

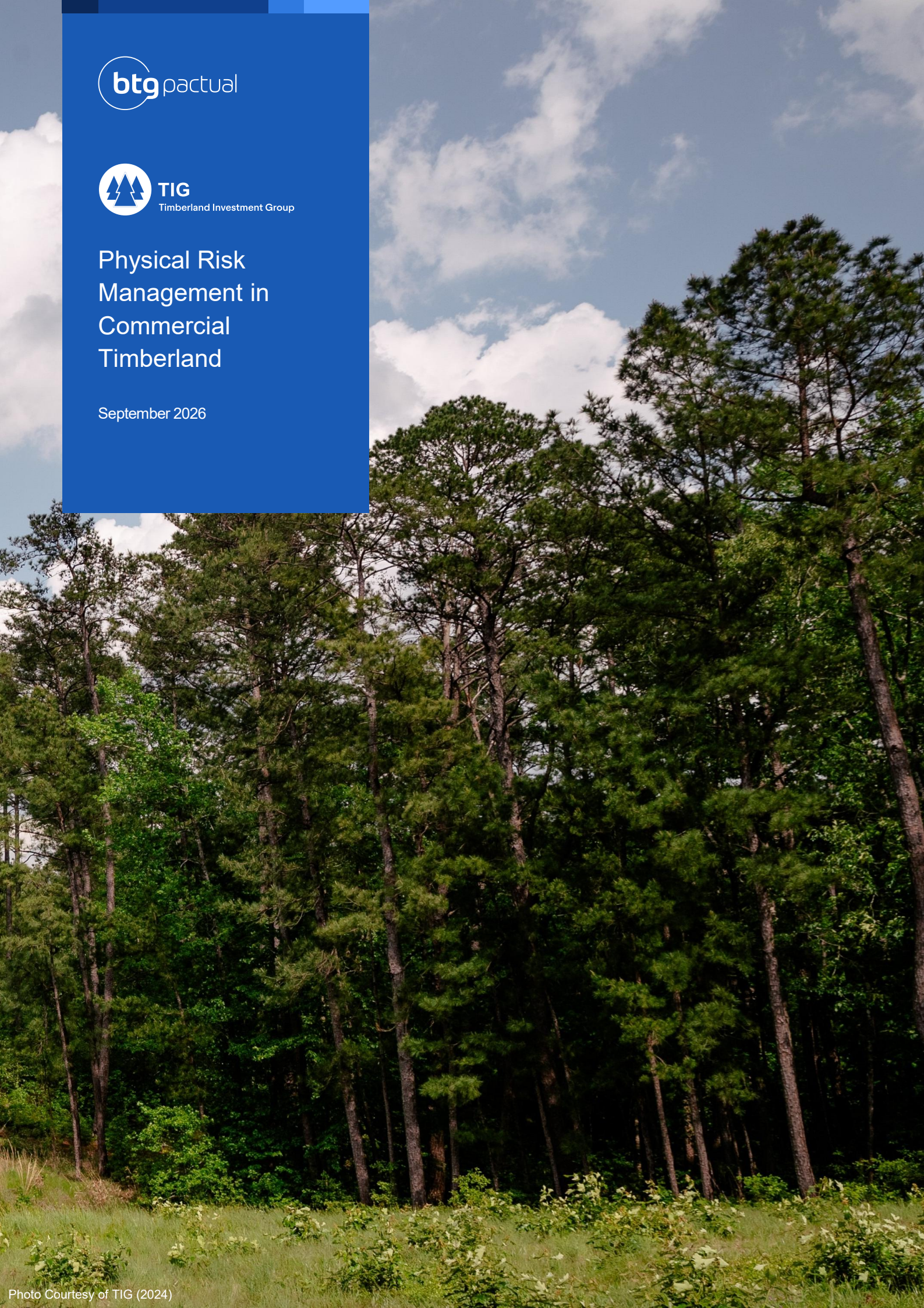


TIG

Timberland Investment Group

Physical Risk Management in Commercial Timberland

September 2026



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Table of Contents

Executive Summary & Introduction	03
1. Wildfire	04
2. Pests	06
3. Severe Weather	08
Conclusion	10
References	11

Executive Summary

Timberland has historically delivered low-volatility, inflation-resistant returns with a low correlation with other asset classes.¹ This performance is primarily driven by the biological growth of trees and the inherent value and downside protection of productive land.² However, realizing this performance requires active management of physical risks such as fire, pests, and extreme weather. BTG Pactual Timberland Investment Group (TIG) applies a disciplined, six-step risk management framework across its US\$ 8.5B, 3.4-million-acre timberland portfolio*, averaging **casualty losses from all causes (calculated as total casualty loss divided by fair market value of the TIG portfolio) of just 5 bps (0.05%) per annum from 2012-2025.**

Introduction

Timberland occupies a distinctive position among asset classes. As a real asset that has historically exhibited low volatility, low correlation with many other asset classes, and a positive correlation with US inflation, timberland offers the potential to diversify and reduce the volatility of institutional portfolios.¹

Unlike most financial assets, timberland's performance is grounded in biological growth: trees add volume year after year, and the economic impact of this growth compounds as stands mature into higher-value product classes such as chip-n-saw and sawtimber regardless of developments in the financial markets. Biological growth accounts for **roughly 50–60% of total timberland returns**.^{1,2} This natural compounding underpins the asset class's long-term stability and its appeal to investors seeking diversification, protection from inflation, and capital preservation.

However, as real assets and living biological systems, appropriate physical-risk management is central to achieving low volatility of returns and long-term timberland performance. Physical risks can be materially reduced through appropriate planning, site selection, species selection, silviculture, investment in appropriate infrastructure, monitoring, rapid response capacity, and rapid recovery.

TIG employs a comprehensive framework – **Prepare, Prevent, Limit, Detect, Respond, Recover** – to manage physical risks across its globally diversified US\$ 8.5B / 3.4M acre portfolio. This approach has limited average annual casualty losses from all causes (calculated as total casualty loss divided by fair market value of the TIG portfolio) to 0.05% per annum from 2012-2025.

The case studies and practices described in this report reflect TIG's approach to physical risk mitigation across three broad categories: fire, pests, and severe weather.

*As of June 30, 2026.

1. Wildfire

1.1 Understanding wildfire risk

Wildfire is among the most visible physical risks in forestry, but the characteristics and dynamics of wildfire are often misunderstood. For instance, regular, low-intensity fire is a natural feature of many healthy ecosystems, while in others fire risk is often associated with the absence of active management. In the United States, fire is concentrated on public wildlands rather than on actively managed private forests: over the ten years to 2022, 64% of all acreage burned by wildfire nationally was on federal land, which represents only 31% of US forestland.^{3,4}

Healthy, well-managed forests are often more resistant to ignition, and healthy trees are often more resistant to fire damage. Importantly, **not all fire is bad**. Prescribed burns can reduce surface fuels, improve stand vigor, return nutrients to the soil, and enhance wildlife habitat.^{5,6} The US Forest Service describes prescribed fire as ‘the right fire at the right place at the right time’.⁷ In the southern US prescribed fire is an established technique for reducing the risks posed by surface fuels, as it reduces the energy available to future wildfires.⁸

FIGURE 1: FIRE MONITORING IN BRAZIL
Photo courtesy of TIG (2024).



Controlled burns at Caddo Sustainable Timberlands

In East Texas, TIG's platform company Caddo Sustainable Timberlands (Caddo) is reshaping how private timberland is managed by expanding the use of prescribed fire in commercial forests to reduce fire risk, restore more natural habitat conditions, and support native biodiversity. In collaboration with TIG's Conservation Advisor, The Nature Conservancy (TNC), more than 12,000 acres at Caddo were treated with prescribed fire in 2024 and 2025.

Post-burn assessments revealed regeneration of native understory plant communities and documented 14 new patches of the federally endangered Texas Trailing Phlox (*Phlox nivalis* ssp. *texensis*). Fire is also enhancing forest management productivity by making harvesting and other field operations faster, easier, and more efficient. By suppressing competing understory vegetation, prescribed burning can enhance tree growth and long-term yield, at a lower cost than herbicide or other treatments.

This experience demonstrates that, with the right partnerships and planning, fire can be introduced safely and effectively into working forests.

Caddo was selected to illustrate TIG's prescribed-fire practices and was not selected based on investment performance. The example is not necessarily representative of all TIG properties or outcomes. Prescribed burning involves costs and material risks, including unintended fire spread, smoke impacts, regulatory restrictions, property damage, personal injury, and unsuccessful ecological or commercial outcomes. Results vary by property and conditions.

FIGURE 2: TEXAS TRAILING PHLOX (PHLOX NIVALIS SSP. TEXENSIS)
Photo Credit: Matt Buckingham of the U.S. Fish and Wildlife Service (2025)



1.2 Mitigating wildfire risk

TIG's wildfire-risk strategy spans the full risk-management cycle:

Prepare: Extensive staff training is carried out before each fire season: nearly 100 professional training programs were held across TIG's timberland in 2025, along with pre-positioning of equipment and airborne resources where appropriate, and coordination with third-party support such as fire management groups and regional forestry associations.

Prevent: TIG seeks to avoid highly fire-prone regions from the acquisition stage onwards and in some cases restricts certain operations during high-risk periods. TIG also seeks to maintain vigorous, healthy, stands of trees. For example, thinning out small trees allows the remaining trees to grow more vigorously and can increase resistance to pests and fire.⁹

Limit: TIG seeks to limit surface fuel build-up and lessen the potential impact of wildfire, using firebreaks, buffer zones, mosaic planting, and fuel-reduction programs. Firebreaks can reduce the intensity and spread of fire, allowing time for suppression.^{10,11}

Detect: TIG uses a variety of tools as appropriate, such as satellite thermal imagery, 24/7 fire-tower cameras with automatic detection systems, and regular ground patrols by trained staff for rapid identification of actual or potential fires within TIG's timberland and across the broader landscape.

Respond: TIG applies rapid response and suppression, adopting a 'control while small' doctrine. TIG's presence on-the-ground seeks to enable a quick response to incidents through close relationships between our local teams and firefighting units in the communities where they live and work.

Recover: TIG deploys drone and satellite-based burn-severity mapping, hazard-tree removal, erosion control, replanting, salvage operations and other measures to aid in recovery. Fire-damaged timber often retains commercial value, but for a limited period, and timely salvage can sometimes recover a meaningful share of pre-incident value.

2. Pests

2.1 Understanding pest risk

Many organisms considered as 'pests', such as insects and fungi, are also integral to healthy forest ecosystems. The goal of pest risk management is not typically to eradicate all such organisms, but to prevent outbreaks that are significant enough to damage the economic value of commercial forests. Through application of integrated pest management (IPM), TIG's approach emphasizes working with ecological processes rather than against them.

One example of an insect that can cause economic damage is the Southern Pine Beetle (SPB). Losses are concentrated during cyclical regional outbreaks: a single outbreak across the eastern US between 1999 and 2002 caused in excess of US\$ 1 billion in timber losses, while in 2024 more than 15,500 beetle infestations were recorded across almost 29,000 acres in four states in the US South.^{12,13} Key to control is early detection, often through satellite-based monitoring, and rapid intervention to harvest the affected trees before an outbreak can spread.

FIGURE 3: SOUTHERN PINE BEETLE OUTBREAK AND SUBSEQUENT CONTROL
Photo courtesy of TTG (2024).



2.2 Mitigating pest risk

TIG's pest-risk strategy incorporates all elements of its risk management framework:

Prepare: TIG engages with forestry cooperatives and research networks across the Americas to test and adopt cutting-edge techniques, including biological control (e.g. taking steps to increase the population of a potential pest's natural predators), management interventions, and other steps. IPM avoids calendar-based spraying of insecticides; control measures are applied only when infestations are observed, and only to the specific area where they are required.

Prevent: TIG seeks to maintain healthy, vigorous stands through thinning and competition control, allowing remaining trees to grow more vigorously with greater resistance to insects or disease. Healthy, resilient trees do not allow pest populations to grow as quickly, facilitating control and, in many cases, preventing outbreaks in the first instance.¹⁴

Limit: TIG invests in pest resistant and diverse planting stock, supported by partnerships with cooperatives such as PROTEF (Brazil) and CMGF (Chile), and seeks to manage across landscapes such that tree farms are integrated with natural forests, limiting the extent of single-species tree cover.¹⁵

Detect: Early detection is critical: a pine-beetle outbreak affecting five trees can be readily contained; the same outbreak across five acres can be significantly more difficult to control. TIG uses unmanned aerial vehicles to obtain multi-spectral imagery capable of identifying bark-beetle infestations during the ‘green-attack’ phase, before crowns turn red. On-the-ground surveys and annual field inspections conducted by trained crews are also used for regular monitoring.

Respond: TIG undertakes targeted and timely removal of infested trees, biological controls (such as parasitoid wasps), with selective chemical treatments applied only where appropriate.¹⁶

Recover: TIG salvages affected timber, replants with resistant genetics as available, restores stand structures, applies continuous monitoring, or takes other measures, as appropriate.

3. Severe Weather

3.1 Understanding severe weather risk

Severe weather includes hurricanes and cyclones, thunderstorms, ice storms, drought, heat events, and flooding that can cause substantial damage, particularly in the absence of appropriate risk mitigation. For example, Hurricane Helene in 2024 resulted in approximately **US\$ 1.28B in timber damage in the US state of Georgia**.^{17,18} On average, three major hurricanes (Category 3 or above) make US landfall every five years.¹⁹



Photo Courtesy of TIG (2024)

3.2 Mitigating severe weather risk

TIG applies the six components of its risk-management framework to managing and mitigating severe weather risk:

Prepare: TIG's severe weather preparation includes property-level storm-readiness and risk assessments, planned seasonal planting, and investment in storm-resilient infrastructure (such as roads, bridges, culverts, and harvest landings). TIG also plans silvicultural activities to align with seasonal weather risks, such as planting seedlings during wet seasons, and planning thinning operations to avoid periods in which high winds are more likely. TIG's collaboration with The Nature Conservancy to map and replace vulnerable culverts enhances resilience during storm events that can lead to flooding.

Prevent: TIG conducts acquisition-stage analysis of severe weather exposure, considering factors such as a property's footprint and age-class range and the potential exposure of sites to specific weather risks. Some of this can be mitigated through site selection (avoiding coastal areas to reduce hurricane risk), species selection (selecting tolerant seedlings and matching genetic families to site and climate conditions), or management (designing thinning regimes to accommodate strong wind events).

Limit: TIG uses Markowitz modeling²⁰ and other tools to construct portfolios diversified across investment geographies, incorporating weather event risk through expressed volatility of returns. TIG also utilizes publicly available information, such as Federal Emergency Management Agency (FEMA) Flood Zones for risk assessment and planning.²¹

Detect: TIG uses active weather monitoring and automatic alerts to manage operations, equipment, and personnel, and to pre-position post-storm resources.

Respond: TIG's post-event response begins with maintaining personnel safety, and includes road clearing, damage assessment, and seeking to secure salvage capacity before regional markets are overwhelmed.²²

Recover: Salvage harvesting, which must typically be accomplished within a six-month to two-year window, depending on the region, is often the largest determinant of value recovery.^{23,24} Recovery may also include stand density management and stand improvement to enhance long-term resilience,²⁵ repair or enhancement of infrastructure, and other measures to restart operations, recover value, and reduce risk of loss from future events.

Conclusion

Active management can mitigate many of the physical risks associated with commercial timberland management. Disciplined application of an appropriate risk management framework – prepare, prevent, limit, detect, respond, recover – can materially influence the frequency and severity of losses, making physical-risk management an important part of investment performance. This approach has limited average annual casualty losses from all causes (calculated as total casualty loss divided by fair market value of the TIG portfolio) to 0.05% per annum from 2012-2025.



Photo Courtesy of TIG (2024)

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BTGPactual.TimberlandResearchDistrib@btgpactual.com

Contact us

BTG Pactual Timberland Investment Group, LLC
1180 Peachtree Street NE, Suite 1810
Atlanta, GA 30309

Phone: +1 (404) 551-4021
TIG.Research@btgpactual.com

