

POLICY BRIEF

Bat Species at Risk and the Moira Karst Hibernaculum: Impacts, Legal Obligations, Mitigation, and Fiscal Risk

ALTO HSR Southern Route — Alto HSR Citizen Research Initiative | March 2026

Prepared by	ALTO HSR Citizens Research Initiative; reviewed by Kurt Hennige
Date	March 2026
Submitted to	ALTO High-Speed Rail Public Consultation, April 2026

EXECUTIVE SUMMARY

The Alto High-Speed Rail southern corridor passes through or in close proximity to the Moira Karst, a significant karst limestone formation in Hastings County. Within this formation, a major solution cave has been confirmed as a multi-species hibernaculum for four bat species, all listed as Endangered under SARA: Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, and Tri-colored Bat. White-nose Syndrome has driven declines of 85–99% in Ontario’s cave-hibernating bat populations since 2010. Evidence from the HS2 project in the United Kingdom demonstrates that high-speed rail construction near sensitive bat habitat triggers legal obligations that can impose costs of extraordinary scale: the Sheephouse Wood Bat Mitigation Structure on HS2 has cost in excess of £100 million (approximately CAD \$175 million). A government review in 2021 determined there was no cheaper alternative. This brief concludes that Alto HSR proponents must: (1) commission independent pre-consultation bat surveys and geotechnical vibration pathway assessments at the Moira Karst; (2) treat bat mitigation costs as a material budget risk, potentially in the CAD \$100–200 million range based on HS2 precedent; (3) evaluate route alternatives before any permits are sought; and (4) engage ECCC Canadian Wildlife Service and Ontario MNR at the earliest opportunity.

ALTO’s CEO confirms on public record: bat surveys not yet conducted as of consultation close

On CBC Ottawa Morning on March 25, 2026 — one day before the consultation closed — ALTO’s CEO Martin Imbleau stated publicly: “We intend to file the initiation of the [environmental assessment] process later this year. So we need to look at and to have some sampling in dangerous species. Are there any concerns on the wildlife that we’re not aware of?” He confirmed that environmental field work was commencing “this week.”

This brief documents why “concerns on the wildlife” at the Moira Karst are not merely possible, they are documented, legally significant, and carry precedent costs of CAD \$100–200 million from the HS2 Sheephouse Wood case. The CEO’s admission that ALTO was still asking whether bat concerns exist as the consultation closed establishes conclusively that the pre-consultation bat surveys called for in Recommendation 1 of this brief have not been conducted. Acoustic monitoring, hibernaculum population counts, and SARA s. 73 assessment cannot be substituted with a public consultation that occurred before the data exists.

Source: CBC Ottawa Morning, March 25, 2026. cbc.ca/listen/live-radio/1-100-ottawa-morning/clip/16205093

Section 1 — The Moira Karst Hibernaculum

1.1 The Moira Karst System

The Moira Karst is a karst limestone formation in Hastings County, formed through the dissolution of Paleozoic carbonate bedrock (primarily the Gasport Formation) over millions of years. The system includes the Moira Cave, one of the largest solution cave systems in eastern Ontario, with passages extending in excess of 11 km. White-nose Syndrome was first confirmed in this cave system in 2010, reflecting its role as a significant regional bat aggregation point.

1.2 Confirmed Species and Conservation Status

Species	SARA Status	Ontario Status	Key Threat (post-WNS)
Little Brown Myotis (Myotis lucifugus)	Endangered (2012, emergency listing)	Endangered (2013)	WNS; 90–99% hibernaculum decline in eastern Ontario
Northern Myotis (Myotis septentrionalis)	Endangered (2012, emergency listing)	Endangered (2013)	WNS; 94% overall decline in known hibernating populations
Eastern Small-footed Myotis (Myotis leibii)	Endangered (COSEWIC 2013)	Endangered (2014)	WNS (confirmed 2016 in Ontario); only ~10 known hibernacula in province
Tri-colored Bat (Perimyotis subflavus)	Endangered (2012, emergency listing)	Endangered (2013)	WNS throughout entire Canadian range; 10% of global population in Canada

1.3 Why the Moira Hibernaculum Is Irreplaceable

A hibernaculum's conservation value is determined not simply by the number of animals it currently contains, but by its biological function and irreplaceability. The Moira Karst cave provides functions that cannot readily be replicated: multi-species use of a single cave, meaning disruption affects a disproportionately large fraction of the regional endangered bat population with a single impact event; historical significance as the site reportedly supporting the largest population of Little Brown Myotis in Southern Ontario prior to WNS; limited alternatives, with only approximately ten known hibernacula for Eastern Small-footed Myotis in the entire province; and swarming function as a critical late-summer reproductive and social site. Bat species demonstrate strong hibernaculum site fidelity over decades; individual bats do not simply relocate to equivalent sites, and suitable alternatives may not exist within the species' travel range.

Section 2 — How High-Speed Rail Affects Bats

2.1 Ground-borne Vibration and Noise at Hibernacula

Construction of high-speed rail infrastructure near a cave hibernaculum presents acute risks through ground-borne vibration pathways. Blasting, pile-driving, vibratory compaction, and heavy earthmoving generate vibration energy that propagates through bedrock at velocities and frequencies that can penetrate karst cave systems at significant distances. This is a particular concern in karst terrain, where fractured limestone transmits vibration along solution channels with minimal attenuation. Research (Brown & Berry, 2000) documents that hibernating bats can tolerate peak particle velocities of 1.52 to 5.08 mm/sec, but rail construction introduces sustained vibration over months or years, a qualitatively different exposure profile. Each arousal event for Little Brown Myotis costs approximately 108 mg of fat, equivalent to the energy burned in 68 days of undisturbed torpor. For bats already entering hibernation in compromised condition due to WNS, forced arousals during winter can be directly lethal.

2.2 Operational HSR: Ongoing Suppression of Foraging

A 2021 peer-reviewed study (Jerem and Mathews, Scientific Reports) monitored bat activity at 12 wooded rail-side sites and found that bat activity fell by at least 30–50% each time a train passed, with recovery taking at least two minutes. Alto's planning documents indicate departures will run generally hourly with potential 30-minute peak intervals — 20 to 30 trains per day in each direction. At those headways, cumulative activity suppression across a foraging night is significant. High-speed trains at 300 km/h generate considerably greater broadband noise and vibration per pass than the conventional trains studied, meaning each disturbance event is likely more severe. For populations already depleted 85–99% by WNS, the energetic cost of repeated forced evasive responses leaves no margin.

2.3 Hydrological Disruption of Cave Microclimate

Karst systems are particularly vulnerable to hydrological disruption because groundwater flow, temperature, and humidity within caves are controlled by surface water infiltration patterns. Rail construction involving earthworks, drainage modification, culverting of watercourses, and de-icing chemical application can alter the thermal regime and humidity of a connected cave system. Hibernating bats select specific temperature zones within caves (typically 2–10°C with humidity above 80%); any disruption to these microclimate conditions can render previously suitable hibernation zones unsuitable.

Section 3 — International Experience: The HS2 Precedent

HS2, the UK's in-progress high-speed rail project, provides the most detailed and directly relevant international case study for bat impacts from high-speed rail. The HS2 experience demonstrates unequivocally that proximity to protected bat species triggers legal obligations that are non-negotiable and that mitigation costs can be extraordinary.

Sheephouse Wood, located in Buckinghamshire, contains habitat for Bechstein's bat, with fewer than ten breeding colonies in England. The Sheephouse Wood Bat Mitigation Structure (SWBMS) is a 900-metre-long, up to 10-metre-high steel mesh arch structure designed to completely enclose the railway as it passes through bat habitat. The cost has risen to in excess of £100 million (approximately CAD \$175 million). A 2021 review by the UK Department for Transport, DEFRA, and Natural England, specifically examining whether any cheaper alternative existed, concluded that it did not. Legal analysis by Herbert Smith Freehills (2025) noted: "if HS2 couldn't have shown that the Bechstein bat colony would stay in favourable conservation status, they simply could not have built the line through Sheephouse Wood. They had to offer up mitigation, however expensive that was."

FISCAL RISK

The Moira Karst hibernaculum hosts four Endangered species rather than the single species protected at Sheephouse Wood — all subject to equivalent SARA s. 73 preconditions. The CAD \$100–200 million bat mitigation cost range established by HS2 precedent must be treated as a material budget risk for the southern corridor. It has not been included in any published cost estimate.

Section 4 — Canadian Legal Framework

4.1 SARA Prohibitions

SARA's prohibitions apply automatically to all four Moira Karst bat species:

- Section 32: No person shall kill, harm, harass, capture or take an individual of a wildlife species listed as endangered. All four Moira Karst bat species are listed as Endangered on Schedule 1.
- Section 33: No person shall damage or destroy the residence of one or more individuals of a listed endangered species. A hibernaculum is a cave used by bats for overwintering; this is explicitly recognized in SARA guidance as a “residence.”
- Section 58(1): No person shall destroy any part of the critical habitat of a listed endangered species. Critical habitat for these bat species has been identified in recovery strategies as including hibernacula, swarming sites, maternity roosts, and foraging habitat within specified buffer distances.

Construction vibration causing arousal of hibernating bats, destruction or alteration of the cave microclimate through hydrological disruption, clearing of foraging habitat within buffer distances, or light/noise impacts that impair foraging success are all activities that could constitute harm or harassment under s. 32, or destruction of a residence under s. 33. A SARA permit under s. 73 would be required before any such activities could lawfully proceed.

4.2 Ontario Provincial Law

The Endangered Species Act, 2007 (as amended by Bill 5, June 2025) remains the operative provincial statute as of March 2026. All four Moira Karst bat species are listed as Endangered under the ESA. The amended ESA removes harassment from prohibited activities — but SARA's federal harassment prohibition under s. 32 remains fully operative. The Species Conservation Act, 2025 (enacted June 5, 2025; not yet proclaimed) will further modify the provincial framework. Neither provincial change affects federal SARA obligations.

Section 5 — Recommendations

1	<p>Commission independent pre-consultation bat surveys at the Moira Karst</p> <p>Acoustic monitoring, hibernaculum population counts, and seasonal activity surveys must be completed before any route decision, establishing a baseline against which SARA s. 73 permit applications would be assessed.</p>
2	<p>Commission a geotechnical vibration pathway assessment</p> <p>Assess the transmission of construction and operational vibration through the karst limestone substrate from the proposed alignment to the Moira Cave hibernaculum. This assessment must include blasting impact modelling.</p>
3	<p>Treat bat mitigation as a material budget risk of CAD \$100–200 million</p> <p>Based on HS2’s Sheepphouse Wood precedent, bat mitigation costs must be included in the southern corridor’s lifecycle cost estimate. No such provision currently exists in any published ALTO document.</p>
4	<p>Evaluate route alternatives before permits are sought</p> <p>SARA s. 73(3) requires that all reasonable alternatives have been considered before a permit can be issued. Route alternatives that avoid proximity to the Moira Karst hibernaculum must be formally evaluated.</p>
5	<p>Engage ECCC Canadian Wildlife Service and Ontario MNRF immediately</p> <p>Early formal engagement with competent authorities is essential to establish the regulatory pathway for any southern corridor work near the Moira Karst, and to determine whether the s. 73 threshold for four simultaneously Endangered species can be met.</p>

Key References

- Species at Risk Act, S.C. 2002, c. 29. ss. 32, 33, 34, 58, 73.
- HS2 Ltd. (2024). Sheepphouse Wood bat protection structure – FAQ. HS2 Media Centre.
- Herbert Smith Freehills Kramer. (December 2025). Project Nutcracker: Avoiding more kittiwake hotels and bat sheds. CIEEM. (January 2026). HS2’s Bat Mitigation Structure: Why it exists and what it means.
- Jerem, P. and Mathews, F. (2021). Passing rail traffic reduces bat activity. *Scientific Reports*, 11, 20590.
- Thomas, D.W. (1995). Hibernating bats are sensitive to nontactile human disturbance. *Journal of Mammalogy*, 76(3), 940–946.
- EUROBATS Advisory Committee. (2024 draft). Guidance on the consideration of bats in traffic infrastructure projects.
- Berthinussen, A. and Altringham, J.D. (2012). The effect of a major road on bat activity and diversity. *Journal of Applied Ecology*, 49(1), 82–89.
- COSEWIC 2013; Environment and Climate Change Canada 2018; Ontario MECP 2020 — Government Response Statements for bat species.
- Endangered Species Act, 2007, S.O. 2007, c. 6 (as amended by Bill 5, 2025).
- Species Conservation Act, 2025, S.O. 2025, c. 4, Schedule 10 (enacted June 5, 2025; not yet proclaimed in force as of March 2026).