Natural capital

Sustainable investing in timberland and agriculture 2024

All information in this report is as of December 31, 2024, unless otherwise indicated.
All currency values are stated in U.S. dollars. Report published May 2025.

What you'll *find*

Welcome

This year, we proudly celebrate our 40th anniversary, marking four decades dedicated to natural capital investment. Our commitment to sustainable investing—**good stewardship is good business**—is as relevant and true today as it was when we started in 1985. We believe that our clients' financial success directly depends on the health of the farms and forests we manage on their behalf, and our global vertically integrated farmland and timberland management teams—from portfolio managers to professional farm and forest managers—help us achieve both objectives.

Of course, success is never static. Remaining successful means being responsive to market demands, continuing to raise the bar even as we hold fast to our fundamental strategy and convictions. While there are many things for us to be proud of in 2024, we have two standouts:

1 Timberland—Closed out a successful $480 million fund-raise for the Manulife Forest climate strategy, our first investment product explicitly targeting financial returns from carbon sequestration

2 Farmland—Achieved 100% of our global farmland assets certified or enrolled to be certified under the Leading Harvest Farmland Management Standard[1] and achieved 32 notable practices identified in audits across our global platform

And there's plenty more to celebrate: our entry into controlled environment agriculture, our deepening work accounting for natural capital, and our determined behind-the-scenes efforts to decarbonize and strengthen the efficiency of our operations, to name just a few accomplishments over the year.

All these achievements were years in the making. In some cases, they represent the culmination of more than a half-decade of work to launch a timberland impact investment product and achieve certification globally in our agriculture platform. Successes like these require a solid foundation that can't be manufactured overnight.

As always, we're thrilled to share these success stories with you. Whether it's more metrics and quantitative results, more concrete case studies, greater focus on nature and biodiversity, or enhanced ability to communicate our impact with geospatial tools, our goal is to provide our investors with an exceptional experience, from the deepest experience in natural capital investing around to novel approaches for measuring and communicating investment impact.

We really enjoyed putting together this report, and we hope you enjoy reading it just as much.

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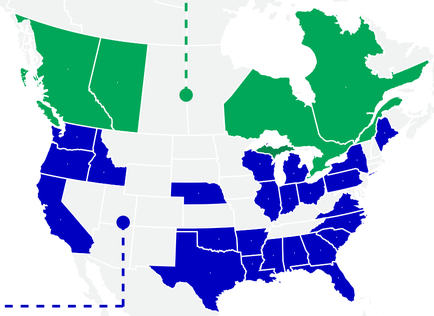
1 Certification as of June 2023, by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Re-certification takes place on a three-year cycle. Most current data shown. Please see leadingharvest.org/certification documents for further information.

Firm overview



Canada

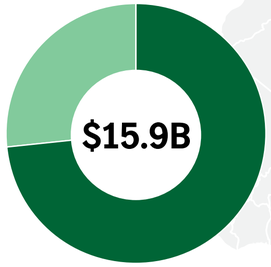
$370M in AUM

69,700+ acres

United States

$10,076M in AUM

3,670,000+ acres



Sustainably managed timberland ($11.7B) and agriculture ($4.2B) across a variety of species and crop types and geographies

Includes primary species such as pine, fir, maple, eucalyptus, and cherry (not all species are grown in all regions)

Berries, citrus, grapes, tree fruit, tree nut, and vegetables (not all produce is grown in all regions)

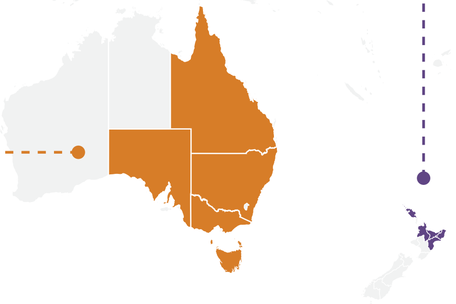
Processing facility (agriculture only)

Indicates legume, grain, and cotton (not all row crops are grown in all regions)

New Zealand

$2,122M in AUM

512,000+ acres



Chile

$334M in AUM

107,000+ acres

Brazil

$73M in AUM

129,000+ acres

Australia

$2,909M in AUM

1,450,000+ acres

Source: Data is provided by Manulife Investment Management, as of December 2024. AUM is calculated on a fair value basis. Data includes assets managed by Manulife Investment Management and its affiliates on behalf of Manulife's Canadian and U.S. general accounts, and also certain third-party investors.

Our impact

In previous reports we've used our material themes: climate, nature, and people, as a structure for discussing sustainability risks, opportunities, and management strategies. All this work is still relevant, and you can find our previous reports and associated documents on our website.

For this report, we're using a broader interpretation of materiality and considering it through the lens of impact. We're mapping the principles of sustainable management to the great work that happens on farms and in forests every day. We want this work to feel real because it *is* real. Sustainability is an everyday operational reality that goes by many different names—some people might call it efficiency, best practice, or simply, the right thing to do. Most farmers and foresters will say they were just doing their job, but that's often an understatement—our team goes above and beyond to make a positive impact on the properties we manage and in the communities in which we operate. The commitment to leave the land as good or better than when it was entrusted to them is something that's embedded in the perspective of our foresters and farmers. This section aims to tell those stories.

There's no one-size-fits-all approach to sustainable management. Every asset is different, just as every investor is different, and opportunities to positively impact the environment and society while pursuing competitive financial returns will vary from place to place and over time. The key for us is constantly being on the lookout for those opportunities.

Timberland impact at a glance

Forests are more than just sources of wood or carbon sinks. Sustainably managed forests provide a variety of ecological, social, and financial benefits to society, including:

- Renewable raw materials, providing for basic human needs (housing, furniture, paper)
- Forest carbon sequestration
- Protecting soil, air, and water quality
- Protecting biodiversity and high conservation value forest
- Contributing to sustainable development through economic growth and rural employment
- Creating recreational opportunities

Sustainable forest management: a whole tree approach

Forests are a living system: When we plan our management, we think about the big picture and manage for the long term. Every part of a tree contributes to sustainable forest management.

Optimizing parts of a harvest tree

Tree tops and branches

- Soil protection
- Renewable energy

Mid-tree and medium logs

- Paper/paper packaging
- Pulp fiber
- Textiles
- Wooden packaging
- Building materials

Tree base and large logs

- Long-lived building materials

Produced enough lumber to build approximately **93,000 houses**[1]

Produced enough fiberwood to make approximately **2 million tons of paper**[2]

1 Approximately 10.2 million m^3 of solid wood at 110 m^3 solid wood/house. **2** Approximately 7 million m^3 of fiberwood at 3.5 m^3 fiberwood/ton of paper.

Forest carbon balance

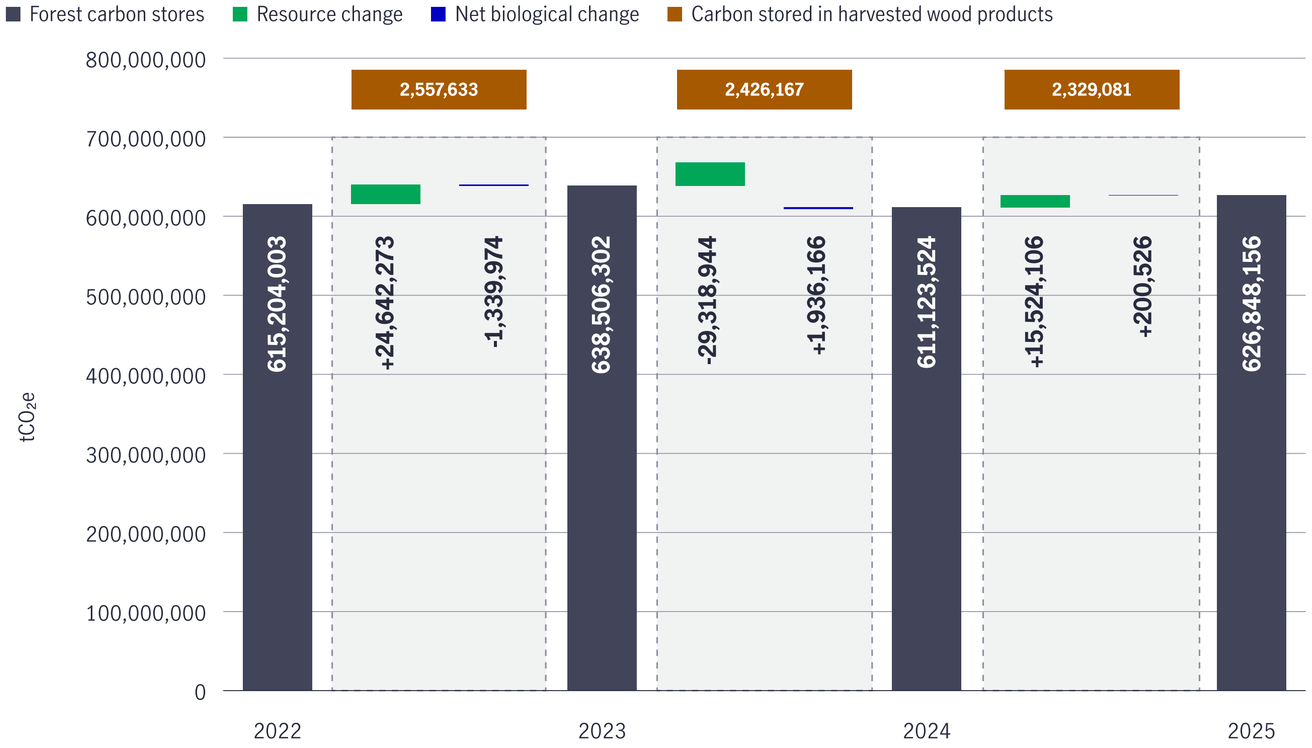
One of the ways we report on changes in our forests is through our forest carbon balance.

Broadly, there are three variables in this calculation: the previous year's final forest carbon store, resource changes, and net biological changes. Resource changes account for variability in our net acreage or methodologies year over year, while net biological change is the measure of the annual net difference between the growth and harvest of timber. In addition, we also track the amount of harvested timber that becomes solid wood and is therefore considered to be a harvested wood product with a 100-year lifetime. We report each of these metrics individually and use them to calculate annual carbon removals.

Sequestered **2.5 million tonnes** of carbon

Saw over **47 million seedlings** planted

Timberland forest carbon flow, 2022–2025



Source: Manulife Investment Management, 2024. For a detailed explanation of what's included in each component of the above graph, see table and accompanying footnotes on page 43.

Preserving snags for wildlife habitat

In forest ecosystems, dead and dying trees, known as snags, play a crucial role in supporting wildlife. These trees are often removed during harvesting and thinning, but our team of dedicated foresters recognizes their importance and adopts practices to preserve them whenever it's safe to do so.

As snags slowly deteriorate, they become home to a variety of insects, fungi, and bacteria. These organisms consume the nutrients in the tree and return them to the soil. Insects lay their eggs under the bark, ensuring a new generation of decomposers crucial for the ecosystem. Small mammals and birds, such as woodpeckers, feed on the abundant insect populations. The cavities in snags also serve as shelters and nesting sites for owls, bats, squirrels, and bees.

By intentionally leaving snags standing, our foresters enhance the biodiversity of the forest. This approach fosters a healthier ecosystem in which the natural lifecycle of trees supports a wide range of wildlife.

The presence of snags ensures the continuation of essential ecological processes, demonstrating our commitment to preserving the forest's integrity and the diverse species that inhabit it.

23% of forests are managed for conservation[1]

1 Not all management practices apply to all regions.

Species spotlight: giant anteater

This amazing animal makes its home in and around the forests we manage in Brazil.

Habitat

Lives across a variety of habitats, including open grassland, scrubland, and savannas, and uses forested areas for rest and shelter during the hottest time of day

Threats

Habitat fragmentation and destruction, hunting, accidents on highways, and forest fires

Diet

Eats up to 30,000 ants and termites a day

How we look out for them

- We maintain over 19,000 hectares of conservation land within our Brazilian forests. These areas play a key role in providing habitat, connectivity, and shelter for giant anteaters and other species.
- Our regular wildlife monitoring program helps us to understand how giant anteaters (and other species) use the forests that we manage. In turn, the monitoring data informs how we plan and implement management activities so that we can avoid negative impacts on giant anteaters and other rare and threatened species.

100% of our forests are certified as sustainably managed, and have undergone biodiversity assessments

Building community connections in Queensland

Our investor-owned timberland management company in Queensland, Australia, HQPlantations (HQP), places a high priority on community engagement. Last year, they tried something new by hosting an inaugural community open day at the Toolara forest office. The purpose of the open day was to reinforce HQP's connection to the community and increase public awareness of the benefits of sustainable plantation forestry.

The event brought together HQP staff, contractors, customers, environmental partners, and First Nations representatives to showcase the pride and professionalism of Queensland's forestry industry.

Approximately 20 presenters participated, offering insight into various aspects of plantation forestry. The displays included trucks and machinery, a harvesting training simulator, drone demonstrations, an AI-assisted fire detection system, a range of wildlife awareness initiatives, and a brumby (wild horse) project, with the Butchulla Native Title Aboriginal Corporation providing a striking presentation of their resources.

The community open day was a resounding success that showcased sustainable forestry to approximately 600 visitors. Attendees were surveyed for feedback and many positive comments were received. Buoyed by this success, HQP plans to make the community open day an annual event, with the location changing each year.

Accessing nature on the Cumberland Forest trails

In 2024, we celebrated the 10th anniversary of our partnership with the United Riders of Cumberland (UROC), which formalizes public access to private timberlands for hiking and mountain biking in the forest surrounding Cumberland, British Columbia. In 2015, we signed a historic land access and use agreement with the UROC and neighboring landowners, allowing for legal, nonmotorized recreation on the private forest lands around the village of Cumberland.

Over the past decade, the trail network has expanded to approximately 200 kilometers of interconnected trails across 6,500 acres of forestlands. This agreement grants the right and responsibility to construct and maintain trails within the designated area and transfers trail management responsibilities to the UROC.

The benefits of this land access agreement are significant, providing access to nature and allowing for the development of a world-class recreational amenity for the region. The trail network has been built by dedicated volunteers and features a complex mix of terrain, forest types, soil types, waterways, and roads.

These trails attract visitors who explore the forest at their own pace or participate in regular events hosted on the Cumberland trail network, including mountain bike races, triathlons, trail runs, and adventure races. The local community also enjoys the extensive recreational opportunities available nearby: Hikers, photographers, artists, nature lovers, dog walkers, and many others are drawn to the forest and its trails.

We're proud of this collaboration and the example it sets for how working forests can provide access to nature and coexist with recreational activities, offering benefits to outdoor enthusiasts and the local community alike.

Provided public access to
5.1 million acres of land[1]

1 Access is for recreational access of any type, including by permit, exclusive recreation lease, or unrestricted open public access.

Efficiency through innovation: precision fertilizer trial in the U.S. Southeast

In many areas, fertilizer is essential for cultivating healthy and productive forests. However, it also represents a significant expense and contributes to greenhouse gas (GHG) emissions. Our goal is always to apply fertilizer efficiently to minimize environmental impact and reduce costs.

Inspired by precision agriculture technology, our team in the U.S. Southeast partnered with North Carolina State University to test a precision nitrogen fertilization approach for forestry, specifically focusing on mid-rotation (post-thinning) fertilization.

Traditionally, we've used broad fertilizer application methods in the U.S. Southeast that didn't account for variations in forest health. For this trial, we used satellite imagery to calculate Leaf Area Index (LAI) measurements, which helped us assess forest health. Thicker canopies indicate healthier forests that require less fertilizer. By processing the LAI data, we identified areas where we could reduce nitrogen fertilizer application rates—either across entire forest stands or within sections of a stand using a variable rate application.

The idea is simple, but executing on it required further innovation. We collaborated with a fixed-wing aerial application contractor to modify aircraft application hardware for precise fertilizer release over small forest sections. This involved upgrading and fine-tuning the gate release mechanism to ensure accurate, GPS-guided delivery based on the LAI analysis. After testing the hardware, we were confident that we could accurately treat areas as small as 2.5 acres within stands.

After years of research and preparation, the trial took place in spring 2024, covering approximately 3,000 acres of loblolly pine. We treated 2,000 acres at a reduced application rate and 1,000 acres with the variable application method.

The trial demonstrated that by applying fertilizer variably and according to need, we could effectively reduce the amount of nitrogen fertilizer used, leading to a more sustainable and cost-effective operation. The trial resulted in a 5.5% reduction in nitrogen fertilizer use across the entire U.S. Southeast fertilizer program. It also reduced GHG emissions by approximately 650 tCO_2e and confirmed that precision fertilization is a positive step toward more sustainable forest management. Our aspiration is to eventually implement this strategy across 50% of the U.S. Southeast fertilizer program.

Ensuring integrity in carbon credits: the role of our carbon standards working group

For carbon credits to effectively offset emissions, maintaining integrity is crucial. In 2021, we established a carbon standards working group (CSWG), an internal team that leverages carbon expertise from within our business. The CSWG's role is to ensure that client carbon projects are of high quality and integrity, with additional co-benefits whenever possible.

One of the CSWG's first tasks was developing our carbon principles. With external advice from leading conservation nonprofits, the CSWG created a comprehensive framework, defining what it means to create a high-quality, high-integrity carbon project.

These principles guide our approach to all carbon projects. As part of our carbon project due diligence, the CSWG evaluates every potential deal against these principles, ensuring that every project is thoroughly vetted. This strategic approach distinguishes our offerings and contributes positively to global climate change mitigation efforts.

As carbon markets continue to evolve, the CSWG actively applies our carbon principles to new project methodologies. For example, the release of ACR Improved Forest Management Methodology version 2.1 in mid-2024 introduced remote sensing and dynamic baselines for carbon projects, adding new dimensions for the group to consider. This leads to thought-provoking discussions and debates as different scenarios are explored. Ultimately, this work reinforces our confidence in our high-integrity approach and underscores our commitment to maintaining the highest standards from the outset.

For illustrative purposes only.

5 new carbon projects in development adhering to the ACR Improved Forest Management Methodology 2.1

Over 6.9 million carbon credits sold in our history

Spotlight: using natural capital accounting to quantify an asset's full value

Asset appraisal is central to managing timberland and agriculture investments, both at acquisition and while the asset is managed. Traditionally, appraisals have focused primarily—if not exclusively—on the financial value of the asset's merchantable timber, crop, and land value. This is problematic because it ignores many other forms of value that a forest or farm may provide to the public and often also to its owner and/or manager.

Recognizing this shortcoming in traditional appraisal methods, we've undertaken an effort to quantify the natural capital in each of our investments over the past several years, beginning with our timberland investments in North America. We've now completed provisional natural capital accounts for each of our North American timberland assets (~70 properties) and intend to expand these to all our global timberland and agriculture investments by the end of 2025.

Importantly, natural capital accounts are split into private value and social value. Private value aggregates business data we've tracked for years (timber revenue, carbon credit sales, recreation revenue, and timberland management costs) to illustrate how different ecosystem services (e.g., recreation, carbon sequestration) contribute to generating returns for our investors. Social value is estimated by a combination of government data and asset characteristics that we track internally (biological stock change, carbon removals, air quality improvements, and the welfare value of recreation), which are used to illustrate all the ways in which the assets we manage for our investors can create benefits for society.

This exciting work is by no means finished: Two key sources of value not currently included in this preliminary version of our accounts are biodiversity and water quality. We recognize these are critical features of our timberland assets and are committed to ensuring they're represented as accurately as possible before inclusion.

Natural capital balance sheet

Property overview		
Property information		
Division		Northwest
Conservation acres		4,000
Total acres		44,000
Private net asset value		**$160,000,000**
Societal net asset value		**$118,000,000**
Asset values (PV50, 2024–2073)	**Private value ($)**	**Societal value ($)**
Core area timber revenue	330,000,000	—
Conservation area timber revenue	18,000,000	—
Carbon sequestration (biological change)	—	34,000,000
Carbon sequestration (100-year HWP)	—	64,000,000
Air quality	—	2,000,000
Recreation	2,000,000	18,000,000
Gross asset value	**350,000,000**	**118,000,000**
Liabilities (PV50, 2024–2073)	**Private value ($)**	**Societal value ($)**
Production costs	-190,000,000	—
Gross asset maintenance cost	**-190,000,000**	**—**

Source: Manulife Investment Management, 2024. Results shown represent the natural capital balance sheet of an asset currently under management. Financial data as of 2024, forest carbon data as of 2023. All value metrics utilize a present value discounted over 50 years (2024–2073), with various assumptions. An internal discount rate is used for timber, carbon credit, and recreation revenue. Discount rates for air quality regulation, the societal value of recreation, and the societal value of carbon were sourced from academic literature. A social cost of carbon, estimate of regional woodland PM2.5 removal value, and welfare value of hunting were used to quantify the societal value of these metrics.

Agriculture impact at a glance

Agriculture plays a vital role in everyone's lives, but sustainably managed farmland does much more than provide healthy, nutritious food for a growing population. Some of the ecological and social benefits of sustainable agriculture and our client's properties include:

- Healthy nutritious food
- Soil carbon sequestration
- Pollinator habitat
- Recreation opportunities
- Contributing to sustainable development through economic growth and employment in rural areas
- Renewable energy opportunities

As the world's population continues to grow and land and water become scarcer, it will be critical to grow more food across a smaller landscape. As disposable income grows alongside population, we predict there will be rising demand for higher value crops, including nuts, fruits, and vegetables. To meet these challenges, we're investing in tools and technology that enable economies of scale by making investments in our assets to ensure they're resilient for the long term and testing new practices that we believe will enhance soil quality and improve returns.

In 2024, our agriculture assets produced:

33 million pounds of almonds
equivalent to 528 million servings[1]

36 million pounds of pistachios
equivalent to 576 million servings[1]

300,000 bins of apples
equivalent to more than 660 million apples[2]

3 million pounds of cherries
equivalent to more than 9 million servings[3]

600,000 pounds of cranberries
equivalent to more than 3 million servings[4]

37 million pounds of grapes
enough to produce almost 12 million bottles of wine[5]

7 million pounds of walnuts
equivalent to more than 112 million servings[1]

8,000 bins of citrus
equivalent to more than 41 million oranges[6]

Agriculture produce values are approximated. **1** Assumes a 1oz serving size. **2** Assumes 2,200 apples per bin. **3** Assumes a 5oz serving size. **4** Assumes a 3.5oz serving size. **5** Assumes 3lbs of grapes needed per 750ml bottle of wine. **6** Assumes 3,000 mandarins and 2,200 navels per bin.

Boosting soil fertility and grape yields with biochar

When growing crops, there are almost always opportunities to apply climate-smart, best management practices (BMPs). Not only do these practices help us adapt to the effects of climate change, but they also help support water retention and contribute to our Leading Harvest certification. As part of the quest to regenerate healthy soils, a biochar/compost blend was applied to one of Manulife Investment Management's client's vineyards in Monterey, California, which is managed by Monterey Pacific (MPI), a third-party vineyard manager that we've partnered with for more than 10 years.

The remarkable results from this study sparked significant interest in biochar/compost applications in viticulture. Responding to this growing demand, MPI formed a partnership with Sitos Group, a sustainable biochar manufacturer, to develop custom biochar solutions. Through this collaboration, biochar is now custom-made for specific soils using a unique slow pyrolysis process. This method allows for the creation of biochar with varying pH values tailored to meet the needs of different soil types, making it a versatile tool for managing soil pH levels, improving soil health, and promoting regeneration.

To maximize the soil health benefits, Sitos Group's biochar is mixed with compost before application. This biochar/compost blend is then injected into the vineyard soil, which creates an optimal environment for soil microorganisms to thrive. The biochar acts as a long-lasting habitat for these beneficial microbes while the compost provides their food. After using this approach for the past five years, we've witnessed a 0.72% increase in soil organic matter and a yield increase of more than 35%, all without compromising grape quality.

Benefits of biochar/compost application

- Improved soil fertility
- Enhanced microbial activity
- Enhanced water retention
- Increased crop yields
- Reduced nutrient leaching
- Improved soil structure
- pH regulation
- Reduced need for chemical fertilizer
- Seasonal resiliency

Encouraged by these results, MPI has expanded the use of the biochar/compost blend to several other vineyards under their management, including another Manulife Investment Management client's vineyard in Monterey, California.

Did you know

Carbon sequestration—Biochar is a stable form of carbon that contains inertinite, a material resistant to decomposition that can remain in the soil indefinitely. By incorporating biochar into soil, atmospheric carbon is effectively sequestered, helping to mitigate climate change.

Waste management solution—Biochar production through pyrolysis can be a way to manage agricultural waste products and repurpose them into a valuable soil amendment and carbon sequestration medium.

Monitoring water quality across our cranberry properties

Across our Lake States cranberry properties, we're taking a proactive approach to water quality management. While irrigation and drainage are essential to cranberry production, we go beyond regulatory requirements to ensure responsible stewardship of our cranberry properties by proactively measuring the water quality. We've found that the water draining out of our cranberry properties is often cleaner than when it came in.

Cranberries depend on water to grow, either in wetlands or in bogs made of sand, peat, and gravel. The crop uses a significant amount of water, not only for growth and harvest, but also for protection from colder weather and frosts. Acknowledging this use of water, our active approach to the sustainable farming of cranberries leads to positive outcomes for the communities that depend on the water leaving the cranberry bogs.

We conduct water testing twice a year, in June and September, before water enters a cranberry property and after the water exits. The samples are collected by our management team at the same location to ensure consistency, and the results are analyzed by a third party for nitrates and phosphates that are the most common agriculture pollutants due to the use of fertilizer. While we use minimal inputs to support healthy crop growth, our testing consistently shows that water leaving the farm is often cleaner (containing fewer nitrates and phosphates) than when it came in.

When managed using sustainable practices, cranberry bogs provide a natural water filter. The cranberry beds can filter out nitrates and phosphates, cleaning the water as it moves through the system and reducing excess nutrients while improving overall water quality.

Our operations team is committed to continuous improvement and has voluntarily chosen to test the water to ensure that we're having a positive effect on the environment and communities around us. By voluntarily monitoring and improving water quality, we're ensuring that our cranberry operations contribute positively to the environment while maintaining productive and sustainable farmland.

"Manulife Investment Management Timberland and Agriculture's Lake States regional manager maintains a significant set of data on irrigation water quality before and after its use. Test results indicate that marshes act as a filter for surface water used for irrigation."
—2024 Leading Harvest Audit, Water Quality Management

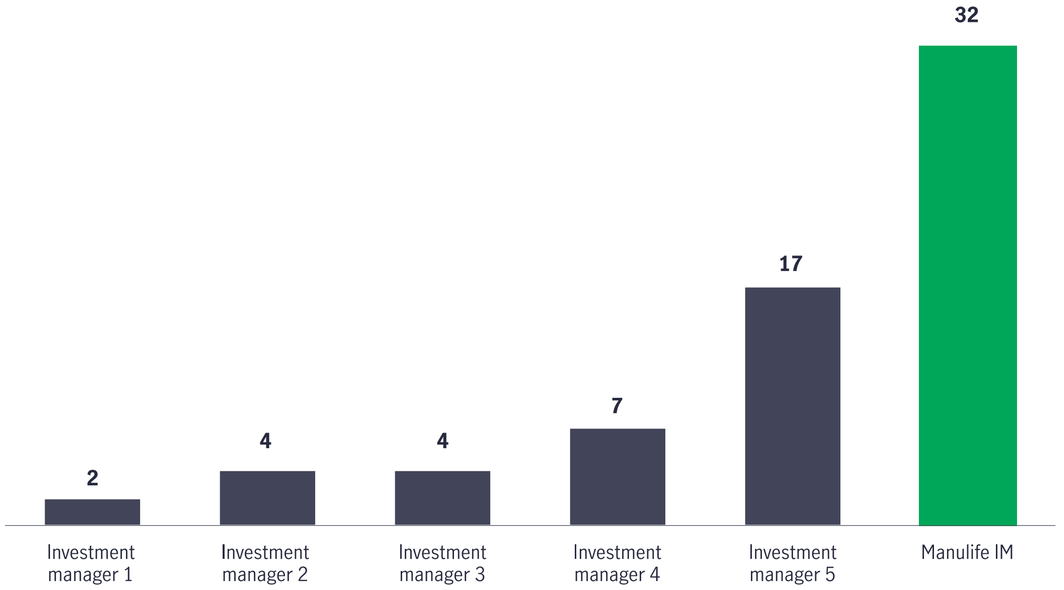
Going above and beyond: notable practices exemplifying our continuous improvement

As an integrated investment manager, we're proud of the work the operations teams are doing across the United States, Canada, and Australia. Across our United States and Australia platform, we have 286,000 acres certified to Leading Harvest, a global sustainable farmland management standard. Since first becoming certified in 2020, our property management teams have focused on continually improving our operations, looking for ways to implement practices that accelerate the transition to a more sustainable and resilient farmland platform.

This year, we recertified our directly operated, tenant-operated, and Australian platforms. Incredibly, auditors identified a total of 32 notable practices. These are activities, policies, and procedures carried out by our operations teams and tenants that go above and beyond what's expected by the Leading Harvest farmland management standard.

These notable practices fall across many different categories, highlighting both the breadth and depth of our stewardship. We were recognized for our work with local communities and support for our employees, as well as our continuous focus on improving soil health. For a full list of the notable practices and links to the full Leading Harvest audit reports, please see the appendix of this report.

2024 Leading Harvest notable practices



Source: IPE, Manulife Investment Management, 2024. Investment managers 1, 3, 4 and 5 are Top 40 natural capital investment managers, as ranked by IPE. Published January 2025. Investment manager 2 is a specialist food and agriculture asset manager.

Establishing a closed-loop fertilizer system

Farming involves complex biological processes and increasingly significant investment in technology, but sometimes simple solutions can be the most innovative and cost effective.

When available and feasible, hog manure can be a significant fertilizer source that provides both economic and environmental benefits. Used on a regeneratively managed farm located in Nebraska, leased out by a tenant farmer and managed by Paul Burgener, Manulife Investment Management's vice president of U.S. farm management, the farm has developed a partnership with a local hog company. "This corn and soybean farm gets much of its fertilizer from hog manure, which is an alternative nutrient plan," said Paul. "When the farm was created, it was developed with the intent that the hog farms would be there." The hog farm is adjacent to the property and there are three lagoons—where the manure is stored—located around it.

During application, the spreading machine can operate up to six miles from the lagoons. Application costs around $100 per acre, but the manure is effectively free, due to an easement that requires the operator of the farm to use hog waste. This benefits both the hog operation, as it requires a place to dispose of the waste, and the row crop farmer, who can use the manure as a substitute for commercial fertilizer. If used properly, manure from the hog farm can provide up to 75% to 80% of the crop nutrients needed on the row crop farm, reducing input costs significantly.

"If it were commercial fertilizer, it would be $200 to $220 per acre, plus the cost of fertilizer," said Paul. The lagoons hold a total of 6,000 to 8,000 gallons of hog manure, applied annually. There are other benefits to using the manure as well: "In terms of this property having sandy soil, it helps to hold moisture and keeps the fertilizer in the root zone better." The fertilizer also enables better absorption of nutrients, such as nitrate, by the crops.

The application of soil amendments and the integration of animals into sustainable farming practices can contribute positively to a regenerative system. Using hog manure is a creative way to replicate many of the benefits of integrating animals into a row cropping system.

53% of our properties used soil amendments

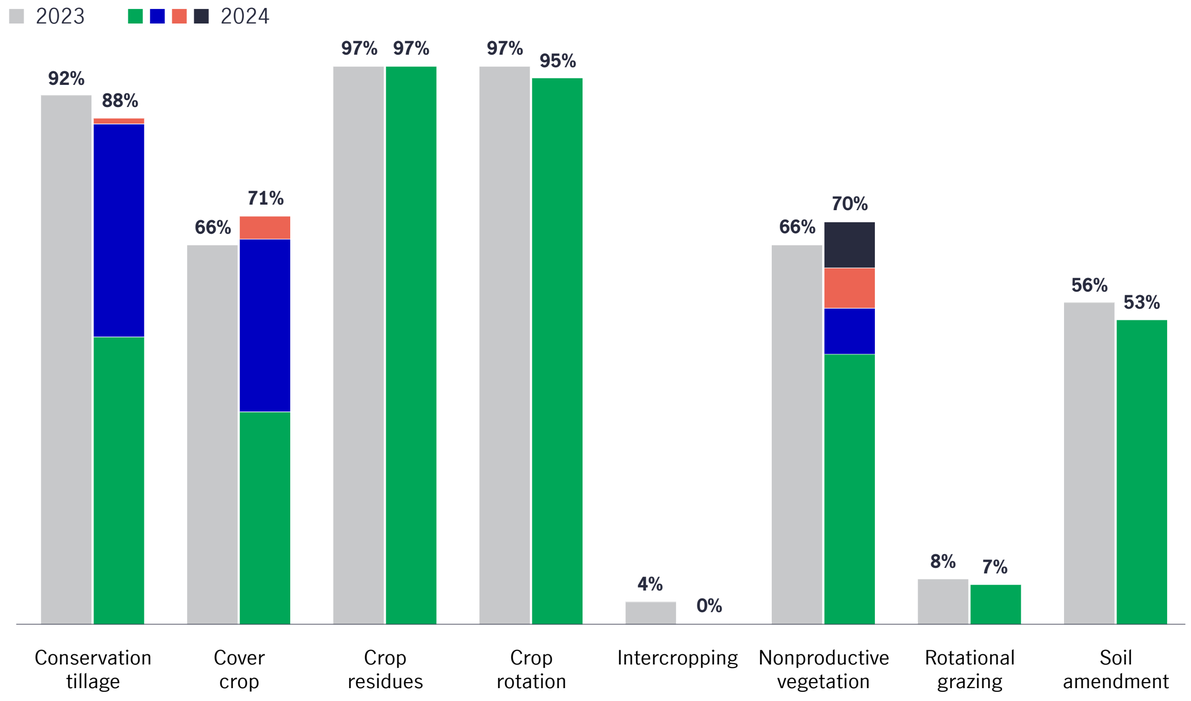
7% used rotational grazing practices

Spotlight: regenerative agriculture

Each year, we speak with every farm manager to assess our use of regenerative farming practices across our global agriculture investment portfolio. The result is an annual regenerative agriculture inventory that allows us to track progress year over year, as well as providing an extensive list of exceptional[1] management practices that we highlight in case studies.

Regenerative practices across our portfolio (by proportion of assets with each practice)[2]

Practice	2023 (total %)	2024 (total %)	2024 (proportion of assets)
Conservation tillage	**92**	**88**	No till—50% Low til—37%, No and low till—1%
Cover crop	**66**	**71**	Planted cover—37% Natural cover—30% Natural and planted cover—4%
Crop residues	**97**	**97**	Crop residues—97%
Crop rotation	**97**	**95**	Crop rotation—95%
Intercropping	**4**	**—**	Intercropping—0%
Nonproductive vegetation	**66**	**70**	Passive vegetation—47%, Active planted vegetation—8% Water recharge area—7% Active and passive vegetation—8%
Rotational grazing	**8**	**7**	Rotational grazing—7%
Soil amendment	**56**	**53**	Soil amendment—53%



Source: Manulife Investment Management, 2024.

1 As defined by Leading Harvest Farmland Management Standards. **2** Percentage values represent regenerative agriculture practices implemented when possible for the crop type. For example, crop rotation is not feasible in orchard crop systems, so they were removed from the calculation for that practice.

Verifying impact through certification

Certification is one way of validating our positive impact. We believe that independent third-party sustainability certification is a comprehensive mechanism for credibly demonstrating sustainable asset management, and it provides critical independent assurance to our stakeholders that we're operating sustainably.

Certification is part of our continuous improvement mindset, and regular audits keep us on track. Beyond audits and certification, we're continually working to find innovative ways of maximizing our positive impact.

Certification status

Timberland—100% of our managed forests were certified under either the Sustainable Forestry Initiative® (SFI®) or Forest Stewardship Council® (FSC®), and our forests in Australia and New Zealand carry dual certification to both FSC and Programme for the Endorsement of Forest Certification standards.[1]

Agriculture—100% of our U.S. and Australian agriculture assets, both directly managed and leased, are certified as sustainable under Leading Harvest.[2] Our Canadian assets are participating in Leading Harvest's Canada pilot project in 2024, and we anticipate all Canadian assets will be certified under Leading Harvest in 2025.

We've provided links to our latest audit reports in the appendix.

1 As of December 31, 2024. 100% of our forests were certified under either SFI (3.4 million acres in the United States and Canada) or FSC (2.2 million acres in Australia, New Zealand, and Chile). Most current data shown. **2** Certification as of June 2023, by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Re-certification takes place on a three-year cycle. Most current data shown. Please see leadingharvest.org/certification documents for further information.

Climate

A changing climate brings both challenges and opportunities for our agriculture and timberland assets. While we can't predict every shift—rising temperatures, changing rainfall patterns, and increased incidences of extreme weather—we see opportunities to adapt and innovate. By using tools and technology, we're proactively managing risks and finding new opportunities, ensuring our clients' assets remain resilient, productive, and well positioned for the future.

Using geospatial analysis to navigate climate risk

As climate change continues to affect the landscape of real asset investing, understanding and mitigating climate risk is a top priority for Manulife Investment Management. We use Munich Re's Location Risk Intelligence Platform to gain a detailed understanding of potential climate risks facing each property. This enables us to make informed decisions during the due diligence process and implement management practices that support long-term, sustainable operation.

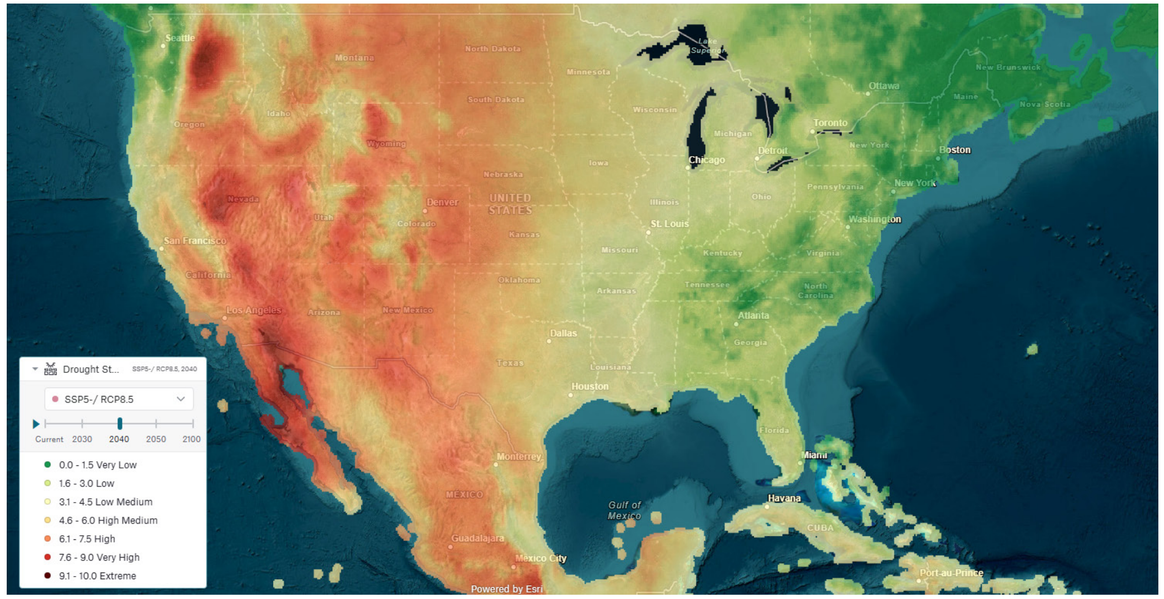
Climate risk manifests in various ways, from drought and wildfire to heat stress, and may affect long-term asset health and productivity. Using a systematic approach to evaluating these risks helps us take steps to promote the resilience and sustainability of our investments.

We use the platform in two ways: for screening and due diligence and when thinking about working in new geographies.

1. During the due diligence phase, we use the platform to assess the climate risks associated with potential assets. This information complements our sustainability tool kit, allowing us to evaluate the long-term sustainability and resilience of each investment.
2. The platform also serves as a resource for our economic research team, identifying emerging geographies where new crops may thrive in the near future, thereby unlocking opportunities for growth.

Results and insight

As we continue to leverage the system's capabilities, we believe we'll be better positioned to navigate the challenges posed by climate change while uncovering opportunities that align with our long-term sustainable management practices.



Source: Munich Re's Location Risk Intelligence Platform, 2025. This image shows drought stress across the United States using an RCP8.5 (representative concentration pathway emissions scenario), often referred to as the 'business as usual' scenario. Drought stress indicates areas of the United States which will likely suffer from drought stress in 2040. The platform allows us to explore alternative scenarios under different time frames.

100% of our investments consider climate risks and opportunities

Using technology to track soil health

As a manager of sustainable agriculture investments, we're committed to harnessing innovative technologies that support regenerative agriculture practices. One of the key areas of focus within our operations is soil health, including the measurement and management of soil organic carbon (SOC) levels. To this end, we've been trialing the use of a cutting-edge, platform provided by Downforce Technologies that helps us better understand SOC dynamics across our farms.

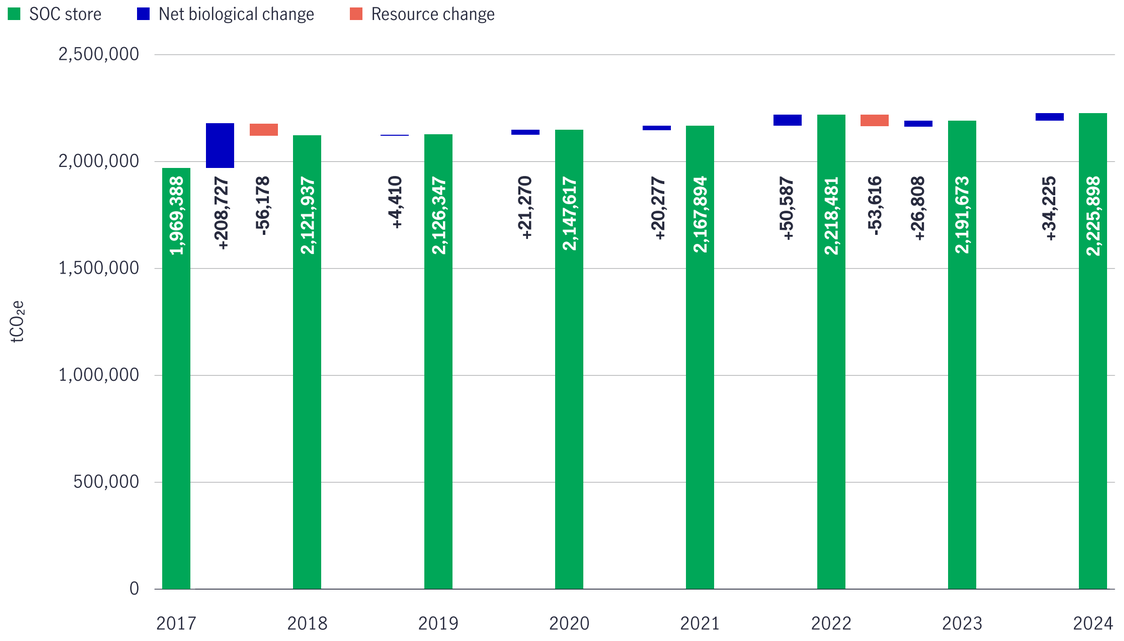
SOC levels play a critical role in soil fertility, water retention, and carbon sequestration, making it a cornerstone of soil health. However, accurately measuring SOC levels and understanding their historical trends can be challenging, particularly at scale. Without this insight, it's difficult to gauge the long-term effects of sustainable farming practices or set achievable soil improvement goals.

Downforce Technologies provides a unique capability to analyze and visualize historical SOC level data, offering a comprehensive look at how soil health has evolved over time. Additionally, the platform generates attainable SOC targets, enabling farms to benchmark their progress and identify areas for improvement. By combining satellite data with soil sample datasets, patented algorithms, and advanced geospatial analysis, the platform delivers actionable insight that's both practical and data driven.

In 2024, we integrated Downforce Technologies' SOC data with our regenerative agriculture property results. This synergy allowed us to gain a deeper understanding of how specific practices—such as cover cropping, reduced tillage, and crop rotation—affect soil health over time. The historical insight provides a baseline number from which we can measure improvement and has been helpful in validating the work of the operations teams to improve SOC levels.

The platform has proven to be a valuable tool in our ongoing efforts to measure, understand, and improve the organic carbon levels in soil. As we continue exploring its potential, we remain committed to leveraging innovative technologies that support our mission to scale regenerative agriculture practices across large-scale operations.

Agriculture SOC flow, 2017–2024



Source: Downforce Technologies, 2025. The results shown are from 40 farmland assets managed by Manulife Investment Management enrolled in the Downforce pilot. While there are yearly fluctuations, there is an upward trend in the amount of soil organic carbon (SOC) stored in the assets between 2017 and 2024.

Nature

The forests and farms we manage are ecosystems, and our job is to keep them healthy and productive over the long term. Clean air and water, healthy soils, and abundant biodiversity create the foundation for productive forests and farms. Healthy and productive ecosystems drive positive environmental, social, and financial outcomes. By protecting nature's health, we enhance long-term asset value while ensuring sustainable resource use.

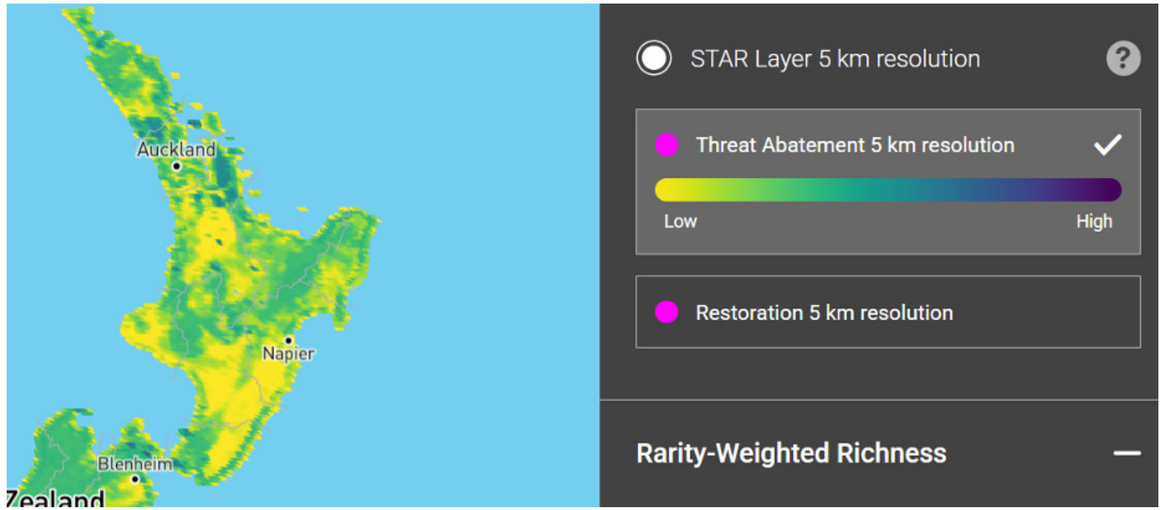
In 2024, we onboarded the Integrated Biodiversity Assessment Tool (IBAT) and Restor, two data platforms that give us access to valuable nature insight, allowing us to track our progress and identify opportunities for growth.

Leveraging biodiversity insight

Increasingly, investors want to understand the financially material relationships their assets may have with nature, particularly biodiversity. We've made significant investments in the past year that will enable us to deliver this information to our investors, including adoption of the IBAT as part of our commitment to maintaining and enhancing biodiversity. IBAT provides access to comprehensive global datasets, including the IUCN Red List of Threatened Species™, the World Database on Protected Areas, and World Database of Key Biodiversity Areas. This authoritative external data helps us incorporate biodiversity into our risk analyses and asset management plans—key recommendations of the Taskforce on Nature-related Financial Disclosures.

IBAT's reports deliver valuable site-specific information, such as Species Threat Abatement and Restoration (STAR) scores. STAR scores can be generated for any area and quantify the potential contributions that land management activities on that site can make toward reducing extinction risk or restoring a more biodiversity-rich environment.

One of the immediate benefits we see with IBAT is its potential as a screening tool for acquisition due diligence that informs our understanding of biodiversity risks and the opportunities associated with properties early in the process. We also look forward to exploring more of IBAT's capabilities for the existing properties that we manage.



Source: IBAT, 2025. Illustrates STAR layer, which enables identification of specific threat abatement and habitat restoration potential.

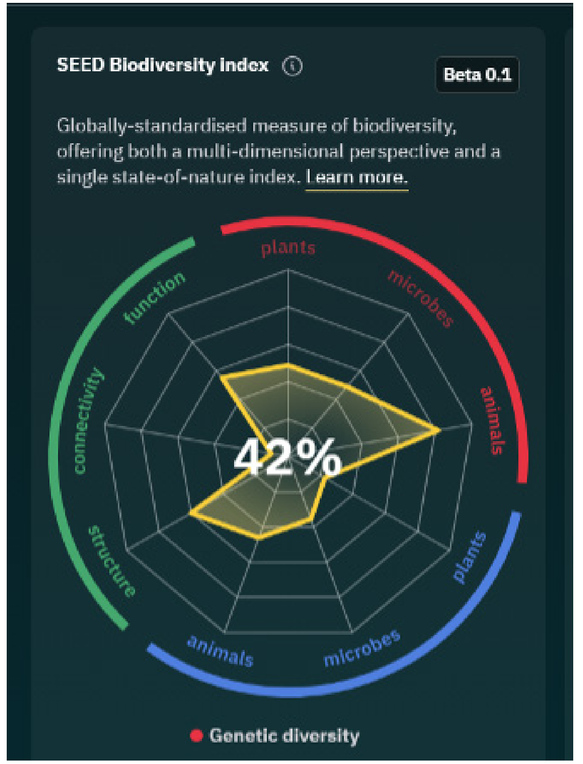
Mapping and measuring nature data

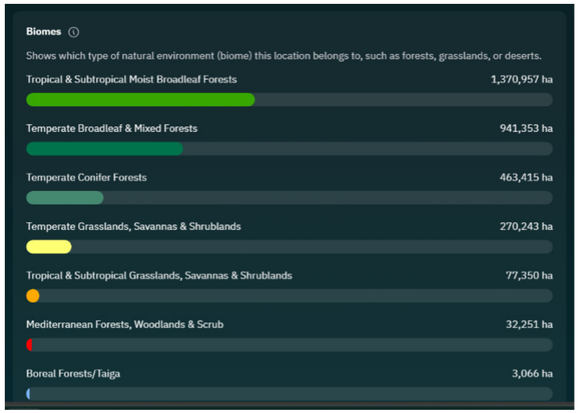
Nature is complex, so it's no wonder that the data surrounding nature is too. We're committed to the sustainable management of timberland and agriculture investments, but it's historically been challenging to quantitatively understand how our management activities depend on and affect nature.

That's starting to change. In 2024, we formed a partnership with Restor, a digital hub for nature (and a spin-off of the Crowther Lab at ETH Zurich). Restor provides open access to ecological information, such as current and potential tree cover, water availability, and potential carbon storage, at specific sites. A unique metric provided by Restor is the SEED Biocomplexity Index. SEED provides a globally standardized single number for any specified site that accounts for changes over time in nature's complexity at the genetic, species, and ecosystem levels.

Measuring biodiversity is a known challenge, and our partnership with Restor is a step toward quantifying our nature footprint. We plan to use Restor's insight alongside our own data and on-the-ground knowledge to better understand, quantify, and communicate about the biodiversity of the land we manage.

Firm report: biomes across global portfolio





Source: Restor, 2024. SEED Biocomplexity Index is still under development, Restor provides the beta version.

People

Our talented people are our most important resource, playing a vital role in the communities in which we invest. Together, we strive to be good neighbors and responsible stewards. We aim to have meaningful and fair interactions with all stakeholders as we invest, manage, and produce products that meet essential human needs. We actively seek opportunities to promote health, well-being, and equity—for our own employees and contractors, and in the communities where we operate.

Assessing risks, impact, and opportunities

We use a human rights-based approach for people-related considerations, from investment due diligence to asset management. This means we use international human rights standards as the fundamental framework for assessing and addressing risks, impact, and opportunities. This helps us to have a comprehensive approach in terms of the type of impact, range of stakeholders, and our accountability within the entire investment cycle. A comprehensive human rights due diligence framework in investments and operations forms the foundation of our strategy and governs our approach to people covering considerations on:

- Salient human rights issues
- Community engagement
- Indigenous peoples
- Access to remedy
- Responsible contracting and supply chain oversight
- Inclusive human capital and goods/services

This approach is aligned with the United Nations Guiding Principles on Business and Human Rights. As demonstrated in the Manulife global human rights statement, we have a public commitment to respect and promote human rights, including workers' rights. We assess the saliency of human rights topics to our business, integrate findings through the introduction of mitigation measures, track emerging issues as well as the effectiveness of existing measures, and communicate internally and externally on the topic. We have numerous policies and procedures in place to ensure that human rights risks are well managed as we operate our agriculture and timberland businesses. These include our social responsibility policy, safe work environment policy, and farm labor contractor policy and audits. These policies demonstrate our principled approach to conducting our business in relation to people-related impact, including our own colleagues, suppliers, and the communities we work in, including indigenous peoples.

Our commitment to human rights doesn't stop with our own business: We're committed to promoting these principles in our supply chain, as stipulated in our responsible contracting policy. We continuously build the capacity of our colleagues and business partners surrounding human rights. In 2024, we started working with a third-party vendor to assess a set of contractors' processes in place for managing human rights risks. Within Manulife Investment Management, we've trained over 750 colleagues on responsible contracting and conducted human rights sessions with business leaders, investment teams, and selected business partners.

To provide access to remedy, Manulife's hotline is available as a grievance mechanism to report any issues. While the ethics hotline is intended primarily for the use of employees, third parties (e.g., shareholders, vendors, suppliers, subadvisors) may also report suspected unethical, unprofessional, illegal, or fraudulent activity.

Safer harvesting through mechanization

Steep terrain is common in many commercially managed forests in New Zealand. Historically, felling trees in such environments could often only be accomplished manually—a potentially hazardous activity. Two of the greatest health and safety risks when harvesting trees are manual falling (when workers on the ground fell trees using chainsaws) and breaking out (when workers on the ground attach fallen trees to a cable system that hauls logs off steep terrain).

Rule number one in the forest is that everyone goes home safe at the end of the day, so over 10 years ago, our New Zealand timberland management company, Manulife Investment Management Forest Management (NZ) Ltd (MFM (NZ)), recognized the potential of emerging mechanization technology to improve health and safety outcomes. By incentivizing and collaborating with contractors, we led the early adoption of mechanized harvesting equipment. In the decade since, significant progress has been made to reduce manual felling and breaking out.

Manual felling has largely been replaced by harvesting machines. Crews on flatter terrain now mechanically fell 98% or more of their trees. Crews on steeper terrain use winch-assisted machines for traction control and stability, and 90% of trees in these areas are now mechanically felled. Overall, approximately 95% of all trees harvested in MFM (NZ) managed forests are felled mechanically.

Developments in mechanization have also focused on minimizing the need for breaking out. This is being achieved by automating the process of picking up fallen trees with remote-controlled grapples with cameras attached to existing cable logging systems. This new grapple technology has been widely adopted by contractors working in MFM (NZ) managed forests and is now commonplace.

In areas in which manual felling and breaking out are still necessary due to terrain or environmental restrictions, MFM (NZ) has implemented a certification program. Manual fallers and breaking out operatives undergo extensive training and independent assessments to meet strict standards before working in these higher-risk areas.

Looking ahead

Leaning into emerging trends

In an increasingly fast-paced world with a dynamic news cycle, the ability to zoom out and gain perspective is needed more than ever before. As fiduciaries, this is a core part of our mandate: looking beyond the excitement, reading between the lines, and identifying the megatrends that are shaping the world we live in so that we can invest the capital entrusted to us responsibly for the benefit of our clients. We believe there are four megatrends every investor must consider as they navigate private markets in a rapidly changing world: decarbonization, deglobalization, demographics, and digitization.

We believe natural capital investments are poised to benefit from each of these themes. Forest and soil carbon hold significant decarbonization potential, and younger generations inheriting generational wealth in the demographic transition are more likely to recognize the importance of such factors in their investment priorities. Local and regional production of high-value food and fiber within or proximal to global demand centers may be more resilient to deglobalization than export-oriented commodities. And we're already benefiting from digitization in our asset management, whether it's novel forest inventory technology or new farm equipment that helps us plant and harvest more efficiently and with fewer inputs.

While we're always looking around the corner for what's next and gearing up for change, one thing remains the same: our commitment to be wise stewards of your assets. Because good stewardship is good business.

Decarbonization will require investors to deal with the reality that atmospheric carbon dioxide concentrations are significantly higher today than in preindustrial times; that the carbon-intensive industrial economy responsible for the fantastic increases in global wealth over the past two centuries has also led to the depletion and degradation of the environment, without which the prosperity of future generations is doubtful; and that swift action to reduce our reliance on carbon and enhance our resilience to increasingly devastating natural disasters is not only prudent, it's imperative.

Deglobalization will require investors to recognize that while global trade—like an industrial global economy—has generally led to lower costs and better quality goods and services for most of the world, it too hasn't come without costs. Unequal access to such benefits as well as geopolitical fragmentation and conflict are already leading to a world in which local and regional supply chains may be more resilient to shocks than global ones.

Demographics are shifting as well. Global population growth is nonuniform, with developed nations largely static and most population growth concentrated in the developing world. As the post-WWII population surge retires, we're also witnessing a massive generational wealth transfer. These dynamics will undoubtedly affect investment objectives and horizons as well as sources of demand for goods and services.

Digitization is reshaping all aspects of investing, from the growing demand for data centers required to provide additional computing power and data storage to the need for additional reliable, secure, and renewable energy to power them to the use of AI and machine learning to optimize portfolios.

Appendix

Our statements, disclosures, and certifications

Sustainability reports and disclosures

Timberland and agriculture climate disclosure

Timberland and agriculture nature disclosure

Statements and policies

Timberland and agriculture sustainable investing framework

Timberland and agriculture materiality assessment

Timberland and agriculture policy on deforestation

Manulife Investment Management climate statement

Manulife Investment Management nature statement

Manulife Investment Management water statement

Manulife global human rights statement

Third-party certification and verifications

Leading Harvest audit

- Direct operated
- Tenant operated
- Australia

GHG inventory verification

- Timberland
- Agriculture

Forest certification

- Australia HQP
- Australia HVP
- Brazil
- Chile
- New Zealand
- United States—Western division
- United States—Southern division

Implementing impact through good governance

Our approach to sustainability governance and due diligence is based on a clear structure and decision-making process. The governance of sustainability is overseen by multiple teams and committees, ensuring that sustainability is a key consideration in all investment decisions. Our timberland and agriculture strategy teams are responsible for developing investment strategies and overseeing the implementation of those strategies by the operations teams with the support of the sustainability team. Our natural resource investment committee provides final decision-making and policy authority over sustainable investing in timberland and agriculture, while the Manulife executive sustainability council oversees key sustainability priorities across the organization.

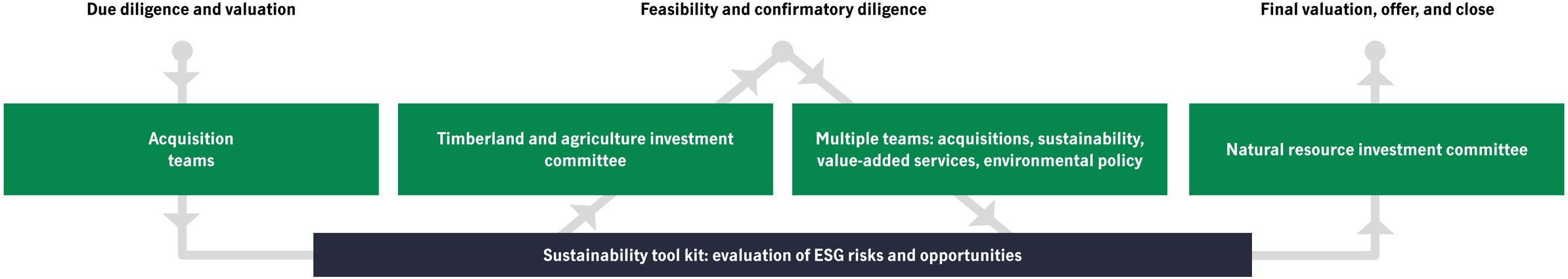
Organizational structure of sustainability governance across timberland and agriculture

Manulife Financial Corporation **Manulife Investment Management**

Executive sustainability council	
Private markets sustainability committee	Natural resource investment committee
Timberland strategy team and agriculture strategy team	
Sustainability team	

Implementing impact through due diligence

Thoughtful decision-making from the outset is key to generating meaningful impact. By embedding sustainability factors into our due diligence process, we ensure that every investment is positioned for long-term growth. Assessing factors such as carbon sequestration, climate and nature risks, soil health, and the health of our communities ensures we're making sound investments for our clients, our people, and our environment.



Sustainability theme	Climate	Nature		People	
Material risks and opportunities	• Climate change impacts • Emissions • Deforestation • CO_2 sequestration	• Sensitive lands • Protected areas • Biodiversity • T&E species • Mitigation banking	• Water quantity/quality • Flood, drought risk • Groundwater depletion • Water banking	• Health and safety • Training and development • Labor practices • Human rights	• Community relations • Indigenous peoples • Job creation • Research, internships

Source: Manulife Investment Management. For illustrative purposes only. T&E refers to threatened and endangered.

Implementing impact in agriculture asset management—Leading Harvest

This table highlights notable practices found during the 2024 Leading Harvest recertification audits. Full audit details can be found on the Leading Harvest website.

Notable practices in Australia	
1.2.1 Adapting to critical external factors	Extensive risk assessment processes are in place to monitor potential risk factors for business and properties using global and local affiliations and networks. These have now been expanded to include a greater range of risks, including climate, sustainability, social, and quality assessment.
2.1.3 Nutrient Management Program	Thorough nutrient budgeting is completed based on seasonal soil testing in collaboration with local agronomists and farm and regional managers.
7.1.1 Threatened species	Excellent implementation of threatened and endangered species identification and protection practices and policies was noticed by the audit team. Annual reporting and maintenance demonstrate a notable commitment to monitoring for emergent issues.
7.1.2 Endangered species	Excellent implementation of threatened and endangered species identification and protection practices and policies was noticed by the audit team. Annual reporting and maintenance demonstrate a notable commitment to monitoring for emergent issues.
8.1.1 Special Site Identification	Our inclusive and existing due diligence process was deemed notable by the site auditor.
8.1.2 Special site management	Excellent implementation of special site management practices by staff was observed on sites.
9.2.1 Community engagement	Extensive engagement occurs within the local community of each property, and a pay it forward scheme has been implemented within the business. A new decision-making process for sponsorships has been implemented to align sponsorship opportunities with business standards.
Directly operated properties	
1.1.1 Farmland stewardship commitment	a. Manulife Investment Management Timberland and Agriculture's stewardship commitment serves as a capstone for several policies that were carefully written to support stewardship throughout the group's asset management. b. Stewardship principles are thoughtfully crafted to be flexible and relevant to all sectors of Manulife Investment Management Timberland and Agriculture's asset management while promoting sustainable management and continual improvement.
1.1.3 Farmland conservation	Manulife Investment Management Timberland and Agriculture's managers are notably conscientious, responsible, highly knowledgeable, and qualified to implement sustainable management practices, including integrated pest management (IPM), and are involved in creating, planning, and participating in robust internal and external training and educational opportunities to support continual development and improvement.
1.2.1 Adapting to critical external factors	Critical external factor forms are formalized, and responses from regional managers indicate that Manulife Investment Management Timberland and Agriculture recognizes that they have highly qualified managers who are sensitive to employees' concerns, aware of industry challenges, and trust their ability to respond to unique challenges while offering support.

Directly operated properties	
2.1.1 Soil quality	Manulife Investment Management Timberland and Agriculture continues to expand on BMPs regarding soil health within their portfolio. 100% of their sites use at least one regenerative practice to maintain soil health.
3.2.1 Input application and in-field practices	Manulife Investment Management Timberland and Agriculture has notably comprehensive policies that support conscientious use of nutrients, equipment, and training and uses BMPs to control potential negative impacts of crop protection on water quality.
3.2.2 Water quality protection	a. Manulife Investment Management Timberland and Agriculture's policy commitments are frequently updated. These policies are flexible and regionally relevant within the group's portfolio, but focused enough to encourage meaningful management practices. Policies were updated to include management of water quality and irrigation runoff through nutrient inputs and the impact on water quality. b. Manulife Investment Management Timberland and Agriculture's Lake States regional manager maintains a significant set of data on irrigation water quality before and after its use. Test results indicate that marshes act as a filter for the surface water used for irrigation.
4.1.1 Pest monitoring	Wisconsin sites are engaging with two independent IPM companies that provide detailed scouting reports and recommendations that are seasonally appropriate and commensurate with the current cranberry growth stage.
4.1.3 Pest control practices	Manulife Investment Management Timberland and Agriculture's agricultural chemical use policy requires IPM approaches to be the basis for all pesticide decisions. The policy outlines expectations, including the use of crop protectants and fertilizers at minimal dosages that offer the intended benefits. Sites visited carry out these practices and are conscious of expectations for minimum crop inputs. Nonchemical approaches are deployed first, and sites are phasing out the use of harsh chemicals when less abrasive solutions are available.
7.1.1 Threatened and endangered species	Manulife Investment Management Timberland and Agriculture maintains dedicated teams, resources, policies, and procedures to support awareness and proactive protection of threatened and endangered plant and animal species during all phases of property management. The group's infrastructure regarding species protection supports responsible investing and property management.
7.1.2 At-risk species	Managers interviewed expressed awareness of at-risk species in their areas and mentioned how helpful it is to have support from Manulife Investment Management Timberland and Agriculture's dedicated environmental services (ES) team. Trainings provided by the ES team are thorough and tailored to be relevant to each property.
7.2.2 Ecologically important sites	Manulife Investment Management Timberland and Agriculture's dedicated ES team provides direct support to farm managers to conscientiously manage properties. Ongoing support and regular biodiversity training support a culture of care on farms. Farm managers work with and around wildlife on sites.
9.2.1 Community engagement	Farm manager interviewed stated "our company wants us to give back to the community." Manulife Investment Management Timberland and Agriculture encourages community involvement and the use of equipment and fuel needed to support community engagement activities.
10.1.2 Respectful work environment	Offering feminine hygiene stations is easy to implement and a meaningful way to demonstrate that the workplace is inclusive and supportive of all employees. It shows that the company acknowledges and respects the needs of its employees, fostering a positive and inclusive work environment that supports productivity.
10.2.1 Personnel and Contract Worker training	Manulife Investment Management Timberland and Agriculture has a robust system of policies and training materials to support safety and welfare. Safety meeting slide decks, policies, an injury-illness prevention program (IIPP), safety principles, injuries and claims reporting procedures, and recordkeeping are comprehensively recorded and documented. Regional managers' development of training modules offers a comprehensive program that can significantly support employee growth and professional development.
10.3.3 Employee sustainability training	a. Annual safety picnics serve as team-building and community events that reinforce safety and sustainability training topics. b. Educating new employees on land stewardship and the importance of conforming to Leading Harvest Farmland Management Standards (LH FMS) occurs during the onboarding process. Including LH FMS content in onboarding materials is unique to Manulife Investment Management Timberland and Agriculture.

Directly operated properties	
12.1.4 Annual review and improvement	Manulife Investment Management Timberland and Agriculture's inclusion of LH FMS as a central management tool and leveraging of annual findings into continual improvement are a clear indicator of the successful integrations of LH FMS into the group's operations as well as the commitment of Manulife Investment Management Timberland and Agriculture to standard conformance.
12.2.1 Support for agricultural research	a. Manulife Investment Management Timberland and Agriculture has a stewardship partners program that's a collaborative approach to support agricultural research and programs aimed at improving sustainable agriculture. Projects focus on habitat restoration, pollinator habitats, economic contributions, workforce development, and more. b. Surveys are leveraged to gain on-the-ground insight into the efficiency, capabilities, and presence of ag technology and identify potential opportunities for further improvement.
Tenant-operated properties	
1.1.2 Farmland stewardship	Manulife Investment Management Timberland and Agriculture explicitly states their intent to operate using regenerative practices to further enhance their stewardship of farm properties. Tenant operators are selected to bring creative and progressive approaches to commodity crop production. Best practices implemented or designed by site operators are setting new expectations for conventional producers and operators.
2.1.1 Soil quality	Auditors assessed a notable practice for both the quality and the results of the soil tests conducted. Tests provide an array of extremely detailed results that are related to nutrient maps, soil types, nutrient recommendations, and tillage practices.
2.2.1 In-field Soil Management	Manulife Investment Management Timberland and Agriculture invests in precision-leveling fields to reduce erosion, which allows for the use of polypipe. Polypipe installation allows properties to move away from less efficient pivot irrigation. Leveling allows multiple types of drainage pipes to move water out of the field to reduce negative impacts, especially during heavy rain events.
2.2.2 Degradation of Agricultural Lands	Sites practice several regenerative practices, including the use of cover crops, conservation tillage, efficient nitrogen fertilizers, manure application, and livestock rotations on specifically designated regenerative properties.
3.1.2 Regional Water Conservation	The implementation of soil moisture probes to inform irrigation in the Delta is regionally notable. Tenants noted a decrease in irrigation times and volume with the use of the soil moisture probes. Conservation of water in spite of the region having ample available water is a BMP that goes above and beyond standard practices typically found in the region.
6.2.2 Resource recovery of agricultural waste	Manulife Investment Management Timberland and Agriculture included access to manure into property selection criteria and uses readily accessible hog manure to reduce the need for externally supplied fertilizer.
7.1.2 At-risk species	Manulife Investment Management Timberland and Agriculture has added a step to the due diligence processes regarding agricultural asset procurement to explore the potential for at-risk species. Manulife Investment Management Timberland and Agriculture has in-house biologists that conduct research on at-risk species, create species cards, and conduct trainings related to biodiversity and species protection for regional managers and tenants.
8.1.1 Special site identification	Sustainability and Responsible Investment tool kits provide an effective additional layer in the due diligence process that's unique to Manulife Investment Management Timberland and Agriculture and supports special site identification. Development of the tool kits expands on the due diligence process and helps identify the sustainability opportunities and risks that managers can expect on sites.
8.1.2 Special site management	Auditors noted special site management for the use of the farmland web app to identify, monitor, and better manage special sites if or when located on managed properties.
12.1.4 Annual review and improvement	a. Multiple aspects of Manulife Investment Management Timberland and Agriculture's annual review were deemed notable by auditors, primarily driven by the socialization and utilization of Manulife Investment Management Timberland and Agriculture's Leading Harvest performance. Annual Leading Harvest audit results are shared widely among the company, with findings affecting action planning, sustainability strategy, and management compensation. b. Manulife Investment Management Timberland and Agriculture holds an annual management review driven by the LH FMS audit that occurred that year. The review speaks to the audit's findings and how to implement and improve based on audit findings. c. Audit summary reports are shared with all ag staff, including those in leadership positions, and increases accountability throughout the organization.

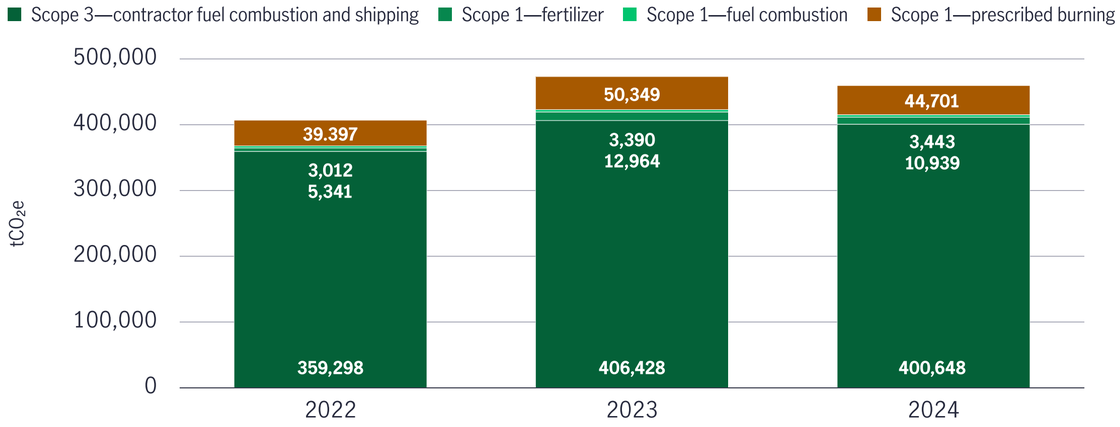
Implementing impact in timberland asset management—Sustainable Forestry Initiative

Not all timberland certification programs provide notable practices as part of the audit process. SFI in North America does provide notable practices, and the 2024 results are shared below. We're proud of this and want to note that in other geographies, we operate to a similarly high level but there's no mechanism for auditors to highlight specific practices.

Notable practices in North America	
4.1.1 Certified organizations shall conserve biological diversity	In both the Southeast GA/FL and the Northeast properties, Manulife Investment Management Forest Management Inc's property managers have exhibited an excellent ability to not only identify and conserve sites of native biological diversity but also collaborate with outside entities in the accurate surveying and enhancement of these areas.

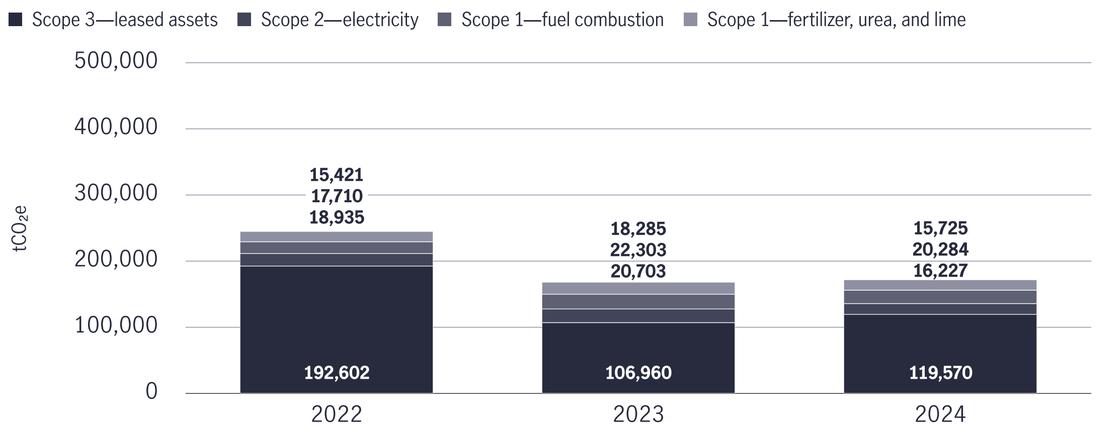
GA refers to Georgia. FL refers to Florida.

Timberland emissions, 2022–2024



We collect annual fuel and fertilizer usage data from our global timberland business to calculate and report on carbon emissions. For our scope 1 emissions, data from direct business operations "within the forest gate" is used. In our scope 3 emissions, data from contractor operations "within the forest gate" and shipping (Australian and New Zealand assets only) are used. The results mean that we can disclose our scope 1 and scope 3 emissions as well as inform internal decarbonization initiatives.

Agriculture emissions, 2022–2024



We collect fuel, fertilizer, and electricity usage data each year from our global agriculture business to calculate and report on the carbon emissions released. We gather data from "within the farm gate" because it's what we can best control and access. As a result, we can disclose our scope 1, scope 2, and scope 3 emissions as well as using this information to inform our internal decarbonization strategies.

Source: Manulife Investment Management, 2024. tCO_2e refers to tons of carbon dioxide equivalent. Please refer to data presented in the emissions tables on the following page for more information. For a detailed explanation of what is included in each component of the above graphs, see footnotes accompanying the tables on those pages. **Timberland emissions:** Scope 1 emissions are direct emissions from sources that we control. These include timberland emissions from fuel, fertilizer, and prescribed burns. With recognition that prescribed burn emissions are within Scope 1, but uniquely anthropogenic biogenic emissions, they have been highlighted distinctly. Scope 3 emissions are indirect emissions in the value chain. Timber emissions associated with harvesting activity are classified as scope 3 as harvesting is conducted by contractors. Scope 3 emissions currently accounted for include categories 1 (purchased goods and services such as contractor harvesting) and 12 (end-of-life treatment of used products such as emissions from short-lived harvested wood products, although these are conservatively treated as scope 1 emissions). They do not currently include upstream or downstream transportation of products, or processing and milling. Fluctuations in timberland scope 1 and 3 emissions from year to year are related primarily to increases or decreases in harvesting and silvicultural operations, which are themselves related to dynamic timber markets. **Agriculture emissions:** Scope 1 and 2 emissions are calculated based on activity data provided by managers directly operating our farms. Scope 3 emissions are those from leased farms outside our operational control and are estimated using crop-specific emissions intensity data from publicly available research. Fluctuations in agriculture scope 1 and 3 emissions from year to year are related to several factors, including global commodity prices, weather patterns, and irrigation requirements, among others. The large reduction in scope 3 emissions from 2022 to 2023 is due primarily to data quality improvements.

Climate

Timberland	2024	2023	2022
Total standing forest carbon stock (tCO_2e)[1]	626,848,156	611,123,524	638,506,302
Scope 1 GHG emissions (tCO_2e)[2]	59,083	66,703	47,704
Nonbiological emissions (fuel and fertilizer) (tCO_2e)	14,382	16,354	8,353
Anthropogenic biogenic emissions (prescribed burning) (tCO_2e)[3]	44,701	50,349	39,397
Scope 2 GHG emissions (tCO_2e)	—	—	—
Scope 3 GHG emissions (tCO_2e)	400,648	406,428	359,298
Biogenic stock change (tCO_2; +ve = sequestration; -ve = emissions)[4]	200,526	1,936,166	-1,339,974
Carbon stored in harvested wood products (tCO_2e)[5]	2,329,081	2,426,167	2,557,633
Net sequestration (tCO_2; +ve = sequestration; -ve = emissions)[6]	2,069,697	3,889,202	810,658
5-year average sequestration (tCO_2; +ve = sequestration; -ve = emissions)[7]	3,637,260	1,492,609	1,791,934
Percent net productive area[8]	82.3%	82.1%	82.3%
Percent of net productive area harvested	2.7%	2.8%	2.8%
Percent of net productive area planted	2.4%	2.5%	2.7%
Percent of harvest to solid wood	58.9%	59.1%	63.4%
Percent of harvest to fiber	40.7%	40.7%	35.6%
Percent of harvest to biomass	0.5%	0.2%	1.1%
39-year history of number of trees planted	1,402,246,662	1,354,509,684	1,304,430,265
Agriculture	**2024**	**2023**	**2022**
Scope 1 GHG emissions (tCO_2e)[9]	36,009	38,716	31,736
Scope 2 GHG emissions (tCO_2e)	16,227	20,703	18,935
Scope 3 GHG emissions (tCO_2e)	119,570	106,960	192,602
Out-of-scope GHG emissions (tCO_2e)[10]	1,174	—	—
Biogenic removals (tCO_2e)[11]	290,000	310,215	329,853
Net sequestration (tCO_2; +ve = sequestration; -ve = emissions)	118,193	143,835	86,581
Percent net productive area[12]	81%	84%	87%

1 Forest stock currently includes merchantable timber, aboveground biomass, belowground biomass, deadwood, and litter. Soil carbon potentially represents a major carbon storage pool. There is uncertainty associated with measuring soil carbon accurately, especially without site-specific sampling data, so it has been excluded. **2** Scope 1: According to the GHG Protocol, scope 1 emissions are all direct GHG emissions, which are "emissions from sources that are owned or controlled by the reporting entity." Scope 2: According to the GHG Protocol, scope 2 emissions are "indirect GHG emissions from consumption of purchased electricity, heat or steam." Scope 3: According to the GHG Protocol, scope 3 emissions are "other indirect emissions, such as the extraction and production of purchased materials and fuels, transport related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc." Fluctuations in scope 1 and 3 emissions from year to year are related primarily to increases or decreases in harvesting and silvicultural operations, which are themselves related to dynamic timber markets. All results are presented using the AR5 global warming potential values. **3** These emissions refer to the CH_4 and N_2O emitted from Manulife Investment Management's prescribed burning of timberland. With recognition that these emissions are within Scope 1, but uniquely anthropogenic biogenic emissions, they have been separated from Scope 1 non-biogenic emissions as their own line item. **4** Net change in total forest carbon stocks over calendar year 2024. Positive values indicate more forest grew than was harvested (net sequestration); negative values indicate more forest was harvested than grew (net emission). **5** Quantity of carbon assumed to be stored in harvested wood products (from trees harvested over calendar year 2024) after 100 years. Represents long-term storage and calculated using market-specific (geography/species) conversion factors. It is a fraction of biogenic stock change, as only some of the carbon transferred from forest carbon pool to wood products pool goes into long-lived wood products. **6** Biogenic stock change, plus carbon stored in harvested wood products, minus scope 1, 2, and 3 emissions. **7** The average net sequestration per year over the last five years. **8** Fractional area of timberland under management that is managed for commercial production of wood products. Area not managed for commercial production of wood products may include areas with high conservation value, old growth forest, buffer zones, conservation easements, threatened and endangered species habitat, or areas with historical or cultural significance. **9** Fluctuations in scope 1 and 3 emissions from year to year are related to several factors including global commodity prices, weather patterns, and irrigation requirements, among others. The large reduction in scope 3 emissions from 2022 to 2023 is due primarily to data quality improvements. All results are presented using the AR5 global warming potentials. **10** These emissions refer to biologically sequestered CO_2 that is released through Manulife Investment Management's use of renewable diesel. Per GHG Protocol guidance, we report these emissions out-of-scope. **11** Estimated soil carbon sequestration over the reporting period (calendar year 2024), using publicly available crop-specific soil carbon sequestration rates. The figure does not include data from Downforce Technologies as their dataset covers only a proportion of the total portfolio. **12** Fractional area of farmland under management that is managed for the production of crops. Area not managed for the commercial production of crops may include essential infrastructure, conservation easements, buffer zones, or threatened or endangered species habitat.

Nature

Timberland	2024	2023	2022
Number of tree species grown (plantation I total)[1]	15 | 63	15 | 63	15 | 63
Forest third-party certified as sustainably managed[2]	100%	100%	100%
Forests with forest management plan	100%	100%	100%
Forests with biodiversity assessment	100%	100%	100%
Forests with conservation designation[3]	23%	23%	21%
39-year history sensitive lands program acres conserved[4]	500K	492K	479K
Number of stream miles protected by best management practices	17.0K	17.0K	19.2K

1 Total includes 48 naturally regenerating species. **2** As of year-end 2023, 100% of our forests were certified under either the SFI or FSC, and our forests in Australia and New Zealand carry dual FSC and PEFC accreditation. As a condition of certification, forests must have management plans, including consideration of biodiversity. **3** Forests with conservation designation include land bearing one or more of the following designations: old growth forest, forest ecosystem of high conservation value, high-conservation value forest, conservation easements, areas with restricted management due to presence of threatened and endangered species, areas of culture or historical significance, and buffer areas such as stream management zones and riparian management zones. Year-on-year change may be affected by asset acquisitions and/or dispositions in addition to new conservation designations on the existing land base. **4** Sensitive lands are defined as lands whose attributes may lend themselves to management for purposes not related to timber production. They typically are deemed critical habitat for sensitive or endangered species or are lands with high scenic, historical, cultural, or recreational values. We actively seek out and work closely with public agencies and environmental groups to consummate conservation transactions and initiatives that will protect these lands. Land preservation transactions are conducted on behalf of clients in accordance with the terms of the investment mandate, and in seeking to generate overall risk-adjusted returns on their assets. Protection may include moving the land into public or conservation group ownership or placing permanent restrictions on how it can be managed, such as through a conservation easement.

Agriculture	2024	2023	2022
Number of crop types grown	28	26	24
Farms third-party certified as sustainably managed[5]	93%	94%	91%
Farms with farm management plan	100%	100%	100%
Farms with regenerative agriculture practices[6]	100%	100%	98%
Farms with biodiversity assessment	100%	100%	100%
Number of acres of pollinator habitat	295	295	295
Number of stream miles protected by best management practices[7]	0.8K	0.9K	0.8K
Area using integrated pest management	100%	100%	100%
Investments accounting for water risk and opportunity	100%	100%	100%

5 100% of U.S. and Australian farms are third-party certified sustainable. Certification as of July 2023 by Leading Harvest and is based on an annual assessment of the conformation to the Farmland Management Standard. Most current data shown—the slight decrease from 2023 is due to dispositions in the U.S. Please see leadingharvest.org. **6** Includes farms employing one or more of the following practices: conservation tillage or no till; cover vegetation/crop; crop residues; crop rotation; intercropping; non-productive vegetation; rotational grazing; and soil amendment. **7** Includes North America and Australia only.

People

Timberland	2024	2023	2022
Number of employees (timberland)[1]	675	706	699
Number of employees (total)[2]	924	956	947
Number of contractors (estimated)[3]	3,920	4,123	4,283
Percent women[4]	30%	30%	29%
Percent racially and ethnically diverse individuals	17%	19%	14%
Percent of leadership women[5]	22%	15%	15%
Percent of leadership racially and ethnically diverse	9%	8%	11%
Number of new hires[6]	37	64	57
Percent attrition[7]	13%	14%	18%
Lost time injury frequency rate[8]	5.9	5.2	4.4
Percent employees responding to engagement survey[9]	90%	87%	89%
Percentile employee engagement survey score	71st	70th	60th
Lands with public access (acres)[10]	5,103,538	5,034,160	4,963,322

1 Includes 11 (2024), 91 (2023), and 119 (2022) employees with timberland and agriculture responsibility. Employees of HVP and HQP are included. **2** Includes 249 (2024), 250 (2023), and 248 (2022) agriculture-only employees. Employees of HVP and HQP are included. **3** Timberland contractors only; full-time equivalent, not individuals. **4** Includes North America staff as voluntarily reported in Workday only. **5** Leadership includes all timberland and agriculture staff at the level of director or higher (including AVP, VP). **6** Includes 5 (2024) employees with timberland and agriculture responsibility. **7** Combined result for timberland and agriculture. **8** Incidents per 1 million hours; timberland only. **9** Combined result for timberland and agriculture in 2024 Gallup employee engagement survey. **10** Access of any type, including by permit, exclusive recreation lease, or unrestricted open public access.

Agriculture	2024	2023	2022
Number of employees (agriculture)[11]	267	341	367
Number of employees (total)[12]	924	956	947
Number of contractors (estimated)[13]	1,653	1,666	1,870
Percent women[14]	30%	30%	29%
Percent racially and ethnically diverse individuals	17%	19%	14%
Percent of leadership women[15]	22%	15%	15%
Percent of leadership racially and ethnically diverse	9%	8%	11%
Number of new hires[16]	36	58	54
Percent attrition[17]	13%	14%	18%
Lost time injury frequency rate[18]	6.3	7.3	5.2
Percent employees responding to engagement survey[19]	90%	87%	89%
Percentile employee engagement survey score	71st	70th	60th
Lands with public access (acres)[20]	85,988	90,441	81,456

11 Includes 11 (2024), 91 (2023), and 119 (2022) employees with agriculture and timberland responsibility. The significant change in 2024 is due to a shift in cost centre boundaries. **12** Includes 657 (2024), 615 (2023), and 580 (2022) timberland-only employees. **13** Agriculture contractors only; full-time equivalent, not individuals. **14** Includes North America staff as voluntarily reported in Workday only. **15** Leadership includes all timberland and agriculture staff at the level of director or higher (including AVP, VP). **16** Includes 5 (2024) employees with timberland and agriculture responsibility. **17** Combined result for timberland and agriculture. **18** Incidents per 1 million hours; agriculture only. **19** Combined result for timberland and agriculture in 2024 Gallup employee engagement survey. **20** Refers to public access available for recreation by permit or lease.

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The case study/ies shown here are for illustrative purposes only, do not represent all of the investments made, sold, or recommended for client accounts, and should not be considered an indication of the ESG integration, performance, or characteristics of any current or future Manulife Investment Management product or investment strategy.

Manulife Investment Management conducts many ESG engagements each year but does not engage on all issues or with all issuers in our portfolios. We also frequently conduct collaborative engagements in which we do not set the terms of engagement but lend our support in order to achieve a desired outcome. Where we own and operate physical assets, we seek to weave sustainability into our operational strategies and execution. The case studies shown are illustrative of different types of engagements across our in-house investment teams, asset classes and geographies in which we operate. While we conduct outcome-based engagements to enhance long term-financial value for our clients, we recognize that our engagements may not necessarily result in outcomes which are significant or quantifiable. In addition, we acknowledge that any observed outcomes may be attributable to factors and influences independent of our engagement activities. The case studies shown are a sampling across issues and geographies. Our approach to ESG investing and incorporation of ESG principles into the investment process differs by investment strategy and investment team. It should not be assumed that an investment in the company discussed herein was or will be profitable. Actual investments will vary and there is no guarantee that a particular fund or client account will hold the investments or reflect the characteristics identified herein. Please see our ESG policies for details.

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