Messier	UQO	Sebastien Guerrero - MSc8				
	Brad Pinno	UofA	Kyle Dues - PhD11				
	Charles Nock	UofA	PDF7				
	Olivier Villemaire-Côté	ULaval	Etienne Morissette - MSc6				
	Brad Pinno	UofA				PDF8	
	Brad Pinno	UofA					MSc7
	Jen Beverly	UofA					MSc9

HQP assignment across each of the six DIVERSE Themes supervisor(s) and location. (UQO = Université du Québec en Outaouais; UofA = University of Alberta; ULaval = Université Laval; UofT = University of Toronto; UBC = University of British Columbia; UQAM = Université du Québec en Montréal; Dalhousie = Dalhousie University; UWinnipeg = University of Winnipeg).

Data Collection & Sharing

As part of the ongoing efforts to achieve the DIVERSE Project's objectives, we seek to achieve our research goals, the research team is working closely with our partners to collect local data from each of the DIVERSE sites, which will feed directly into each of the six themes. Further, by acquiring this finer-scale data, our work will more accurately reflect each DIVERSE site's forest management practices and challenges, strengthening our findings' robustness and applicability. This will be especially important in Theme 4 (see above), where extensive data are required to parameterize and calibrate vegetation dynamics and future projections in LANDIS-II across a series of forest management strategies and global stressors. To facilitate this data request and transfer, our team has created a DIVERSE Partner Data Request Guidance Document, which also includes a guidance video. Briefly, the data relevant, include, but are not limited to: 1) forest inventory data, 2) sample plot data and local tree growth curves, 3) soil inventory data, 4) natural disturbances data, 5) forest harvesting data (past and present), and 6) land use data.



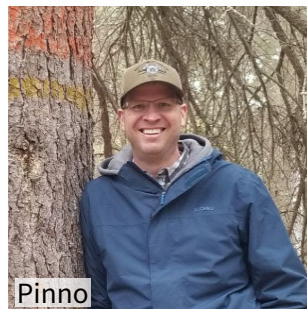
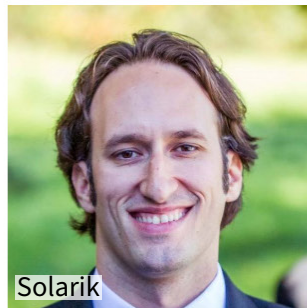
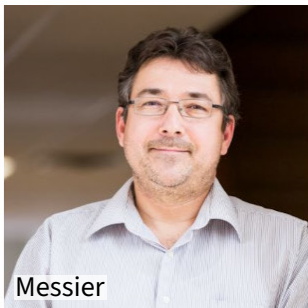
Project Leadership Team & Support Staff

Project Leadership Team (PLT)

- Dr. Christian Messier, Université du Québec à Outaouais - the Principal Investigator
- Dr. Kevin Solarik, NCASI - Project Co-Lead
- Dr. Charles Nock, University of Alberta - Project Co-Lead
- Dr. Brad Pinno, University of Alberta - Project Co-Lead and Theme 6 Lead

Support Staff

- Kathryn Knodel, University of Alberta, Western Project Coordinator (Hired in May 2024)
- Madeleine Gauthier, Université du Québec à Outaouais, Eastern Project Coordinator (Hired in November 2024)
- Kim Bannon, Université du Québec à Montréal, Administrative Assistant (Assigned November 2023)
- Clément Hardy, Université du Québec à Montréal, LANDIS-II Technical Assistant
- Matthew Garcia, University of Minnesota, LANDIS Programmer and Analyst





Science & Steering Committees

To ensure that the DIVERSE project remains focused and executes research aligned with its primary objectives outlined in the proposal, two committees have been established in November 2024: the Science and Steering Committees.

The Science Committee is tasked with ensuring scientific integration, fostering collaboration, and maintaining the relevance of the project's work. By providing expert guidance, the committee:

- Delivers actionable insights for partners and stakeholders,
- Advises the Steering Committee,
- Identifies research gaps, and
- Ensures alignment with project goals and practical applications.

The Science Committee will meet at least twice annually, using a consensus based on the prioritized decision-making process.

The Steering Committee ensures the project aligns with its objectives, while providing a platform for stakeholders to contribute to innovative, socially acceptable solutions for forest management. The Steering Committee meets annually and focuses on high-level oversight, including:

- Setting program objectives,
- Reviewing and approving program plans and budgets,
- Monitoring progress and performance indicators, and
- Providing guidance on program direction and priorities.

Committee Composition

(See Appendix for full list of committee members)

Both committees include a diverse range of stakeholders, who were chosen to ensure balanced representation in terms of their geographic location in Canada and their expertise. We also made sure to prioritize an EDI approach when selecting members which include:

- Project Leadership Team,
- Theme Leads,
- Research coordinators,
- Government representatives,
- Forest industry partners,
- Non-Government Organizations (NGO),
- Highly Qualified Personnel (HQP),
- Indigenous/right holders' representatives, and
- External representatives.

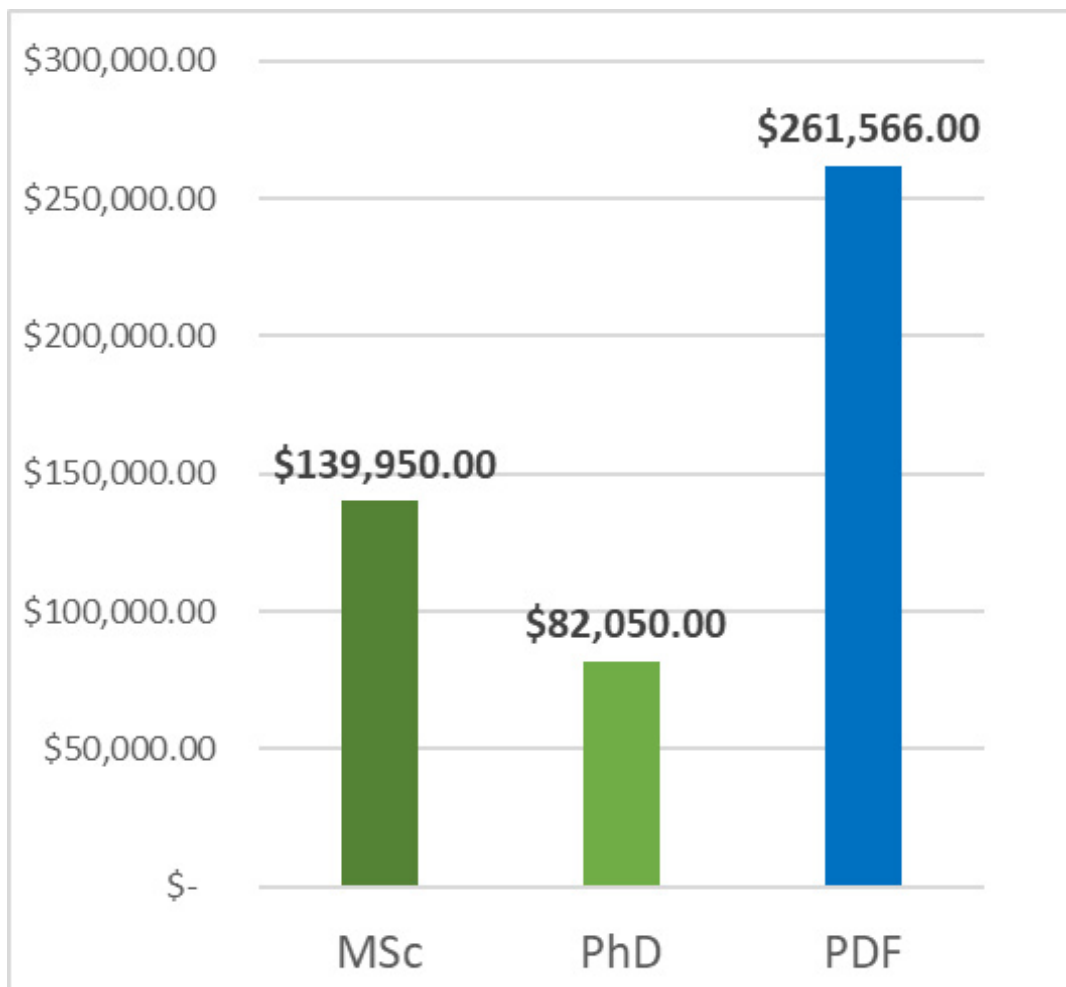


Project Partner Contracts & Agreements

Much of the work put in by our coordinators this past year has been in developing research agreements between us and our partners, as well as between universities themselves to send out funding to each institution. Given the project's extensive network of partners, and the large number of students and researchers involved, this process was complex and time-consuming. Our support staff played a key role, dedicating six months of intensive effort to complete the agreements by late summer.

Finances

The DIVERSE project is funded through the contributions of our partners, as well as NSERC Alliance and Mitacs. For every \$1.00 of eligible partner contributions, Mitacs contributed a matching \$1.00. Mitacs funds operate differently than our NSERC funding; Mitacs grants go towards HQPs (highly qualified personnel) stipends, rather than other research related costs. This year, we received a combined amount of \$315,000 from Mitacs and our partners, and \$873,066.00 from NSERC, for a total of **\$1,188,066** funding for the 2023-2024 project year. In addition to our cash funds, our partners committed to **\$2,326,500** of in-kind contributions for 2024.



DIVERSE Year 1 : Funding towards HQPs in the first year of the DIVERSE project.



DIVERSE Website

We launched the DIVERSE website in June 2024, providing a dedicated platform to share our research with the public, researchers and partners as part of our internal communication strategy. This will streamline access to forms, files and internal administrative procedures. We are also tracking website analytics to inform useability and to optimize content.

Social Media

To further expand our reach, the DIVERSE team has established several social media pages that outline the project. We have launched a LinkedIn Profile and Page (insert link) to grow our professional network, which already has 360 followers. This page serves as a platform to share communication resources (e.g., peer-reviewed articles, graduate student opportunities, project updates and results). In addition, we have created an Instagram account (link) to enhance our science communication through photos and videos.

Newsletter

We published our first triannual newsletter in July 2024 and are currently finalizing the upcoming Fall edition. Moving forward, we plan to release a newsletter each season, featuring:

- Updates on research progress across themes,
- A Partner's Spotlight showcasing collaborations with the industry,
- Highlights of graduate students' research
- Upcoming project milestones, and
- Relevant communications (e.g., peer-reviewed articles, videos, etc.)

Below: DIVERSE Newsletters Schedule

Newsletter	Time Published
Fall (Sep-Dec)	January
Winter (Jan-Apr)	May
Summer (May-Aug)	September

Events

- **Picture a Scientist documentary viewing:** on November 28th, 2024, UofA DIVERSE researchers and their lab members took part in a documentary viewing of "Picture a Scientist", a documentary in which leading female scientists discuss the inequalities they've faced as they write a new chapter in STEM for women.
- **DIVERSE Webinars Series:** We kicked off our DIVERSE webinar series in June, with a presentation from Dr. Christian Messier. All our webinars are available to view on our [YouTube channel](#).

Fact Sheets

The research team has collaboratively developed seven 2-page fact sheets: one providing an overview of the entire project and one for each of the six research themes. These fact sheets, which will be available on [our website](#), are designed for the general audience, while offering sufficient detail to serve as valuable resources for stakeholders when needed.



Science & Steering Committee Members

Member	Affiliation	Role in the Committee	Science Committee	Steering Committee
Christian Messier	Université du Québec en Outaouais	Principal Investigator		
Kevin Solarik	NCASI	Co-Principal Investigator		
Brad Pinno	University of Alberta	Co-PI & Theme 6 Lead		
Charles Nock	University of Alberta	Co-Principal Investigator		
Isabelle Aubin	NRC - CFS	Theme 1 Lead		
Olivier Villemaire-Côté	Université Laval	Theme 2 Lead		
Marie-Josée Fortin	University of Toronto	Theme 3 & 4 Lead		
Harry Nelson	University of British Columbia	Theme 5 Lead		
Kathryn Knodel	University of Alberta	Research Coordinator		
Madeleine Gauthier	Université du Québec en Outaouais	Research Coordinator		
Nelson Thieffault	CFS - Canadian Wood Fibre	Government representative		
Caren Dymond	BC Government	Government representative		
Étienne Vézina	Resolute	Forest industry partner		
Doug Turner	Université Laval	Theme 2 Lead		
Solange Nadeau	CFS - Laurentian	Indigenous/ First Nations/ Right Holders		
To be filled	To be filled	Indigenous/ First Nations/ Right Holders		
Karen Saunders	World Wildlife Fund	NGO		
Beth Turner	Université du Québec en Outaouais	Student (HQP) Representative		
Peter Reich	University of Michigan	External representative		
Anthony D'Amato	University of Vermont	External representative		
Simon Beaudry	Université du Québec en Outaouais	Host University Representative		
Jodi Axelson	BC Government	Government representative		
Stephen Mayor	Ontario Government	Government representative		
Stephanie Parzei	Interfor	Forest Industry Partners		
Gord Whitmore	Mercer	Forest Industry Partners		
Kevin Webber	Ts'elxwéyeqw's Nations	Indigenous/ First Nations/ Right Holders		
Kurt Pochailo	Miisun	Indigenous/ First Nations/ Right Holders		
Kirsten Vice	NCASI	NGO		
Maria Janowviack	NIACS	External representative		
Aaron Weiskittel	University of Maine	External representative		



Links

- [DIVERSE website](#)
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- Our [most recent newsletter](#)
- [Fact Sheets](#)