

# When Storms Clear the Way: How Tropical Cyclones May Facilitate Tree Migration Northward

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19-04-2025



“Some plants are busy flexing their muscles to counter the wind, while others are struggling to keep their heads intact or completely occupied with fighting off the rapacious birds. With their backs bent and faces down, no one is in the mood for idle chitchat.”

In “Light and Free”; *Wild Wise Weird* [1]



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As climate change accelerates, tropical cyclones (TCs)—long considered among the most destructive weather events—are extending their geographic reach into temperate and boreal regions. Yet, beyond their well-known damage, new research reveals that these storms may also act as ecological agents of change, accelerating the transition of forests in northern latitudes [2].

Historically confined to tropical and subtropical zones, TCs are now increasingly affecting the temperate–boreal ecotone, particularly in coastal areas of Northeast America and Asia. These disturbances, while less economically visible due to lower population density, are triggering significant ecological shifts. In particular, TCs disproportionately damage coniferous trees—more vulnerable to windthrow and stem breakage—creating openings in the canopy that favor the establishment of temperate broadleaf species better adapted to the changing climate [3,4].

This shift is particularly relevant in the context of climate-induced stressors such as warming and drought, which already challenge the regeneration of boreal conifers. The heavy rainfall associated with TCs may help mitigate drought conditions and provide favorable microsites for seedling establishment, enhancing the migration of broadleaf species northward [5]. Moreover, broadleaf-dominated forests tend to be more fire-resistant than their coniferous counterparts, potentially reducing the risk and severity of future wildfires [6].

However, this emerging dynamic is not without trade-offs. While TCs may accelerate transitions toward more climate-resilient forest compositions, they also drive widespread tree mortality and changes in carbon storage, with uncertain long-term consequences. Recognizing both the risks and opportunities, Altman and Korznikov [2] advocate for the creation of globally coordinated, long-term monitoring networks to track forest responses to TCs and other disturbances.

This perspective calls for a rethinking of natural disturbances—not simply as disasters to be mitigated but also as processes that can reshape ecosystems in the Anthropocene. In this light, the expanding reach of tropical cyclones underscores the deeply intertwined relationship between natural dynamics and human-induced climate change—offering both a warning and a potential pathway to adaptation [7,8].

## References

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