Climate Change Adaptation Strategy for Nova Scotia's Christmas Tree and Greenery Industry

Climate Adaptation Leadership Program
November 2022

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Nova Scotia's Christmas tree and greenery industry[1] produces quality products that are in growing demand locally and internationally. But climate change is here, and the industry is experiencing the impacts. The time between regeneration and harvesting a mature and marketable product can be 8-10 years or more so producers face immediate threats from climate change impacts while they must also plan and prepare for conditions 10 years in the future. To capitalize on opportunities for growth while managing impacts of climate change, the industry needs to be strategic, coordinated, and take an all-hazards approach across the value chain. This strategy, developed by a team of stakeholders from across the industry, presents a set of agreed-upon outcomes designed to support industry-wide action to increase preparedness for climate change.

Top industry concerns regarding climate change, identified through the work of the Scan Team, include the impact on tree farms, nurseries, seeds, and seedlings, as well as impacts on labour. Training, research and development, education, and information exchange were identified as essential strategies for reducing industry vulnerability to climate change. Although impacts of climate change are difficult to predict making challenges associated with them complex to address, Nova Scotia's Christmas tree and greenery industry has already begun the process of preparing themselves. This strategy builds on these efforts while addressing critical gaps and provides a pathway for the industry to achieve the adaptation outcomes they have identified.

At its core, effective adaptation to climate change requires coordinated collective action. Many of the strategy outcomes aim to improve coordinated action across the industry. Immediate priority should be given to:

- Creating and enhancing collaborative communication surrounding how the industry is adapting and can further adapt to climate change

- Developing robust partnership and processes to coordinate and sustain industry climate change adaptation efforts between the Christmas tree and greenery industry and provincial and federal governments as well as other key groups associated with the industry

- Creating awareness and using up-to-date climate and adaptation knowledge, information, and materials to support strategic planning and risk management

- Updating, using, and adapting best management practices for all parts of the industry value chain

- Putting processes in place to update and revitalize policies, regulations, and programs to leverage opportunities and minimize risks to industry associated with climate change

- Attracting new entrants to the industry who will actively be engaged in adaptation efforts

- Educating consumers about how supporting Nova Scotia's Christmas Tree and Greenery industry and products helps rural Nova Scotia adapt to climate change

Immediate next steps towards the implementation of this strategy include communication of this strategy to industry stakeholders and engagement with the sector. Communicating the strategy throughout the industry fosters collective understanding, commitment, and ownership of the strategy. Following industry commitment, next steps include the creation of industry representative governance group and implementation teams. Implementation teams will be tasked with developing implementation plans, and developing and implementing workplans and activities designed to achieve the adaptation outcomes outlined in this strategy.

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[1] In the context of this analysis report and the climate adaptation strategy that these results will be used to develop, 'industry' refers to the entire Christmas Tree and Greenery system including growers and nurseries, grading, transportation, and marketing. See Appendix 4 for the Christmas tree and greenery industry system map.

INTRODUCTION

Climate change is here (Eyzaguirre et al., 2022) and Nova Scotia's Christmas tree and greenery industry[2] is experiencing the impacts. Recent impacts of Hurricane Fiona include Infrastructure damage, safety concerns, and a need for additional supplies and services using valuable time that the industry is typically using to prepare for its busy season. While the industry faces an exciting opportunity for growth as demand for products increases, climate change complicates growth opportunities by presenting complex challenges adding to pre-existing issues such as labour shortages and meeting ever-earlier-season market demand. Planned industry responses need to be coordinated, strategic, and adaptive to changing conditions to capitalize on opportunities and manage threats.

Compared to most agricultural commodities, Christmas trees take a longer time to produce marketable products. It can take 8-10 years or more for a Christmas tree to mature. That means that while producers wrestle with current climate and extreme weather-related impacts, such as water shortages or wind damage, they must simultaneously plan for the future, by making smart planting and management decisions today that will be appropriate for climate conditions decades in the future. They need to anticipate consumer and market demands 10 or more years into the future as well as environmental suitability conditions over the same time frames.

In April of 2021, the Christmas tree and greenery industry began working with the Department of Environment and Climate Change (ECC), through the Climate Adaptation[3] Leadership Program (CALP), to develop a plan to guide partners from across the industry's value-chain to anticipate and strategically respond to changing climate related operating conditions. This industry-wide climate adaptation strategy is the result of that work. (see Appendix 1 for details on CALP's scope and approach).

Over the past 1.5 years, two dedicated teams contributed to the development of this climate adaptation strategy: a Scan Team and a Governance Team. The Scan Team, made up of representatives from across the Christmas tree and greenery industry, participated in a series of workshops and activities that included the development and analysis of a sector-wide climate change survey. This survey was implemented between July 14 and August 31, 2021. The survey asked questions about climate vulnerabilities and impacts, ways that climate change has been taken into consideration, and factors that increase the industry's effectiveness in addressing change[4]. The survey results, along with expertise supplied by the Scan Team, contributed to the development of this strategy. A governance team, made up of sector representatives and senior leaders from the Nova Scotia government, provided guidance throughout the process and will be instrumental in ensuring the effective implementation of the strategy.

This strategy is designed to help guide the industry to effectively adapt and thrive in the face of change by setting ambitious yet plausible outcomes, which, when achieved, will mean the industry is proactively preparing for and adapting to the changing climate. This strategy also highlights key partners that need to play a central role in its implementation as well as potential activities that could be considered stepping stones for enhancing the industry's ability to adapt.

Strategy Highlights

This strategy was developed using an outcome-oriented approach. An outcome-oriented approach is particularly well suited to climate change adaptation planning because it offers strong strategic direction by clearly describing the future end-state that the industry is trying to achieve while providing flexibility in the steps or activities taken to achieve those outcomes. This flexibility is critical because while the future end-

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[3] In human systems, adaptation is the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects (IPCC WGII Sixth Assessment Report Annex).

[4] For details on the structured CALP process and key findings from the industry-specific climate adaptation survey please see Appendices 2 and 3, respectively.

state is not expected to change there are many uncertainties about how climate change will play out and impact the industry: which climate risks will be encountered and when will they be experienced? Which part of the industry will be impacted when and to what degree? How will different groups along the value chain respond? What are the cascading or cumulative impacts of those responses? Due to the uncertainty of climate impacts, there are likely numerous possible solutions. As many solutions are available, there may be high uncertainty about which solution will work the best, both in the short- and long-term. Solutions that may be effective initially may need to be modified or replaced with other solutions over time. To manage this uncertainty, this adaptation strategy for Nova Scotia's Christmas tree and greenery industry is built around broad and ambitious outcomes with flexibility on adaptation.

Importance of climate change adaptation for the Christmas tree and greenery industry

The results of the climate adaptation survey put a spotlight on how interconnected climate change impacts on the Christmas tree and greenery industry are, how interwoven they are with other industry challenges, and that the response requires an approach involving partners from across the value chain. Results also suggest that the industry's ability to successfully deal with change, has been associated with engaging diverse industry stakeholders early on, nurturing relationships, and establishing agreement on the challenge and the outcome to be achieved. Clarity on outcomes, process and roles so diverse partners across the system know what to do and how to help one another may support more successful implementation. By implementing an effective and sustainably resourced engagement process around adapting to climate change, the industry can better coordinate and move knowledge into action and achieve its outcomes in the face of change and uncertainty.

Survey results suggest that the greatest industry concerns regarding climate change, is the impact on tree farms, nurseries, seeds, and seedlings - all of which are vulnerable to extreme weather, freeze thaw cycles, warmer average temperatures and changing precipitation patterns. These assets and inputs are necessary for industry success, are highly climate sensitive and directly exposed to the elements. Climate impacts on labour was another top concern that emerged from the survey. Working conditions are dangerous in extreme heat and with more heat-warnings anticipated, the health and safety and productivity of workers are vulnerable. Workers may also not have the requisite skills, information and knowledge needed to proactively anticipate, manage and mitigate climate risks and bring fragile products safely to market. Training, research and development, education and information exchange were seen to be key approaches for reducing industry vulnerability to climate change.

While there are many climate-related impacts that were indicated as top priority, the climate issue that emerged as most important stem from changes in temperature and precipitation. Warmer average temperatures, ice storms, and extreme hot days (particularly in Fall) affect tree health, tree quality and regeneration rates. They also affect consumer demand for Christmas trees and greenery products, since changes in tree quality and availability can lower market demand and market share for Nova Scotian trees. The changes in precipitation patterns also have a big impact on the Christmas tree and greenery industry. Floods stemming from more intense precipitation periods can also damage trees and farm infrastructure, while water shortage and drought may increase production costs if irrigation and drainage are necessary. Increased production costs and lost revenues may lead tree farmers to transition out of tree farming leaving the growing demand for Nova Scotia's trees under even more pressure while also impacting farm families and communities and the local economy in which they contribute to.

In addition to these direct impacts, there are indirect ways in which climate change is perceived to be impacting operations. It's creating more favourable conditions for existing pests and diseases and the emergence of new ones, which also indirectly threaten tree health, economic value, and the goal of increased production. Climate change is also creating a more uncertain operating environment. Events are less predictable. It's harder to anticipate how severe the impacts could be and how they might cascade through the value chain. This makes long term and seasonal planning more challenging, particularly for transportation handlers, graders, and marketers who rely on accurate supply and demand forecasts of tree and greenery products.
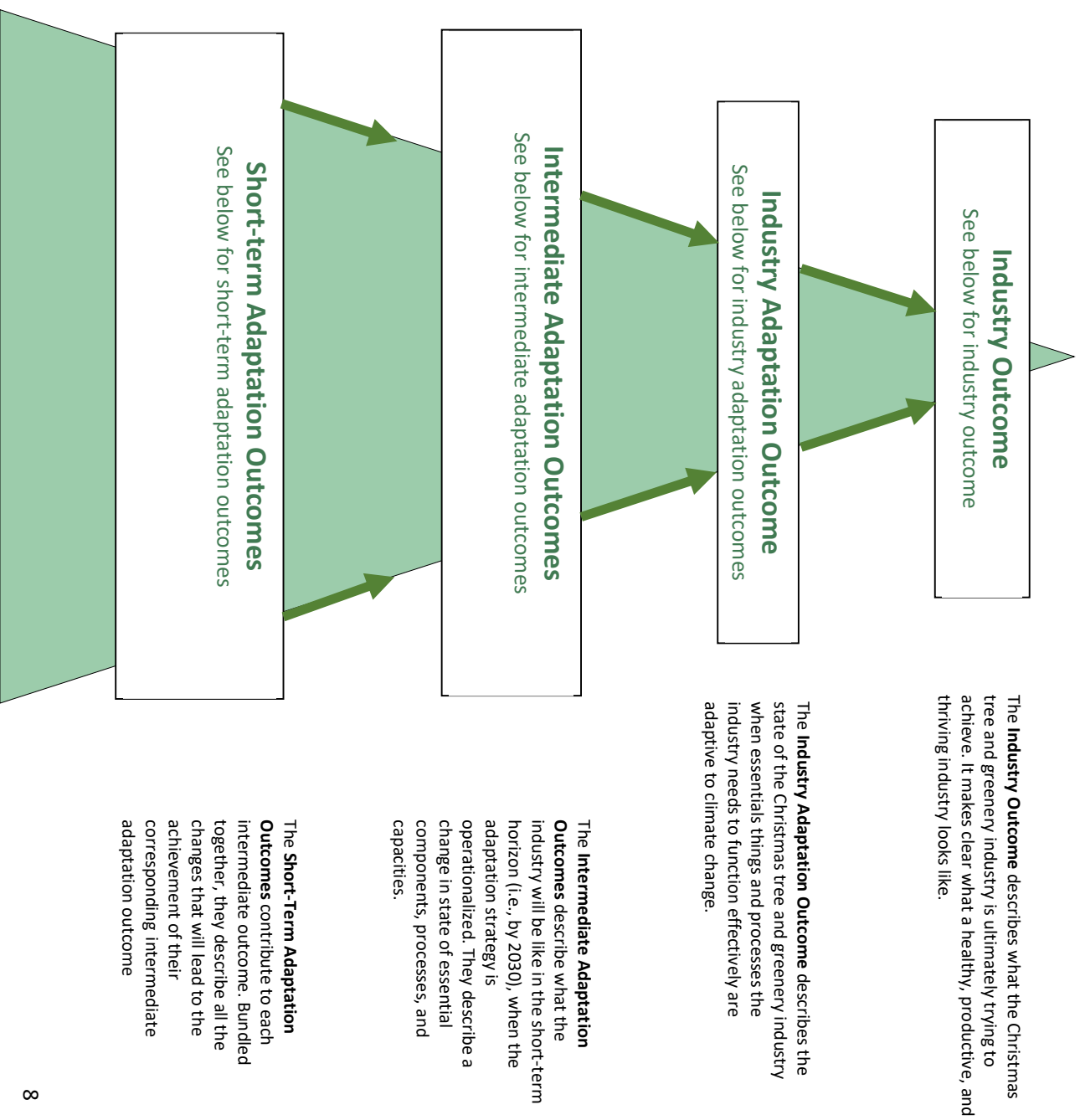
Survey results show that over the past year the Christmas tree and greenery industry have taken climate change into consideration particularly when it comes to long term planning, operational decision making and product development. Climate change, however, was not regularly taken into consideration at the tree farm level. This suggests Christmas tree producers are aware of climate change, but it may not yet be a top priority. Scan Team members suggested that the industry could benefit from being more proactive when it comes to dealing with threats and the survey results indicate the industry may be better at dealing with slow onset climate change issues like gradual warming, and changes in species distribution. Sudden changes and crises such as new pest or diseases, or large-scale infrastructure damage may pose a greater challenge.

Climate change adaptation in Nova Scotia agricultural industry

Nova Scotia's agricultural industry, which plays an integral role in supporting the health and well-being of all Nova Scotians, is experiencing significant challenges and opportunities due to direct and cascading impacts of climate change. To better prepare for climate change, three agricultural sectors - cattle and sheep, horticulture, and Christmas tree and greenery - participated simultaneously in the CALP Program to conduct a climate change scan and produce sector-specific climate change adaptation strategies. Climate change presents different risks to each sector and each strategy reflects the sectors' unique climate adaptation priorities by outlining sector-specific adaptation outcomes. However, high-level themes that emerged were similar across all, presenting an opportunity for cooperation across sectors in the implementation of their strategies. Coordinating adaptive actions could help optimize resources, reduce redundancies, and support a synergistic approach to implementation in areas such as knowledge mobilization, research, and building stronger partnerships across value chains.

Figure 1: The framework used to organize outcomes within this strategy. The industry outcome at the top represents what the Christmas tree and greenery industry aims to achieve overall - not just in the face of climate change but in the face of all potential challenges and opportunities that the industry may encounter over time. Outcomes presented below the industry outcome are climate-change specific and reflect an increasing level of detail from top to bottom. These outcomes help to focus and organize the strategy and they are designed to guide action that the Christmas tree and greenery industry can take to prepare for climate change. Arrows show that accomplishments at each level are intended to contribute to the achievement of the outcome(s) at the level above.

Industry Outcome
See below for industry outcome

Industry Adaptation Outcome
See below for industry adaptation outcomes

Intermediate Adaptation Outcomes
See below for intermediate adaptation outcomes

Short-term Adaptation Outcomes
See below for short-term adaptation outcomes

The **Industry Outcome** describes what the Christmas tree and greenery industry is ultimately trying to achieve. It makes clear what a healthy, productive, and thriving industry looks like.

The **Industry Adaptation Outcome** describes the state of the Christmas tree and greenery industry when essentials things and processes the industry needs to function effectively are adaptive to climate change.

The **Intermediate Adaptation Outcomes** describe what the industry will be like in the short-term horizon (i.e., by 2030), when the adaptation strategy is operationalized. They describe a change in state of essential components, processes, and capacities.

The **Short-Term Adaptation Outcomes** contribute to each intermediate outcome. Bundled together, they describe all the changes that will lead to the achievement of their corresponding intermediate adaptation outcome

The outcomes in this strategy are arranged in a hierarchical structure (see Figure 1). The industry outcome describes the optimal state of the Christmas tree and greenery industry and provides industry context for the adaptation outcomes. The industry adaptation outcome is representative of the ideal state of the industry when it is adapted to climate change. The overarching industry adaptation outcome is comprised of 4 unique theme areas, each with a singular intermediate adaptation outcome. The intermediate adaptation outcomes are broken down further into manageable short-term adaptation outcomes. These short-term adaptation outcomes, together, contribute to achieving the theme area intermediate adaptation outcome. Similarly, the intermediate adaptation outcomes, together, contribute to achieving the industry adaptation outcome.

The Scan Team worked collaboratively to develop the strategy outcomes. All adaptation outcomes were informed by results of the Christmas tree and greenery industry climate adaptation survey including priority vulnerabilities (essential things and processes[5] that were identified through the survey as being both important and vulnerable to climate change), climate change impacts, effectiveness factors (factors[6] associated with an experience dealing with change that increase the effectiveness in addressing that change), and what the industry is currently doing to address climate change[7]. A summary of key survey results can be found in Appendix 2.

Industry Outcome

The overarching outcome that Nova Scotia's Christmas tree and greenery industry aims to achieve is:

"Nova Scotia's Christmas tree and greenery industry[8] is sustainably[9] expanding, productive, profitable, viable, and innovative. Quality products are driving high demand from local and international markets, and the industry is providing stable jobs and benefits for rural and urban communities".

Industry Adaptation Outcome

The adaptation outcome is the desired state of the Christmas tree and greenery industry when it is adapted to climate change:

> *"Nova Scotia's Christmas tree and greenery industry is proactively prepared for climate change. Important components[10] and processes[11] are adaptive to the impacts of climate change. The industry is opportunity- and risk-aware and is applying its knowledge to effectively adapt and capitalize on opportunities resulting from a changing climate".*

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[5] The system map showing things (i.e., inputs and enabling environments) and processes important for the industry to achieve its desired outcomes can be found in Appendix 4

[6] Factors associated with experience included context (e.g., who and how many people were involved, whether people agreed on various aspects like who to involve, what should be done, or outcomes to be achieved), the nature of the challenge (i.e., its complexity), the processes associated with the experience (e.g., whether people knew what to do, if communication was adequate, whether the process was well designed and implemented), and people and relationships associated with the experience (e.g., engagement level, ease of collaboration, resources available)

[7] How frequently over the past year they had taken climate change into consideration across 22 situations

[8] In context of the climate adaptation strategy, industry refers to the entire Christmas tree and greenery system including growers, seedling producers, suppliers, distributors, transporters, brokers, etc. See Appendix 4 for the Christmas tree and greenery industry system map.

[9] In the context of the climate adaptation strategy, sustainable refers to environmental, economic, and social sustainability. IPCC WGII Sixth Assessment Report Annex, 2022 definition of sustainability is: Involves ensuring the persistence of natural and human systems, implying the continuous functioning of ecosystems, the conservation of high biodiversity, the recycling of natural resources and, in the human sector, successful application of justice and equity

[10] Important industry components include tree farms, nurseries, seeds, and workers/skilled labour.

[11] Important industry processes include growing & maintenance, regeneration (natural & planning), research & development, and education & information exchange.

Intermediate and Short-Term Adaptation Outcomes

Intermediate outcomes with their corresponding short-term outcomes are found in Table 1 below. Each of the 4 theme areas focuses on addressing areas of concern related to climate change while also incorporating ways to increase the effectiveness and adaptability of the sectors.

Table 1: Intermediate and short-term adaptation outcomes

Theme	Theme focus and outcome statements
1. Industry Leadership and Partnership	Nova Scotia's Christmas tree and greenery industry is made of many parts and components that work together to produce high quality Christmas tree and greenery for the market. Effective collaboration and coordination among stakeholders across the industry is an important way to effectively manage climate change risks and opportunities. Having in place collaborative processes and effective partnerships can increase the likelihood of successful, coordinated adaptation across the whole industry. **Intermediate adaptation outcome 1**: By 2030, Nova Scotia's Christmas Tree Council, Christmas tree and greenery industry and partners[12] are effectively implementing, monitoring, and updating their industry's climate change adaptation strategy and are using the capacity and networks necessary to sustain adaptive action. **Short-term adaptation outcomes**: 1.1 By 2023, the Christmas Tree Council of Nova Scotia and the Christmas tree and greenery industry have in place robust partnerships and relationships and collaborative processes that are being used to collaboratively implement the industry's climate change adaptation strategy. 1.2 By 2024, Nova Scotia's Christmas Tree Council and the Christmas tree and greenery industry are achieving their climate change adaptation outcomes through robust partnership arrangements with provincial and federal governments, and key groups associated with the industry that are facilitating industry-wide collaboration on implementing the climate change adaptation strategy.
2. Enhancement and Application of Knowledge to Support Effective and Sustainable Climate Change Adaptation	Availability, accessibility and usability of relevant knowledge, information, and tools for climate change action are essential and facilitate the development and implementation of effective responses to emerging priorities and changing production, processing, and marketing practices. **Intermediate adaptation outcome 2**: By 2030, the Christmas Tree Council of Nova Scotia, Christmas tree and greenery producers, and industry stakeholders are actively monitoring,

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[12] Including provincial and federal governments, research and post-secondary institutions and extension services.

sharing, and using critical knowledge, information, and tools to adapt and enhance their business[13] and industry in the face of climate change.

Short-term adaptation outcome:

2.1 By 2025, Christmas tree and greenery industry-specific climate and adaptation data, knowledge, information, and tools that support adaptation efforts are regularly used by the industry, the Christmas Tree Council of Nova Scotia, and other industry stakeholders to support strategic planning, risk management, production management, and decision-making

2.2 By 2027, the Christmas Tree Council of Nova Scotia and Nova Scotia's Christmas tree and greenery industry are continuously and collaboratively partnering with research providers to focus and generate innovative, long-term, industry-led research that is supporting proactive climate change adaptation; research is sustainably supported and funded by industry stakeholders and partners.

2.3 By 2028, the Christmas Tree Council of Nova Scotia and other Christmas tree and greenery industry stakeholders are translating research into usable knowledge, information, and tools about production, harvesting, handling, transportation, consumer demand, and market conditions in the face of climate change and are actively using that knowledge to thrive and be prepared for uncertain conditions.

3. Accessible, Adaptive and Innovative Services and Programs	The programs and services delivered by associations, government, and research institutions help industry access expert advise, resources, technology, and supports. Access to reliable, up-to-date, and affordable adaptive and innovative services and programs can help enable effective adaptation and growth efforts made by Nova Scotia's Christmas tree and greenery industry.

Intermediate adaptation outcome 3:

By 2030, government, research institutions, and industry associations are delivering programs and services (including research) and setting directives through regulations, policies, and standards that support Christmas tree and greenery industry growers and distributors to proactively respond to climate change, recover from setbacks (e.g., associated with extreme weather events or pest management), and thrive

Short-term adaptation outcome:

3.1 By 2024, Government, industry, and research institution programs are supporting industry education, practices, and shifts in operations through programs, services, and directives, including climate change-related investments in infrastructure and recovery supports (e.g., crop insurance).

3.2 By 2030, Provincial and Federal Governments, the Christmas Tree Council of Nova Scotia and other Christmas tree and greenery industry associations have strong, collaborative relationships and processes to regularly update and revitalize relevant agricultural, environmental, and trade policies, regulations, and standards as well as programs and services to address the

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[13] Tree regeneration requires a period of 10 years so Christmas tree and greenery industry's decision-making must factor in this planning horizon

shifting industry needs for ensuring continuous and prosperous growth in the face of climate change.

3.3 By 2023, the profitability, sustainability, and climate-readiness of Nova Scotia's Christmas tree and greenery industry is continuing to attract new entrants to the industry.

4. Sustainable Management and Productive Processes	For the Christmas tree and greenery industry to remain sustainable and viable in the face of climate change they need to continue to use and/or adopt new practices. This means taking an innovative and proactive industry-wide approach to adapt vulnerable components associated with growing, storing, marketing, and transporting. **Intermediate adaptation outcome 4**: By 2030, producers and distributors are adjusting production[14] and distribution practices to suit new and emerging climate conditions, in a manner that is proactive, sustainable, cost-effective, and profitable industry-wide. **Short-term adaptation outcomes**: 4.1 By 2025, representatives of Nova Scotia's Christmas tree and greenery industry, including provincial and federal governments, the Christmas Tree Council of Nova Scotia, and other industry associations are collaboratively communicating the needs of the industry and actively negotiating and sourcing inputs to develop supply chains to ensure industry input needs are met in a timely and economically feasible manner in the face of climate change. 4.2 By 2025, Nova Scotian Christmas tree and greenery producers are actively updating, using, and adapting agreed upon and sustainable best climate adaptation management practices and techniques to increase production. 4.3 By 2026, the quality of Nova Scotia's Christmas tree and greenery products are improving through the industry-wide adoption of updated guidelines for optimal and safe shipping and handling in extreme weather or fluctuating conditions caused by climate change. 4.4 By 2027, Nova Scotian Christmas tree and greenery sales are increasing to well-informed consumers who understand the environmental benefits of buying local trees to help Nova Scotia adapt to climate change.

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[14] Production includes vegetation, pest, and disease management

This strategy acts as a starting point to help orient the Christmas tree and greenery industry to become more climate-change ready. The strategy framework provides a progressively more detailed breakdown of outcomes that the industry aims to achieve. All short-term outcomes are important, but it can be helpful to show which should be achieved first in order to prepare the groundwork for subsequent work. The Scan Team worked together to identify priority short-term outcomes that should be considered during the initial phase of implementing the strategy. Priorities are presented in Table 2 below, along with possible activities they identified that could contribute to achieving the outcomes (See appendix 3 for a more fulsome list of potential activities). Activities are the result of initial suggestions by the Scan Team and ECC to kickstart implementation action of the strategy. Activities may be amended and updated as needed by the teams implementing the strategy. A more detailed and comprehensive list of implementation activities will be needed for each short-term adaptation outcome and supporting implementation plans and/or workplans. These workplans will be developed and updated by the sector's implementation teams (see Next Steps section of this report for more details.

Table 2: Priority short-term outcomes, rational, and possible activities

Priority short term outcome	Rationale	Possible Activities in support of this outcome
1.1 By 2023, the Christmas Tree Council of Nova Scotia and the Christmas tree and greenery industry have in place robust partnerships and relationships and collaborative processes that are being used to collaboratively implement the industry's climate change adaptation strategy.	Strategy implementation will be more effective and efficient when strong collaborations between industry, industry associations, and government agencies are in place.	• Establish or repurpose an industry representative partnerships and governance processes that will transparently and equitably coordinate achievement of the industry's climate change adaptation strategy • Develop decision making and prioritization processes for the sector adaptation strategy and governance system that transparently defines representation, powers and responsibility and decision-making responsibilities
1.2 By 2024, Nova Scotia's Christmas Tree Council and the Christmas tree and greenery industry are achieving their climate change adaptation outcomes through robust partnership arrangements with provincial and federal governments, and key groups associated with the industry that are facilitating industry-wide	The industry's survey highlights successful outcomes that are associated with partners working together on shared sector outcomes with each partner having clearly defined roles and good information sharing techniques. Collaborative partnerships through 4.1 lays the	• Develop and implement a simple monitoring system to enable sector adaptation governance system to track its performance on achieving the strategy outcomes. • Develop and agree to partnership agreements between partners on the strategy

collaboration on implementing the climate change adaptation strategy.	foundation for the successful implementation of the industry's adaptation strategy.	
2.1 By 2025, Christmas tree and greenery industry-specific climate and adaptation data, knowledge, information, and tools that support adaptation efforts are regularly used by the industry, the Christmas Tree Council of Nova Scotia, and other industry stakeholders to support strategic planning, risk management, production management, and decision-making	Having Up-to-date industry-specific climate change information and people knowing how to access, and use this information is foundational in supporting long term planning, management and resourcing decisions, and operational decisions (including worker safety).	• Work with industry and researcher identify industry-wide climate data needs and gaps (including must have and would like to have) • Work with industry associations to identify how information can be most effectively distributed to and used by the industry for most effective uptake. • Establish partnership with researchers and data collection agencies (ECC, ECCC, AG Canada), and climate services provides (CLIMAtlantic) to support sustained collection, storage, interpretation, and visualization of climate data and information.
2.2 By 2027, the Christmas Tree Council of Nova Scotia and Nova Scotia's Christmas tree and greenery industry are continuously and collaboratively partnering with research providers to focus and generate innovative, long-term, industry-led research that is supporting proactive climate change adaptation; research is sustainably supported and funded by industry stakeholders and partners	This short-term outcome is closely related to short-term outcome 1.1: Once industry specific and relevant information is available to industry stakeholders, industry stakeholders need the confidence, knowledge, skills, and support to use the information, knowledge, and tools so they can inform planning, site selection, best management practices, harvesting, grading, shipping and storge decisions. Climate relevant best management practices will support the industry to be climate change adapted.	• Work with industry associations to pilot knowledge transfer and information sharing sessions across the industry • Work with industry associations and other partners to identify relevant mechanisms where industry specific data and information can be effectively shared, accessed, and used by industry stakeholders. • Develop funding programs and demonstration sites to plant and maintain shelterbelts around growing area to aid in sheltering Christmas trees from severe wind damage.
3.2 By 2030, Provincial and Federal Governments, the Christmas Tree Council of Nova Scotia and other Christmas tree and greenery industry associations have strong, collaborative relationships and processes to regularly update and revitalize relevant agricultural, environmental, and trade policies, regulations, and standards as well as programs and services to address the	Strong and collaborative partnerships between industry stakeholders, industry associations, and government agencies are critical in for supporting policy, regulation, and program updates. Industry stakeholder and association contributions ensure industry concerns can be taken into consideration. Industry input can lead to more effective uptake of policies,	• Establish an industry and government advisory panel to review existing policies, regulations, and programs, and how they may affect the industry in the face of climate change and make policy recommendations to government agencies.

shifting industry needs for ensuring continuous and prosperous growth in the face of climate change.	regulations and programs and a more adaptive industry	
3.3 By 2023, the profitability, sustainability, and climate-readiness of Nova Scotia's Christmas tree and greenery industry is continuing to attract new entrants to the industry.	This short-term outcome is linked to short-term outcome 2.2: New entrants may be more attracted if they see an industry that is sustainable, profitable, and climate-ready as a result of updated and collaboratively developed policies, regulations, and programs. New entrants may help industry growth through increased production and market expansion.	● Develop and implement a strategy, that emphasizes the industry's climate change adaptation efforts, to attract and encourage new entrants.
4.1 By 2025, representatives of Nova Scotia's Christmas tree and greenery industry, including provincial and federal governments, the Christmas Tree Council of Nova Scotia, and other industry associations are collaboratively communicating the needs of the industry and actively negotiating and sourcing inputs to develop supply chains to ensure industry input needs are met in a timely and economically feasible manner in the face of climate change.	Timely, affordable, and available inputs are critical for a climate adapted industry to prosper. Strong and effective collaboration between industry stakeholders, industry associations, and government agencies are crucial to ensure that industry can efficiently and affordably access necessary inputs.	● Partner with researchers and value chain stakeholders to map the industry's supply chain and identify critical constraints in current and projected climate scenarios. ● Carry out scenario planning with industry and government to explore options to overcome constraints. And develop and implement mechanisms that strengthen the industry's supply chain. ● Ensure supports and programs are in place to mitigate and help industry recover from climate related disruptions.
4.2 By 2025, Nova Scotian Christmas tree and greenery producers are actively updating, using, and adapting agreed upon and sustainable best climate adaptation management practices and techniques to increase production	For a climate-change adapted industry, producers must have timely and affordable access to updated best management practices and the inputs required so they can modify their current practices.	● Undertake a literature review to identify the most up to date best management practices for a climate adapted industry. ● Work with industry leaders to identify a mechanism to inform and train industry stakeholders of the most up-to-date best management practices and how to implement/utilize them. ● Work with NSDA, Perrenna, and industry to establish a monitoring and evaluation system to monitor the effectiveness of the best management practices.

KEY PARTNERS

The Christmas tree and greenery industry functions as a system that relies on tree nurseries and farms; grading, brokering, and distribution; marketing and consumption (see Appendix 4 for a system map of Nova Scotia's Christmas tree and greenery industry, developed by the Scan Team). The system relies on a coordinated collective approach which include people, processes, and components within each part of the system to function smoothly achieving the outcomes set by the industry. Given the wide range and multifaceted impacts of climate change and the interdependence of the Christmas tree and greenery industry parts, climate change impacts may affect industry system parts differently while still causing cascading climate change impacts to the entire Christmas Tree and greenery industry. Survey results showed that successful implementation of the industry's adaptation strategy may be more likely if the process is well designed with engagement, buy-in, participation and commitment from all parts of the industry system. Given these, ensuring that key partners are aware of and committed to the implementation of the industry's adaptation is important. The following key partners are suggested as a starting point for successful strategy implementation as they were named numerous times by Scan Team members. This list is not exhaustive and further details on specific partners associated with each short-term adaptation outcome can be found in Appendix 6.

❖ Federal and provincial government agencies provide resources, funding, and programs to industry stakeholders. They also update, develop, and administer relevant agricultural policies and regulations. These agencies include Agriculture and Agri-Food Canada (AAFC), the Nova Scotia Department of Environment and Climate Change and the Nova Scotia Department of Agriculture (NSDA).

❖ Nova Scotia Christmas tree and greenery industry stakeholders including growers, producers, marketers, retailers, transporters, graders, brokers, NSDA extension services and specialists, Perennia Christmas tree specialists, nurseries, and seedling producers

❖ The Christmas Tree Council of Nova Scotia who promotes and advocates the interests of Nova Scotia's Christmas tree and greenery industry with memberships spanning the entire industry. The council is a key partner that develop and facilitate industry stakeholder partnerships and strongly support and drive strategy implementation.

❖ Industry research specialists located at research institutions with on-going industry-relevant research including Dalhousie University, Acadia University, and Nova Scotia Community College.

NEXT STEPS

Having well-defined processes for implementing the strategy and monitoring progress will set the Christmas tree and greenery industry up for success when it comes to achieving the outcomes in this strategy. The table below outlines the recommended immediate next steps, in sequential order, for beginning the process of strategy implementation.

Priority Next Step	Purpose	Approximate timeline
Endorsement of strategy by Christmas tree and greenery industry Governance Team and confirmation of resources for implementation	Seek buy-in and endorsement of the Strategy by the Christmas Tree Council of Nova Scotia, NS Departments of Agriculture and Environment and Climate Change, Perennia, and Nova Scotia Federation of Agriculture. Explore availability of human and financial resources (ideal and likely) for initial and long-term sustained implementation	Winter 2023
Introductory engagement sessions with priority industry stakeholders.	Communicate strategy to key stakeholders. This will help initiate ownership of the strategy and commitment to action, increase awareness and understanding of adaptation outcomes, and identify next steps involved in implementation	Winter 2023
Formation of implementation team(s) tasked with achieving specific outcomes of the strategy.	Implementation teams will support organized implementation of the strategy including engagement with key partners and development of workplans containing key activities designed to achieve strategic outcomes.	Spring 2023
Training of implementation team	Relevant training on strategy implementation and monitoring will enhance teams' skills and knowledge for implementing the strategy and will increase likelihood of successfully achieving short-term, intermediate, and overarching outcomes.	Spring 2023
Development of workplans by implementation teams	Implementation teams will be tasked with the development of detailed intermediate-outcome and short-term outcome specific workplans, including tangible activities, timelines, and budgets. Workplans will be used to measure progress made towards achieving outcomes.	Summer 2023
Approval and confirmation of resourcing for implementation plan/s by Governance Team	Seek buy-in and approval of implementation plan/s by Governance Team	Summer 2023

CONCLUSION

Nova Scotia's Christmas tree and greenery industry produces quality products locally and internationally. While the industry faces an exciting opportunity for growth as demand for products increase, climate change presents complex challenges adding to pre-existing challenges such as labour shortages and meeting ever-earlier season market demand. Compared to other agricultural commodities, Christmas trees take a longer time to produce marketable products; it can take 8-10 years or more for a Christmas tree to mature so producers are wrestling with current climate and extreme weather-related impacts while they simultaneously make planting and management decisions today that are appropriate for climate conditions decades in the future.

Recognizing the need to act proactively and quickly to address vulnerabilities to climate change, the Christmas tree and greenery industry partnered with ECC to develop this climate adaptation strategy. The strategy uses an outcome-oriented approach, which is particularly well suited for climate adaptation planning because it offers strong strategic direction while providing flexibility in the steps or activities taken to allow for course-adjustment as uncertainties relating to climate change play out. The Scan Team - a group of stakeholders from across the industry - developed the outcomes using results of the survey and their expertise to inform the work. Outcomes are designed to help industry stakeholders visualize a common climate adapted future they are working towards together, and implementation plans will follow with more detail.

Outcomes are organized into three theme areas focussing on industry leadership and partnership, enhancing knowledge to support climate adaptation, services and programs, and sustainable management and productive processes. Within theme areas, outcomes are broken down into several manageable short-term outcomes. The Scan Team prioritized short-term outcomes that should be achieved during the initial phase of implementation to prepare the groundwork for subsequent work. Immediate priority should be given to: partnerships and relationships in place for industry-wide strategy implementation; use of industry-specific climate and adaptation data to support strategic planning, risk management, production management, and decision-making; partnerships for updating and revitalizing relevant policies, regulations, standards, programs, and services; communication of industry input needs and supply chain development; and updates, use, and adaptation of best climate adaptation management practices.

Climate change is experienced across the Christmas tree and greenery industry and therefore adaptation requires an industry-wide response. Achieving the adaptation outcomes will require the collective effort of all stakeholders working together, monitoring progress, and sustaining action. To successfully deal with climate change, industry stakeholders from producers, industry associations and, distributors, to government departments and researchers, need to be committed to the outcomes and engaged in well-designed processes for strategy implementation.

As a next step, a well-defined process for implementation and monitoring needs to be developed. Industry stakeholders should be engaged to enhance their understanding of what will be required to achieve the adaptation outcomes and collective ownership of the strategy. A coordinator should be hired and embedded in an organization to manage and monitor strategy implementation. Under the guidance of the coordinator, ECC, and strategy governance, and in collaboration with the implementation teams, workplans should be developed detailing activities, timelines, and budgets for achieving strategy adaptation.

The Christmas tree and greenery industry faces an exciting opportunity for growth if it can effectively anticipate and manage change into the future. It has dealt with change before and is ready to respond.

GLOSSARY

The Glossary provides the International Panel on Climate Change (IPCC WGII Sixth Assessment Report Annex, 2022). definition of some climate change-related terms used within this strategy

Adaptation
In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects

Climate change
A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer

REFERENCES

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IPCC WG11 Sixth Assessment Report Annex 11, 2022. Climate Change 2022, Impacts, Adaptation and Vulnerability. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Annex-II.pdf

APPENDICES

Appendix 1: Climate Adaptation Leadership Program (CALP) scope, methods, and approach

➢ **The CALP Program**

The Climate Adaptation Leadership Program (CALP) is a skills-development and capacity-building program intended to help enhance provincial departments and stakeholder's climate resiliency. Led by the Climate Change Division (CCD) within Nova Scotia's Department of Environment and Climate Change (ECC), the CALP program is partially funded by Natural Resources Canada (NRCan) through the Building Regional Adaptation Capacity and Expertise (BRACE) program, and partially by the Nova Scotia Government.

The CALP program is modelled around a typical adaptive management cycle which includes a 5-step process:

> Step 1. Becoming fully aware of climate risks and opportunities, as well as what factors make the industry effective in the face of change
> Step 2. Developing an industry adaptation strategy with strategic adaptation priorities
> Step 3. Pragmatically operationalizing the strategy
> Step 4. Monitoring and adjusting the strategy
> Step 5. Sustaining the strategy over the long term

➢ **Program Goal**

The CALP program uses a learn-by-doing approach to develop and implement an industry specific climate change adaptation strategy. Through the development and implementation of the industry adaptation strategy, the CALP process aims to enhance and build industry capacity while also increasing industry preparation and anticipation of climate related risks and opportunities in the present and in the future.

➢ **Why is this Important?**

The work of Nova Scotia's Christmas tree and greenery industry is a significant part of the holiday season throughout the province. Climate change and its cascading impacts threaten the industry's key things and processes, placing extra pressures on the industry. The climate change adaptation strategy developed through the CALP process helps to guide the Christmas tree and greenery industry in achieving industry adaptability and resiliency in the face of climate change, mitigate climate risks, and take advantage of any opportunities that arise.

> ➤ **CALP's Five-Step Learn-by-Doing Process**

Steps	What is involved

Step 1
 	
Study systems functions, priorities, capacities, and climate risks
 	
(Being Fully Aware)
	Three workshop series:
	
	    Workshop Series 1 – System Mapping
	
	    Workshop Series 2 – Survey Design
	
	    Workshop Series 3 – Data Analysis

Step 2 Adaptation strategy development (Being Strategically Oriented)	One workshop series: Workshop Series 4 – Strategy Development Approval of the strategy by scan and governance teams. The Christmas tree and greenery industry CALP scan is currently transitioning from Step 2 to Step 3 as of August, 2022.

Step 3
 	
Strategy implementation
 	
(Being Tactically Pragmatic)
	An implementation team will be selected to help with strategy implementation.
	
	Strategy implementation will follow a similar workshop format as Step 1 with 4 possible workshops:
	
	    Workshop Series A: Program Re-Orientation
	
	    Workshop Series B: Implementation Planning
	
	    Workshop Series C: Monitoring and Evaluation
	
	    Workshop Series D: Building the Champion Network

Step 4
 	
Build a monitoring & evaluation system
 	
(Being Feedback Responsive)
	Questions will be addressed to ensure that strategy implantation is going as planned and results are occurring as expected.
	
	Examples of questions to be addressed:
	
	    Are we achieving what we set out to do?
	
	    What needs to change?
	
	    What we did vs. what we were supposed to do?
	
	    Are we seeing the desired results?

Step 5 Make a plan to sustain action (Being Sustainably Networked)	A plan will be developed to move forward while continuing to build industry capacity with industry stakeholders.

> ➢ **Workshop Process Leading to the Adaptation Strategy**

Throughout steps 1 and 2, the Scan Team completed numerous workshops together. The workshops, which culminated into the adaptation strategy, are summarised below.

→ *Workshop 1 Series: System Mapping*

The first part of Workshop Series 1 was used as an orientation. Scan Team members were introduced to the CALP process and their roles within the process. During the remaining portion of Workshop Series 1, Scan Team members worked collaboratively in reviewing and validating a system model of the Christmas tree and greenery industry, prepared by the scan ECC facilitators and industry leads. This system model is a diagram that represents the intertwined components that work together for the successful operation of Nova Scotia's Christmas tree and greenery industry from production to marketing and 'consuming'. Once the system model was agreed upon and validated by the Scan Team, Scan Team members were also asked to validate industry outcomes, developed by ECC facilitators, and to develop a preliminary list of climate change impacts effecting the Christmas tree and greenery industry. These workshop outputs laid the foundation for the remaining workshop series to come.

→ *Workshop 2 Series: Survey Design*

The second workshop series saw the Christmas tree and greenery Scan Team agree-upon and validate an industry-wide Climate Change Survey. Industry ECC facilitators prepared a survey draft prior to beginning Workshop Series 2 based on the information gathered from Workshop Series 1, mainly the system model. Throughout the workshop series, Scan Team members collaboratively reviewed, edited, and validated the survey draft to create the final draft. Scan Team members also brainstormed the best ways to distribute the survey across their industry as well as ways to increase survey completion. After validation and endorsement from the scan Governance team, the survey was distributed via the processes outlined by the Scan Team, to the Nova Scotian Christmas tree and greenery industry.

The survey covered topics such as:

- Demographic questions
- Providing an example of experiencing change
- Identify priority things and processes likely to be affected by climate change
- Identify most concerning climate change impacts that effect the Christmas tree and greenery industry
- Identify where climate change is being considered throughout the industry on both an individual and industry-level basis

→ ***Workshop 3 Series: Data Analysis***

Workshop series 3 had Scan Team members analyzing data collected from their industry survey. Industry ECC facilitators led Scan Team members through various data analysis procedures, using the BNApp (a specifically designed online software), to give scan members a sense of where their data comes from and what it is saying. Scan Team members were then provided ample time to review key data emerging from the survey results and to discuss the meaning of the data findings. A full data analysis report was developed by industry ECC facilitators and validated and endorsed by both the Scan Team and scan governance team.

Data analysis covered throughout this workshop series included analysis on:

- Priority vulnerable things and processes to climate change
- Climate change impacts and opportunities
- Factors effective in addressing change
- Consideration of climate change on an individual and industry level

→ ***Workshop 4 Series: Adaptation Strategy***

The final set of workshops saw the Scan Team develop the industry's climate change adaptation strategy. Using the data collected from the survey, industry ECC facilitators developed a series of overarching, intermediate and short-term adaptation outcome statements which Scan Team members reviewed and validated until satisfied that all outcome statements represented the priorities of the Christmas tree and greenery industry. Scan Team members also developed a list of next steps as well as key and influential partners essential for strategy implementation.

ECC facilitators will seek endorsement from industry governance and Scan Teams before dispersing the strategy to the public.
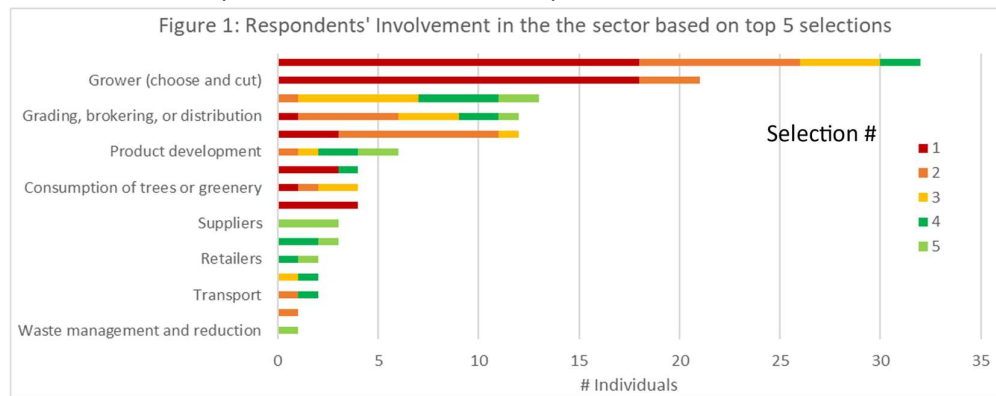
Appendix 2: Key findings from the industry-specific climate adaptation survey

The Christmas tree and greenery industry adaptation strategy was developed using the data gathered from the industry-wide climate change survey in the summer of 2021. This Appendix section provides a summary of the key messages that emerged from the survey data analysis.

|	
Survey distribution and engagement	**Who responded to the Christmas tree and greenery industry climate change survey?** The Christmas tree and greenery industry climate change survey received 48 respondents. To better understand the audience that completed the survey, survey respondents were asked to indicate what part of the Christmas tree and greenery industry they were involved with. Respondents were able to select more than 1 answer. The majority of respondents identified as a grower either supplying trees for export or for choose and cut. Of the survey respondents, there was at least 1 respondent for each answer option available. Figure 1: Respondents' Involvement in the the sector based on top 5 selections
Key Finding 1	**What Christmas tree and greenery industry things and processes did survey respondents consider most vulnerable to climate change?** Survey respondents selected tree farms, nurseries, seeds & seedlings and workers/skilled labour as the most vulnerable things to climate change. Survey respondents also indicated that growing & maintenance, regeneration, research & development and education & information exchange as the most vulnerable processes to climate change within the Christmas tree and greenery industry.
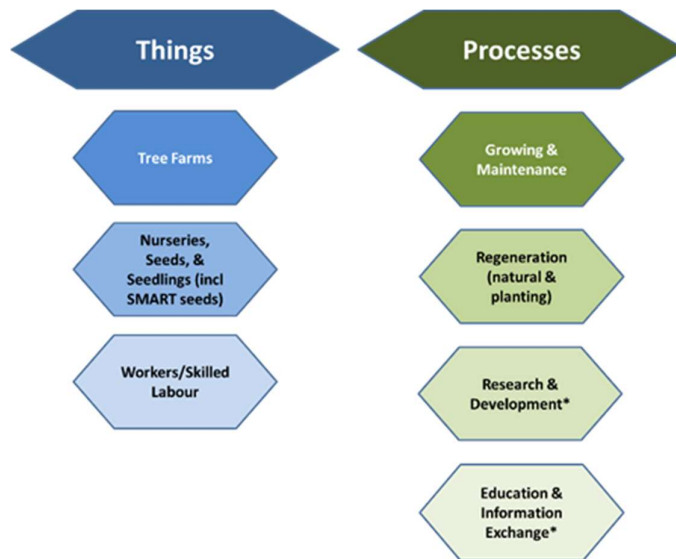
Key Finding 2	**What climate change impacts did survey respondents consider to be most threatening to the priority vulnerable things and processes?**
	Top climate impacts effecting the industry's priority vulnerable things and processes included: climate uncertainty, warmer temperatures, emergence of new pests and diseases, storm frequency, intensity & duration, ice storms, changes in rainfall amount, and existing pest or disease pressures. Top climate impacts indicated by respondents that only effect the industry's priority vulnerable processes include: flooding, periods of very hot days, cumulative heat units, increase in fall hot days, and climate conditions on transport routes.

Climate Impacts viewed as most likely to impact priority vulnerabilities
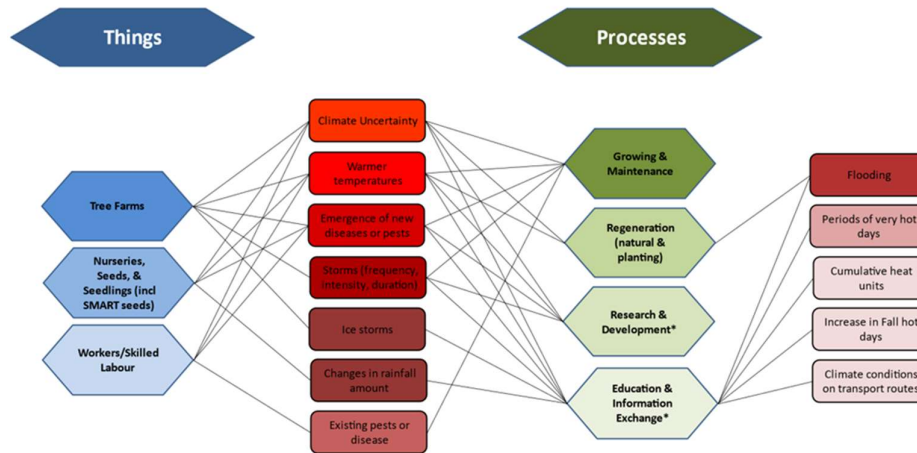
Key finding 3	**What effectiveness factors helped the Christmas tree and greenery industry's ability to adapt to change?**
	The Christmas tree and greenery industry's ability to successfully adapt to change was most largely influenced by having a well implemented process. Ensuring people know what to do as well as designing and implementing a monitoring system may help to ensure effective process implementation. The data also suggests that the Christmas tree and greenery industry may be positioned well to deal with slowly

emerging climate change issues while quickly emerging issues may pose a greater threat to the industry.

Effectiveness Factors contributing to positive outcomes

Success: Process implementation, Process design, Engagement, Relationships
- When process was well designed and well implemented, and when people involved were engaged, and relationships were easier, outcome was **>13x more likely to be successful**

People: Process implementation, Agreeing about the challenge, How quickly challenge emerged
- When process was well implemented, most to all agreed on the challenge, and the challenge emerged slowly, people were **>4 x more likely to be better off**

Things: Process implementation, How quickly challenge emerged, Resources
- When process was well implemented, the challenge emerged slowly, and financial & human resources were adequate to implement activities, things were **~5x more likely to be better off**

People (unintended): Process implementation, Taking risks
- When process was well implemented, and people felt OK taking risks, unintended people were **>8x more likely to be better off**

*****Process implementation:** Process design, Knowing what to do, Monitoring
- When process was well designed, people knew what to do, and monitoring was designed & used, process was **>10x more likely to be well implemented**

Key finding 4	**How often climate change is considered on an individual and industry basis?** Survey respondents were asked to indicate how often they consider climate change in series of scenarios. Overall, survey respondents seemed to rarely or never consider climate change in the majority of scenarios. The only places in which survey respondents indicated that they were regularly to sometimes considering climate change was during long-term planning, making operational decisions and during product development.

Survey respondents were asked to indicate how often they believe the industry takes climate change into consideration within the same series of scenarios. Overall, survey respondents perceive that climate change is being considered much more at the industry level than at the individual level. This may be due to survey respondents being less knowledgeable about how climate change is being considered within the industry as a whole as compared to what they, themselves do. |

How frequently over the past year **respondents** have taken climate change into consideration in these situations (% of time)
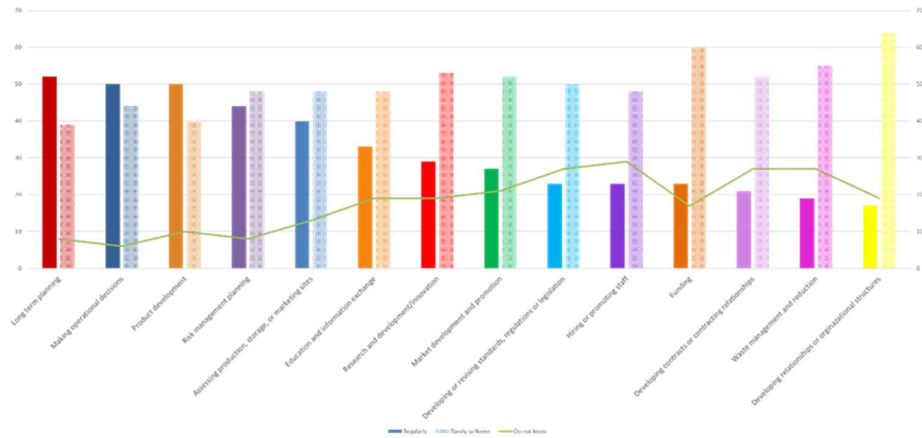
How frequently over the past year **the industry** has taken climate change into consideration in these situations (% of
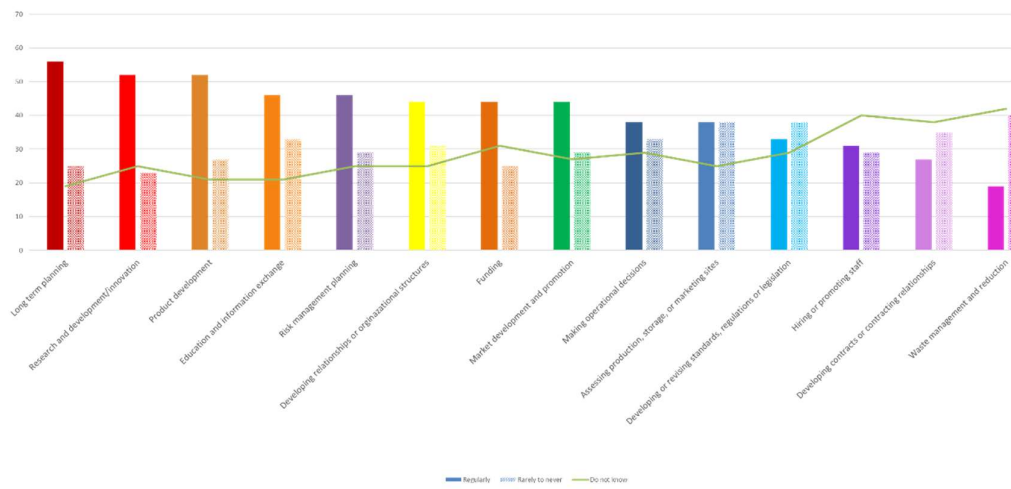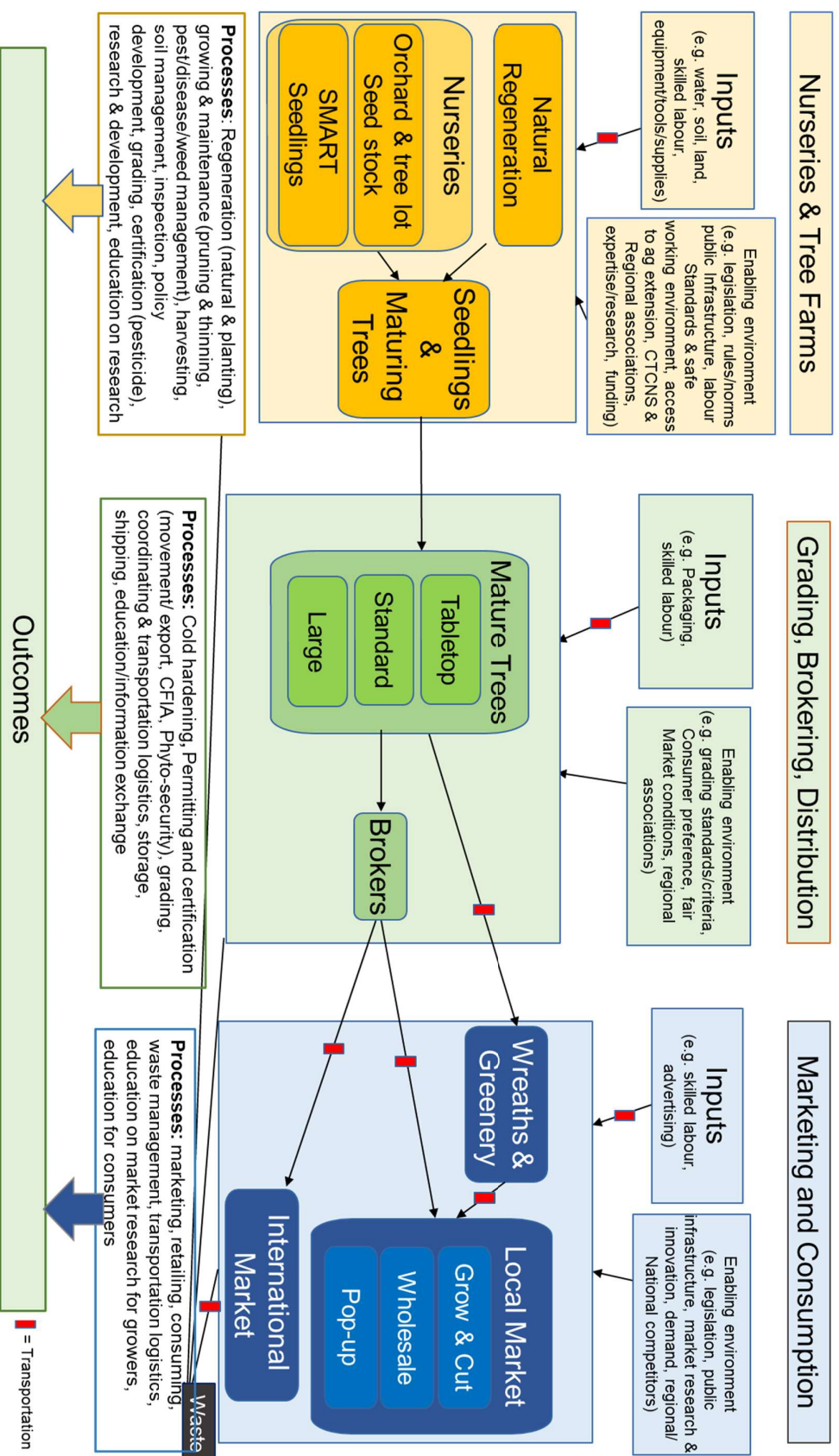
Appendix 3: Possible Activities

Implementing this strategy will position the Christmas tree and greenery industry well to thrive and expand in a changing climate. Successful implementation will require the engagement and commitment of key partners across the system coupled with activities that are best suited to achieve each short-term outcome. For each intermediate adaptation outcome theme area, Scan Team members brainstormed potential activities; these activities are which are presented below. This list is intended to help inform workplan development for strategy implementation but is not intended to be prescriptive or comprehensive.

Intermediate adaptation outcomes theme area	Potential Activities
Industry leadership and partnership	• Formation of governance structures • Communication of strategy by industry and governance
Enhancement and application of knowledge to support effective and sustainable climate change adaptation	• Address rising challenges such as late frost and fungal problems. • Source climate data for Christmas tree and greenery growing regions and share these data sets with industry. • Develop and adopt technology to mitigate effects of climate change – this may be found in other commodities. • Develop a better understanding of climate change impacts affecting the Christmas tree and greenery industry that skipped over Nova Scotia.
Accessible, adaptive, and innovative services and programs	•
Sustainable management and production Processes	• Create an internal 'supply chain' to produce Christmas tree and greenery products (e.g. analyze soil fertility requirements and supply appropriate fertilizer inputs).

It is important to note that the content in this section captures initial thinking and ideas on possible activities that when completed will contribute to achieving the adaptation outcomes. There needs to be a more detailed and comprehensive list of activities for each short-term adaption outcome and supporting implementation plans and/or workplans. The next step of developing activities and project work plans is likely to be completed by the implementation team during the strategy implementation phase.

Appendix 4: Christmas Tree and Greenery Industry System Model

Nurseries & Tree Farms

Inputs
(e.g. water, soil, land, skilled labour, equipment/tools/supplies)

Enabling environment
(e.g. legislation, rules/norms public Infrastructure, labour Standards & safe working environment, access to ag extension, CTCNS & Regional associations, expertise/research, funding)

Natural Regeneration

Nurseries

SMART Seedlings

Orchard & tree lot Seed stock

Seedlings & Maturing Trees

Processes: Regeneration (natural & planting), growing & maintenance (pruning & thinning), pest/disease/weed management), harvesting, soil management, inspection, policy development, grading, certification (pesticide), research & development, education on research

Grading, Brokering, Distribution

Inputs
(e.g. Packaging, skilled labour)

Enabling environment
(e.g. grading standards/criteria, Consumer preference, fair Market conditions, regional associations)

Mature Trees

Tabletop

Standard

Large

Brokers

Processes: Cold hardening, Permitting and certification (movement/ export, CFIA, Phyto-security), grading, coordinating & transportation logistics, storage, shipping, education/information exchange

Marketing and Consumption

Inputs
(e.g. skilled labour, advertising)

Enabling environment
(e.g. legislation, public infrastructure, market research & innovation, demand, regional/ National competitors)

Wreaths & Greenery

Local Market

Grow & Cut

Wholesale

Pop-up

International Market

Waste

Processes: marketing, retailing, consuming, waste management, transportation logistics, education on market research for growers, education for consumers

Outcomes

= Transportation

Appendix 5: Key Partners

Extensive List of Key Partners Required for Strategy Implementation

Intermediate adaptation outcomes theme area	Key Partners
Enhancement and application of knowledge to support effective and sustainable climate change adaptation	- Christmas Tree Council of Nova Scotia - Provincial and federal governments - Agriculture extension specialists: Department of Agriculture, Perennia (Christmas tree specialist, Climate Data Specialist) - Research partners: Dalhousie, Acadia, Nova Scotia Community College - Genome Atlantic - Nova Scotia Federation of Agriculture - Academic Institutions: Acadia University, Nova Scotia Community Collage, Dalhousie University Agricultural Campus, - Industry stakeholders
Accessible, adaptive, and innovative services and programs	- Christmas Tree Council of Nova Scotia - Provincial and federal government - Agriculture extension specialists: Department of Agriculture, Perennia - Research partners: Dalhousie, Acadia, Nova Scotia Community College - Genome Atlantic - Canadian Food Inspection Agency - Minor Use Representative: to bring concerns about pesticide products forward to companies and advocate for the Christmas tree and greenery industry as needed - US National Christmas Tree Association - Trade Commissioner Services: Nova Scotia Business Inc (NSBI), and Atlantic Canada Opportunities Agency (ACOA)
Sustainable management and production Processes	- Producers & new entrants - Distributors - Industry associations and commodity groups including the Christmas Tree Council of Nova Scotia and representatives from the 3 regional associations. - Consumers/customers, and market - Seedling producers - Agriculture extension specialists: Department of Agriculture, Perennia - Post-secondary researchers - Provincial and federal governments - Companies that transport products.
Industry leadership and partnership	- Producers - Distributors - Industry associations - Consumers/customers - Seedling producers - Agriculture extension specialists: Department of Agriculture, Perennia

- Post-secondary researchers