

POLICY BRIEF

Wild Turkeys & High-Speed Rail:

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

ALTO HSR Citizen Research Initiative • March 2026 • Revised October 2026

EXECUTIVE SUMMARY

Ontario spent four decades rebuilding its wild turkey population from provincial extirpation. The Ministry of Natural Resources estimated more than 70,000 birds in 2007, and later estimates are around 100,000. The first restored flock was released near Kingston, and the farmland-and-woodlot country of Eastern Ontario remains core turkey range. ALTO's southern corridor option, which the federal government described in June 2026 as its "strong preference," with a potential Kingston stop, would cross this landscape. **We have found no published study of high-speed rail (HSR) bird collisions in North America, and none anywhere that examines wild turkeys or comparable gallinaceous ground birds.** The most detailed research, from Spain, estimated mortality of 60.5 birds per kilometre per year on one HSR line section, mainly pigeons, corvids, larks and other small to medium-sized species. Standard HSR fencing will not exclude turkeys, which readily fly over 2-metre barriers. The anti-bird screens tested on Spanish HSR reduced mortality of small and medium-sized birds by more than 30% where installed, but they address birds flying across the line, not birds foraging on it. Beyond the ecological impact, an Initiative calculation puts the kinetic energy of an average adult male turkey (about 7.6 kg) struck at 300 km/h at roughly 26 kilojoules, and of a large male (13.6 kg) at about 47 kilojoules, well outside the bird sizes for which aircraft and train windscreens are tested. Turkeys occur along both of ALTO's Eastern Ontario corridor options, but the southern option crosses more of the agricultural mosaic that supports the highest turkey numbers. ALTO has not published a bird collision risk assessment 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, the result of unregulated hunting and forest clearing; the last native bird was seen near Aurora, north of Toronto. Planned restoration began in 1984, led by the Ontario Ministry of Natural Resources with the Ontario Federation of Anglers and Hunters (OFAH) and the National Wild Turkey Federation (NWTF). Ontario traded river otters to Missouri, moose to Michigan and partridges to New York for wild turkeys; the first birds were released near Kingston, and further exchanges brought the total to about 274 live-trapped birds. From the winter of 1986–87, birds from established Ontario flocks were trapped and moved, and about 4,400 turkeys were eventually released at 275 sites across the province. The first legal spring hunt took place in 1987.

The Ministry estimated the provincial population at “over 70,000 birds and growing” in 2007, and later estimates are around 100,000. These figures are derived from harvest data and carry wide uncertainty; Trent University researcher Jennifer Baici has suggested the 2007 estimate may have been high. In 2002 OFAH identified the **Trenton–Belleville–Kingston–Napanee area** as a region of burgeoning turkey populations, as new Wildlife Management Units (WMUs) there were opened to turkey hunting. The reintroduction cost about \$120,000, of which \$100,000 was donated by OFAH, NWTF and other conservation groups and \$20,000 came from government.

Spring and fall turkey seasons now support outfitters, accommodations and equipment retailers across the region.

2. Why Wild Turkeys Are Uniquely Vulnerable to HSR

Wild turkeys are North America's largest game bird and among its heaviest flying birds. Adult males (toms) typically weigh 5–11 kg, averaging about 7.6 kg, and large toms reach about 13.6 kg; hens average about 4.3 kg. Turkeys spend their waking hours mostly on the ground, foraging by scratching in soil and leaf litter and walking long distances in flocks along field edges and forest openings, and they roost in trees overnight. Almost every aspect of their biology places them at high risk of collision on a high-speed line.

2.1 Ground Foraging and Ballast Attraction

All gallinaceous birds swallow small stones (grit) that their gizzards use to grind food, and grouse and other gamebirds are documented collecting grit from gravel road shoulders. Main-line ballast is coarse, typically 30–50 mm crushed stone, which is larger than the grit turkeys swallow. But ballast beds, shoulders and access roads accumulate finer crushed material, and a cleared, dry, well-drained right-of-way offers open ground for dust-bathing and for foraging on insects and seeds along embankment edges. A ballasted corridor through turkey habitat could therefore act as an **attractant**, drawing flocks onto the right-of-way. This is an inference from turkey biology and gamebird behaviour on roads; it has not been tested on a railway.

2.2 Inability to Evade High-Speed Trains

Spanish cockpit-camera research on the Madrid–Albacete HSR line found that birds began their escape at a mean distance of about 60 metres from an approaching train for passerines (songbirds) and about 136 metres for raptors. At 300 km/h a train covers 136 metres in about 1.6 seconds and 60 metres in under a second (Initiative calculation). A heavy bird in the track bed would have that time to detect the train, decide to flee, take off (turkeys typically run or jump to launch) and climb clear of the train's path. Research on birds and road vehicles has found that birds tend to judge an approaching vehicle by its distance rather than its speed, so escape fails more often as speed rises. Turkeys roost overnight, so their exposure would fall in daylight hours, when trains run most frequently.

2.3 Edge-Habitat Specialists in Farmland Country

Turkeys do best where farmland, hedgerows and woodlots meet, and much of the southern option crosses exactly that mix. The Spanish mortality estimates come from a line that runs mostly at or near ground level on embankment, with dryland farmland along about 60% of its route. On flat farmland a 300 km/h line would be expected to run largely on embankment for drainage and to carry roads over or under the track, so **the southern option would resemble the setting in which the Spanish mortality was measured.**

2.4 Turkeys on Both Corridor Options, but the Southern Option Crosses More Turkey Country

Between Peterborough and Perth, ALTO's corridor study published two broad options. The **northern option** crosses the Canadian Shield through Hastings, Frontenac and Lanark counties, roughly between Highway 7 and the Cloyne–Mazinaw Lake area. The **southern option** runs through the more densely settled agricultural and cottage country to the south, passing south of Westport and through South Frontenac. In June 2026 the federal Transport Minister described the southern route as the government's "strong preference" and asked ALTO to assess a potential stop near Kingston; local reporting indicates this would shift the line toward Rideau Lakes, Stone Mills and Hastings County. A refined corridor map was expected in fall 2026; no final alignment had been published at the time of this revision.

Wild turkeys occur along both options, but the landscapes differ. Trent University research by Jennifer Baici found that building density and snow depth and temperature were the strongest predictors of turkey presence in Ontario, and the Ontario Wild Turkey Management Plan notes that periodic severe winters can eliminate turkeys from localized areas. The northern option is predominantly Shield forest, rock and wetland, with deeper snow and less farmland. The southern option, and particularly a Kingston variant, would cross more of the Napanee Limestone Plain and the farmland belt north of Lake Ontario: the area where the first restored flock was released and where OFAH reported burgeoning populations.

On this basis the southern option is likely to carry the higher turkey collision exposure, while northern populations, though sparser, may be less able to absorb added mortality; the Management Plan notes that **hen losses have a greater impact on populations in northern areas where winter mortality is higher**. Neither proposition has been quantified. MNRF harvest and hunter-observation data by WMU would allow turkey density to be compared along each option, and bird collision risk should be a formal route-selection criterion.

3. Why Fencing Cannot Protect Turkeys

3.1 Standard HSR Fencing

HSR lines are normally fenced, typically with 2-metre fencing, for public safety and to exclude large mammals. Wild turkeys are strong short-distance fliers, reported to reach about 90 km/h, and routinely fly up to tree roosts, barn roofs and power poles. A 2-metre fence is not a barrier to a wild turkey; it is a perch.

3.2 Anti-Bird Collision Barriers

Spain's LIFE Impacto Cero project (2013–2019) developed and tested tubular anti-bird screens along a high-speed line, designed to make birds fly higher as they cross the track. The project reported a reduction of more than 30% in the mortality of small and medium-sized birds in the area of the screens, with the strongest effect for larger birds and birds flying in flocks. Screens of this kind address birds *flying across* the tracks. They do nothing for birds *on* the tracks:

foraging in the track bed, resting on embankments, or dust-bathing. The concept addresses crossing behaviour, not occupation behaviour.

3.3 The Fundamental Problem

Turkeys could be drawn **inside** the fenced corridor to forage, collect grit and dust-bathe. A fence that keeps deer out may help keep turkeys in. Once inside the right-of-way, a heavy ground bird would have roughly one to two seconds to detect and evade a 300 km/h train. Acoustic deterrents have been reported to lose effectiveness within 3–6 weeks unless they are moved, as birds habituate. Speed restrictions long enough to cover the turkey habitat on the southern option would erode the journey-time advantage on which the HSR case rests.

4. Operational Risk: Train Damage and Service Disruption

Bird-train collisions are not only an ecological concern. On an Initiative calculation (kinetic energy = $\frac{1}{2}mv^2$, with 300 km/h = 83.3 m/s), a wild turkey struck at full speed carries about **15 kilojoules** for an average hen (4.3 kg), **26 kilojoules** for an average adult tom (7.6 kg) and **47 kilojoules** for a large tom (13.6 kg). For comparison, US and Canadian certification rules for transport-category aircraft require the windshield to withstand a 4-lb (1.8 kg) bird at the aircraft's design cruising speed. An average tom is about four times that mass and a large tom about 7.5 times. Because aircraft certification speeds are higher than 300 km/h, the energy ratio is smaller than the mass ratio: assuming a certification speed of about 300 knots, the 1.8 kg test bird carries roughly 21 kilojoules (Initiative calculation), comparable to an average tom at 300 km/h and less than half the energy of a large tom.

The Spanish HSR researchers noted that “the possibility of collision with large birds or with large flocks is not insignificant, given the potential cost of stopping the trains and repairing the damage.” ALTO has not published an assessment of this operational dimension for any of its corridor options.

4.1 Damage to Windscreen, Nose Cone and Equipment

HSR cab windscreens are laminated glass designed for debris resistance. The European standard for train windscreens (EN 15152) specifies impact testing with a 20-gram aluminium projectile fired at 20 km/h above the train's design speed; we have not identified any requirement in it for impacts by bird-sized masses of several kilograms. ALTO has not published windscreen or nose-cone impact specifications for its proposed rolling stock. A cracked cab windscreen would ordinarily require the train to be withdrawn from service. Modern HSR trains also carry signalling antennas, sensors and aerodynamic fairings in the nose, and brake equipment, bogies and electrical equipment beneath the train are exposed when birds are struck at track level.

4.2 The Flock Strike Scenario

Wild turkeys travel in flocks that can number several dozen birds. A flock on or near the tracks raises the possibility of **multiple simultaneous strikes**, the rail equivalent of the flock strike that

aviation treats as among the most dangerous bird-collision scenarios. In the 2009 “Miracle on the Hudson,” US Airways Flight 1549 lost both engines after striking a flock of Canada geese and ditched in the Hudson River. Canada geese typically weigh about 2.6–6.5 kg; wild turkey hens average about 4.3 kg and toms about 7.6 kg. We have found no evidence that any high-speed train has been designed or tested for multiple strikes by birds of this size at 300 km/h.

4.3 Service Disruption Cascade

Every strike requiring inspection or windscreen replacement takes a trainset out of revenue service, and each withdrawal can affect later departures. The Spanish mortality estimates (60.5 birds/km/year on a section with 53 daily trains, and 26.1 on a section with 25) relate to much smaller species and cannot be transferred directly to turkeys. But the southern option would cross a substantial length of agricultural turkey habitat, and the frequency of operationally significant strikes is a business risk for which ALTO has not published an estimate.

5. The Research Gap

We have found no published study of bird collisions on high-speed rail in North America. Systematic data come mainly from Spain: the on-board camera estimates above, and an earlier carcass survey along 10.6 km of line that found about 91.3 birds/km/year. Smaller studies exist elsewhere, including a collision-risk assessment for the crested ibis on a Chinese HSR line. Spanish work has also documented deaths of large species, including the great bustard and Eurasian eagle-owl on the Madrid–Valencia line, but no study we have found examines wild turkeys or comparable gallinaceous birds. Spain has no wild turkeys. In the United States, Amtrak’s Acela reaches 150 mph (about 240 km/h) on parts of the Northeast Corridor and Brightline runs at up to 125 mph (about 200 km/h) in Florida, both within wild turkey range, but we have found no published bird-strike data for either. **On current evidence, the collision risk to wild turkeys from 300 km/h trains is unquantified.**

Fencing also creates a second problem: habitat fragmentation. Railway ecology research warns that continuous fencing “should be reserved for collision hotspots, as it increases barrier effects.” The Frontenac Arch, which ALTO’s Eastern Ontario corridor options would cross, is a narrow link between the Canadian Shield and the Adirondacks. A continuous fenced HSR line would sever movement routes for turtles, snakes, amphibians and small mammals, and for turkey hens with young poults, which cannot fly until about two weeks after hatching.

6. Collision Risk Assessment

RISK FACTOR	CONDITION ON SOUTHERN ROUTE	EVIDENCE	RISK
Turkey population	Core Ontario turkey range; first restored flock released near Kingston; MNR 2007 estimate >70,000 province-wide	MNR 2007; OFAH; Project Upland	HIGH

Landscape type	Agricultural/forest mosaic, similar to the farmland setting of the Spanish study line	García de la Morena 2017	HIGH
Embankment profile	Flat farmland likely to need embankment for drainage and road crossings, as on the Spanish study line; alignment not yet published	García de la Morena 2017	HIGH
Ballast attraction	Ballast fines, shoulders and access roads may supply grit; dry track bed suits dust-bathing. Inferred, untested	Turkey biology; gamebird road-grit studies	MODERATE
Fence effectiveness	Standard 2 m fencing does not exclude turkeys; anti-bird screens untested for ground-foragers	LIFE Impacto Cero	VERY HIGH
Evasion capability	Heavy bird; about 1–2 seconds' warning at 300 km/h; birds judge fast vehicles poorly	García de la Morena 2017; DeVault et al. 2015	VERY HIGH
Existing data	No published North American HSR bird collision study found; none found for turkeys or comparable gallinaceous birds	Literature review	UNKNOWN
Train damage risk	Initiative calculation: about 26 kJ (average tom) to 47 kJ (large tom) at 300 km/h; 4–7.5× the mass of the 1.8 kg aviation certification bird; flock strikes possible	Initiative calculation; aviation certification rules; EN 15152	VERY HIGH
Service disruption	Each strike requiring inspection removes a trainset from service; 26–60 birds/km/yr measured on Spanish HSR for smaller species; flock strikes possible	García de la Morena 2017	HIGH

7. Recommendations

1. **Require a bird collision risk assessment before route selection.** We have found no published HSR bird collision study in North America. ALTO must commission pre-construction baseline surveys of bird populations, including turkey density by WMU, along all corridor options, with bird collision risk as a route-selection criterion.
2. **Fund North America's first HSR bird collision research.** The Spanish on-board camera methodology should be adapted and piloted on existing rail corridors through turkey habitat, including the faster US services within turkey range, to establish baseline collision rates before HSR construction.
3. **Evaluate slab track through high-density turkey habitat.** Eliminating ballast would remove a potential grit source and dust-bathing surface. It would not eliminate collision risk, and its cost and cold-climate performance would need to be weighed.

4. **Design species-specific mitigation.** Spanish anti-bird screens were designed for small and medium-sized birds flying across the line in Mediterranean farmland. Any mitigation for Eastern Ontario must address ground-foraging gallinaceous birds in a cold-climate agricultural mosaic, which is a 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.** Ontario is near the northern edge of the wild turkey's range, and severe winters can sharply reduce local populations, so collision losses would add to existing mortality. The environmental assessment must quantify the risk that HSR collisions could degrade corridor populations and undermine four decades of conservation investment, most of it contributed by hunters and conservation organizations.
8. **Disclose rolling stock bird-strike specifications and projected operational costs.** ALTO must disclose windscreen and nose-cone impact specifications for proposed rolling stock and state whether they have been tested against impacts by birds of turkey size (roughly 4–14 kg) at 300 km/h. Projected annual costs of bird-strike-related maintenance, service delays and trainset withdrawals through the turkey habitat on the selected corridor must be included in the business case.
9. **Incorporate bird collision risk as a formal route-selection criterion.** The southern option crosses more of the farmland-and-woodlot landscape that supports Ontario's highest turkey numbers; the northern option crosses Shield country where turkeys are generally sparser. Bird collision risk and operational disruption potential should be quantified and compared across corridor options before the alignment is fixed.

8. Status of the Figures

Figures attributed to a source are quoted from the named published sources listed in the References and can be checked there. Kinetic energies, travel distances and times, and mass ratios are Initiative calculations from the stated inputs (bird mass, a 300 km/h train speed, and the cited certification values); they are estimates, not measurements. Turkey population figures are agency or published estimates with wide uncertainty. Where ALTO has not published something, such as a bird collision assessment, rolling-stock impact specifications or a final alignment, the text says so rather than inferring it, and no claim is made about why any particular information has or has not been published. This brief makes no statement about the motives or conduct of any person or organisation.

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