POLICY BRIEF

Wild Turkeys & High-Speed Rail:

Collision Risk, Fencing Limitations, Operational Damage, and the Unassessed Threat to a 40-Year Conservation Investment

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EXECUTIVE SUMMARY

Ontario invested 40 years rebuilding its wild turkey population from provincial extinction to approximately 100,000 birds. The Trenton–Belleville–Kingston–Napanee corridor is identified prime turkey habitat. Alto's proposed Southern Route runs directly through this corridor. **No study has ever examined HSR bird collision risk in North America, and no study anywhere has examined collisions with gallinaceous ground-nesting birds comparable to wild turkeys.** The only HSR bird-collision research (Spain) found mortality of 60–91 birds/km/year in agricultural landscapes. Standard HSR fencing cannot exclude turkeys, which routinely fly over 2-metre barriers. The only purpose-built anti-bird barriers ever tested reduced mortality by just 30% for small flying-across species—not for 14 kg ground-foraging birds attracted to railway ballast. Beyond the ecological impact, a 14 kg turkey at 300 km/h delivers approximately 48,600 joules of kinetic energy—nearly eight times the aviation windshield certification standard—posing risks of windshield damage, sensor destruction, and service disruption. Turkeys are present along both the Northern and Southern corridors, but the Southern Route passes through dramatically higher population densities in exactly the highest-risk landscape configuration. Alto has not assessed bird collision risk for any corridor option.

Wild turkey interacting with a low-speed vehicle in Eastern Ontario. Photo: L. Davidson

1. Ontario's Wild Turkey Recovery

The eastern wild turkey was extirpated from Ontario by 1909 due to unregulated hunting and habitat loss. Beginning in 1984, the Ontario Ministry of Natural Resources, the Ontario Federation of Anglers and Hunters, and the National Wild Turkey Federation conducted one of the world's most successful wildlife reintroduction programs. Ontario traded river otters, moose, and partridges to US states in exchange for 274 live-trapped turkeys. Between 1985 and 2005, an additional 4,400 birds were trapped and relocated to 275 locations across the province.

Today approximately 100,000 eastern wild turkeys live in eastern and southern Ontario. The **Trenton–Belleville–Kingston–Napanee corridor** was specifically identified by OFAH as a region of burgeoning turkey populations, with new Wildlife Management Units (69A, 65, 64B) opened for spring and fall hunting. The reintroduction cost $120,000, of which $100,000 came from conservation organizations and volunteers—not government. Turkey hunting now supports a recreation economy of outfitters, accommodations, and equipment retailers across the affected WMUs.

2. Why Wild Turkeys Are Uniquely Vulnerable to HSR

Wild turkeys are North America's largest ground-nesting bird. Adult males stand 4 feet tall and weigh up to 14 kg. They spend the vast majority of their lives on the ground, foraging by scratching in soil and leaf litter, walking several miles per day in flocks of 6–50 birds along field edges and forest openings. Every aspect of turkey biology places them in the highest-risk category for HSR collision.

2.1 Ground Foraging and Ballast Attraction

All gallinaceous birds require small angular stones (grit) for their gizzards. Railway ballast is crushed angular stone (30–50 mm). "Turkey grit" is a commercial product name for functionally identical material. A ballasted rail corridor through turkey habitat would act as an **attractive nuisance**, drawing flocks onto the right-of-way to collect grit, dust-bathe in dry crushed stone, and forage for insects along cleared embankment edges.

2.2 Inability to Evade High-Speed Trains

Spanish HSR cockpit-camera research found birds react to approaching trains at 60–136 metres. At 300 km/h, a train covers 136 metres in 1.6 seconds. A 14 kg bird on the ground in railway ballast has under two seconds to detect the train, decide to flee, achieve liftoff with a heavy body requiring a running start, and clear the 8.5-metre danger zone between the tracks and catenary. Wild turkeys also have very poor night vision, and trains operate around the clock.

2.3 Edge-Habitat Specialists in the Highest-Risk Landscape

The most recent Spanish HSR collision research (2025) found that tall embankments significantly increase the probability of dangerous bird crossings, and that species associated with human-modified agricultural landscapes were the most prone to collision. The Napanee Plain is flat terrain requiring elevated embankments, set in a mixed agricultural/forest mosaic—**precisely the highest-risk landscape configuration identified in the research.**

2.4 Turkeys on Both Corridors — But the Southern Route Is Far Worse

Wild turkeys are present along both the proposed Northern and Southern corridors. However, population density, habitat quality, and management status differ dramatically. The **Southern corridor (Kingston–Belleville–Napanee)** passes through high-density established populations in WMUs 65, 64B, 69A, and 72, all of which support both spring and fall hunting seasons. Fall seasons are only approved when spring harvests exceed 200 birds per WMU for three consecutive years, confirming robust populations.

The **Northern corridor (Parry Sound–Sudbury–North Bay)** passes through transitional boreal/mixed forest where turkey populations are spotty and lower-density. WMUs 42, 47, 49, and 50 only received spring hunting seasons in 2014—no fall seasons have been approved, indicating populations below the 200-bird harvest threshold. Trent University research found that

the strongest predictors of turkey presence in Ontario were building density and snow depth/temperature, with turkeys considered near their northern tolerance limit in WMU 42 and above.

The Ontario Wild Turkey Management Plan explicitly notes that **hen harvest has a greater impact on populations in northern areas where winter mortality is higher.** Northern populations are more fragile—but they are also far less dense. The Southern Route would affect the heartland of Ontario's turkey recovery, where the highest concentrations, most established populations, and greatest recreational investment are located. Bird collision risk should be a formal route-selection criterion.

3. Why Fencing Cannot Protect Turkeys

3.1 Standard HSR Fencing

All HSR lines are fenced (typically 2-metre chain-link) for human safety and large-mammal exclusion. Wild turkeys fly at speeds up to 90 km/h and routinely clear fences, barn roofs, and power poles 30–40 feet high. Even domestic heritage turkeys breach 6-foot fencing. Standard security fencing is not a barrier for a wild turkey—it is a perching spot.

3.2 Anti-Bird Collision Barriers

Spain's LIFE Impacto Cero project (2013–2019) is the only study worldwide that tested anti-bird barriers on HSR. Tubular screens 4–5 metres high were designed to force birds to fly above the train envelope. They reduced mortality by approximately 30% for small and medium birds *flying across* the tracks. They do nothing for birds *on* the tracks—foraging in ballast, resting on embankments, or dust-bathing. The concept addresses crossing behaviour, not occupation behaviour.

3.3 The Fundamental Problem

Turkeys would be attracted **inside** the fenced corridor for grit, foraging, and dust-bathing. A fence that keeps deer out keeps turkeys in. Once inside the right-of-way, a 14 kg ground bird has under two seconds to detect and evade a 300 km/h train. Acoustic deterrents lose effectiveness within 3–6 weeks as birds habituate. Speed reduction over 150+ km of turkey habitat would negate HSR's competitive advantage.

4. Operational Risk: Train Damage and Service Disruption

Bird-train collisions are not only an ecological concern. A 14 kg wild turkey striking a train at 300 km/h delivers approximately **48,600 joules** of kinetic energy (KE = ½mv²), equivalent to roughly 35,860 foot-pounds of force. For comparison, aircraft windshields are certified to withstand impacts from a 1.8 kg (4 lb) bird. A wild turkey tom is nearly **eight times heavier** than the certification standard.

The Spanish HSR researchers explicitly noted that the possibility of collision with large birds or with large flocks is significant, given the potential cost of stopping the trains and repairing the damage. This operational dimension has not been assessed for any of Alto's proposed corridors.

4.1 Damage to Windshield, Nose Cone, and Sensors

HSR cab windshields are laminated glass designed for debris resistance, but they are not certified against 14 kg impacts at 300 km/h. A cracked or shattered cab windshield forces immediate train withdrawal from service. In aviation, a cracked cockpit window costs up to $90,000 to repair and takes the aircraft out of service for weeks. Modern HSR trains carry forward-facing radar, signalling receivers, and aerodynamic fairings in the nose assembly. A 14 kg bird impact could damage these critical systems, impairing train control and requiring depot inspection. Undercarriage components including brake systems, bogies, and electrical equipment are also vulnerable when birds are struck on the track bed.

4.2 The Flock Strike Scenario

Wild turkeys travel in flocks of 6 to 50 birds. A flock on or near the tracks presents the possibility of **multiple simultaneous strikes**—the rail equivalent of the "flock strike" that aviation considers the most dangerous bird collision scenario. The 2009 "Miracle on the Hudson" crash resulted from a Canada goose flock strike on both engines. Canada geese weigh approximately 4–6 kg; wild turkeys can weigh 5–14 kg. No train has been designed or tested for multiple-turkey flock strikes at 300 km/h.

4.3 Service Disruption Cascade

Every turkey strike requiring inspection or windshield replacement takes a trainset out of revenue service. On a corridor with limited trainsets (as proposed for Alto), each withdrawal affects every subsequent departure. With collision rates of 60–91 birds/km/year documented in Spain for much smaller species, and the Southern Route traversing approximately 150 km of dense turkey habitat, the projected frequency of operationally significant bird strikes is a material business risk that Alto has not quantified.

5. The Research Gap

No HSR bird collision study has ever been conducted in North America. The Spanish research—the only systematic data available—found mortality of 60.5 birds/km/year on one line section and 91.3 birds/km/year on another in agricultural landscapes. Spain does not have wild turkeys. No country with operational HSR has wild turkeys. **The collision risk to North America's largest ground-nesting bird from 300 km/h trains is entirely unquantified.**

Additionally, fencing creates a second problem: habitat fragmentation. Railway ecology research explicitly warns that continuous fencing "should be reserved for collision hotspots, as it increases barrier effects." The Frontenac Arch is already a narrow wildlife corridor—a continuous fenced HSR line would sever movement corridors for turtles, snakes, amphibians,

and turkey hens with flightless poults during the 4–5 week period before chicks develop flight feathers.

6. Collision Risk Assessment

RISK FACTOR	CONDITION ON SOUTHERN ROUTE	EVIDENCE	RISK
Turkey population	~100,000 in eastern/southern ON; corridor is identified prime habitat	OFAH, MNRF	VERY HIGH
Landscape type	Agricultural/forest mosaic — highest-risk type in Spanish research	Malo et al. 2025	VERY HIGH
Embankment profile	Flat terrain requires elevated embankments — highest collision frequency	García de la Morena 2025	VERY HIGH
Ballast attraction	Crushed angular stone = commercial "turkey grit"; attractive nuisance	Turkey biology	HIGH
Fence effectiveness	Standard 2m fencing irrelevant; anti-bird barriers untested for ground-foragers	LIFE Impacto Cero	VERY HIGH
Evasion capability	14 kg, 1.6 sec reaction window at 300 km/h, poor night vision	DeVault et al. 2015	VERY HIGH
Existing data	Zero North American HSR bird collision studies; zero gallinaceous bird studies globally	Literature review	UNKNOWN
Train damage risk	14 kg bird at 300 km/h = ~48,600 J; 7.8× heavier than aviation windshield cert standard; flock strikes compound problem	Transport Canada; aviation cert	VERY HIGH
Service disruption	Each strike requiring inspection removes trainset from service; 60–91 birds/km/yr in Spain for smaller species; flock strikes possible	García de la Morena 2017	HIGH

7. Recommendations

1. **Require a Bird Collision Risk Assessment before route selection.** No HSR bird collision study has been conducted in North America. Alto must commission pre-construction baseline surveys of bird populations along all proposed corridors, with bird collision risk as a route-selection criterion.
2. **Fund North America's first HSR bird collision research.** The Spanish cockpit-camera methodology should be adapted and piloted on existing rail corridors through turkey habitat to establish baseline mortality rates before HSR construction.
3. **Mandate slab track through high-density turkey habitat.** Eliminating ballast removes the grit attraction. This does not eliminate collision risk but removes a known attractant from the right-of-way.

4. **Design species-specific mitigation.** Spanish anti-bird barriers were designed for flying-across Mediterranean species. Any mitigation for Eastern Ontario must address ground-foraging gallinaceous birds in a cold-climate agricultural mosaic—a completely different problem.
5. **Require continuous monitoring with adaptive management triggers.** On-board camera mortality monitoring with publicly reported annual data. If mortality exceeds thresholds, operational changes must be implemented automatically.
6. **Formally consult MNRF, OFAH, NWTF, and hunting communities.** The turkey recovery was driven by hunters and conservation organizations. Affected WMU stakeholders must be consulted on corridor selection and mitigation.
7. **Assess cumulative impacts on the conservation investment.** Turkeys are at the northern edge of their range and sensitive to additive mortality. The EA must quantify the risk that HSR collisions could degrade corridor populations and undermine four decades of public investment.
8. **Disclose rolling stock bird-strike certifications and projected operational costs.** Alto must disclose windshield and nose cone impact certifications for proposed rolling stock and confirm whether they have been tested against 14 kg impacts at 300 km/h. Projected annual costs of bird-strike-related maintenance, service delays, and trainset withdrawal through 150 km of turkey habitat must be included in the business case.
9. **Incorporate bird collision risk as a formal route-selection criterion.** The Southern Route traverses the heartland of Ontario's turkey recovery—high-density, established populations in exactly the highest-risk landscape configuration. The Northern Route passes through lower-density, marginal turkey habitat. Bird collision risk and operational disruption potential should be quantified and compared across corridor options.

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