2025 NORTHWEST TERRITORIES FOREST HEALTH REPORT

RAPPORT de 2025 SUR LA SANTÉ DES FORÊTS AUX TERRITOIRES DU NORD-OUEST

Le présent document contient la traduction française de l'introduction

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

K’áhshó got’ı̨ne xədə k’é hederı ɂedı̨htł’é yerınıwę nı dé dúle.
Dene Kədə́

ʔerıhtł’ís Dëne Sųłıné yatı t’a huts’elkër xa beyáyatı theɂą ɂat’e, nuwe ts’ën yółtı.
Dëne Sųłıné

Edı gondı dehgáh got’ı̨e zhatıé k’ę́ę́ edatł’éh enahddhę nıde naxets’ę́ edahłí.
Dene Zhatıé

Jii gwandak izhii ginjìk vat’atr’ijąhch’uu zhit yinohthan jì’, diits’àt ginohkhìi.
Dinjii Zhu’ Ginjik

Uvanittuaq ilitchurisukupku Inuvialuktun, ququaqluta.
Inuvialuktun

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Inuktitut

Hapkua titiqqat pijumagupkit Inuinnaqtun, uvaptinnut hivajarlutit.
Inuinnaqtun

kīspin ki nitawihtīn ē nīhīyawihk ōma ācimōwin, tipwāsinān.
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Tłı̨chǫ yatı k’ę̀ę̀. Dı wegodı newǫ dè, gots’o gonede.
Tłı̨chǫ

Indigenous Languages
request_Indigenous_languages@gov.nt.ca

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Introduction

Most of the insect and disease agents observed annually in the Northwest Territories are naturally occurring (endemic) in northern forest ecosystems, and the damage they cause is expected. By contributing to nutrient cycling, decay, and forest succession, they help support forest resilience, natural dynamics, and biodiversity, which are important for any healthy forest. Their populations fluctuate in natural cycles, periodically increasing associated defoliation or damage. Warming or cooling trends may alter the timing, duration, and intensity of these cycles. While many endemic populations cause minimal damage, increased activity during cycles can occasionally cause substantial damage or tree death, especially if outbreaks are sufficiently frequent and severe. For example, bark beetles or stem diseases can cause immediate tree death, while repeated defoliation from some insects can result in branch and tree mortality. There is also the potential for damage to be amplified when stressed by other disturbances such as drought or flooding.

The 2025 NWT forest health surveys were conducted between June 6 and August 5. They included an aspen defoliation and aspen running canker (ARC) reconnaissance survey in the Dehcho and South Slave regions in June, a general ground survey in July, and aerial overview surveys (AOS) took place in July and August. A remote ground survey was conducted in the Cameron Hills to diagnose aspen defoliation in August. Supplemental ARC surveys were conducted during July’s general grounds survey.

Included in the surveys were an aerial and ground survey for Wood Buffalo National Park, an aerial survey for Nahanni and Nááts'ı̨hch'oh National Park Reserves, and an aerial survey for the Thaıdene Nëné National Park Reserve and neighbouring Territorial Protected Areas. These National Park surveys were conducted under a Government of the Northwest Territories, Department of Environment and Climate Change (ECC), Forest Resource and Parks Canada Agency (PCA) memorandum of understanding.

A virtual survey of flooding and high-water table in the Slave River area was conducted using high-resolution imagery to verify and document areas with higher levels of tree mortality. High-resolution imagery was also used to refine aerial overview survey data, where possible.

This report, prepared by SKOG Forest Health on behalf of ECC, provides a summary of the 2025 surveys and results and a summary of current NWT forest health conditions.

Introduction

La plupart des insectes et des agents pathogènes observés chaque année aux Territoires du Nord-Ouest (TNO) sont naturellement présents (endémiques) dans les écosystèmes forestiers nordiques, et les dommages qu'ils causent sont attendus. En contribuant au cycle des nutriments, à la décomposition de la matière organique et à la succession forestière, ils favorisent la résilience des forêts, les processus naturels et la biodiversité, qui sont essentiels à la santé des écosystèmes forestiers. Leurs populations fluctuent selon des cycles naturels et connaissent périodiquement des augmentations qui s'accompagnent d'une défoliation ou de dommages plus importants. Les tendances au réchauffement ou au refroidissement du climat peuvent modifier le moment, la durée et l'intensité de ces cycles. Bien que de nombreuses populations endémiques causent peu de dommages, l'augmentation de leur activité au cours de certains cycles peut parfois entraîner des dommages importants ou la mort des arbres, particulièrement lorsque les infestations sont fréquentes et sévères. À titre d'exemple, les scolytes ou certaines maladies du tronc peuvent provoquer la mort immédiate des arbres, tandis que la défoliation répétée causée par certains insectes peut entraîner la mort des branches et des arbres. Les dommages peuvent également être plus importants lorsque les arbres sont déjà affaiblis par d'autres perturbations, comme la sécheresse ou les inondations.

Les relevés sur la santé des forêts des TNO de 2025 ont été réalisés du 6 juin au 5 août de cette même année. Ils comprennent un relevé de reconnaissance sur la défoliation du peuplier faux-tremble et le chancre diffus du peuplier faux-tremble dans les régions du Dehcho et du Slave Sud en juin, un relevé terrestre général en juillet ainsi que des relevés aériens de synthèse effectués en juillet et en août. Un relevé terrestre en région éloignée a également été mené dans les collines Cameron en août afin de déterminer la cause de la défoliation du peuplier faux-tremble. Des relevés supplémentaires sur le chancre diffus du peuplier faux-tremble ont été réalisés dans le cadre du relevé terrestre général de juillet.

Les relevés comprennent également un relevé aérien et terrestre du parc national Wood Buffalo, un relevé aérien des réserves de parc national Nahanni et Náátsʼįhchʼoh, ainsi qu'un relevé aérien de la réserve de parc national Thaidene Nene et des aires protégées territoriales avoisinantes. Ces relevés dans les parcs nationaux ont été réalisés dans le cadre d'un protocole d'entente entre la Division de l'aménagement des forêts du ministère de l'Environnement et du Changement climatique (MECC) du gouvernement des Territoires du Nord-Ouest et l'Agence Parcs Canada (APC).

Un relevé virtuel des inondations et des secteurs où la nappe phréatique est élevée dans la région de la rivière des Esclaves a été réalisé à l'aide d'images à haute résolution afin de confirmer et de documenter les zones présentant une mortalité accrue des arbres. Des images à haute résolution ont également été utilisées, lorsque cela était possible, pour préciser les données issues des relevés aériens de synthèse.

Le présent rapport, préparé par SKOG Forest Health pour le compte du MECC, présente un résumé des relevés effectués en 2025 et de leurs résultats, ainsi qu'un aperçu de l'état actuel de la santé des forêts des TNO.

Survey Overview

Routes & Coverage

All traditional survey routes were completed in 2025, except for the flight of Náátsʼįhchʼoh National Park Reserve, which was cancelled due to low cloud and rain (Fig. 1). The new Thaıdene Nëné National Park Reserve and Territorial Protected Areas in the East Arm of Great Slave Lake were completed in addition to the normal routes.

6.2M ha were surveyed, including 4.5M ha (72%) in the NT regions, 1.6M ha (26%) in PCA jurisdictions, and 0.1M ha (2%) in external provincial and territorial zones along borders (Table 1). The largest areas surveyed were in the Dehcho and South Slave regions, where 1.2M ha and 1.1M ha were covered, respectively.

Figure 1. 2025 NWT aerial & ground survey routes & estimated coverage.

Table 1. 2025 forest health survey area (in hectares).

Regions	Aerial Survey	Aspen Ground Survey	General Ground Survey	Grand Total	% Area Surveyed
Dehcho	1,110,109.0	41,994.0	39,778.0	1,191,881.0	19.19%
South Slave	1,006,104.0	44,109.0	43,049.0	1,093,262.0	17.60%
Sahtu	823,804.0			823,804.0	13.26%
Beaufort-Delta	809,298.0			809,298.0	13.03%
North Slave	546,172.0		25,163.0	571,335.0	9.20%
Thaidene Nëné NPR	496,782.0			496,782.0	8.00%
Wood Buffalo NP, AB	380,526.0		7,015.0	387,541.0	6.24%
Thaidene Nëné TPA	305,261.0			305,261.0	4.91%
Nahanni NP	281,495.0			281,495.0	4.53%
Wood Buffalo NP, NT	99,666.0	9,617.0	7,084.0	116,367.0	1.87%
Alberta	107,295.0	91.0	3,116.0	110,502.0	1.78%
Yukon	20,911.0			20,911.0	0.34%
British Columbia	2,673.0			2,673.0	0.04%
Total NT Survey Area	4,295,487.0	86,103.0	107,990.0	4,489,580.0	72.28%
Total PCA Survey Area	1,563,730.0	9,617.0	14,099.0	1,587,446.0	25.56%
Total External Survey Area	130,879.0	91.0	3,116.0	134,086.0	2.16%
Grand Total	**5,990,096.0**	**95,811.0**	**125,205.0**	**6,211,112.0**	100.00%

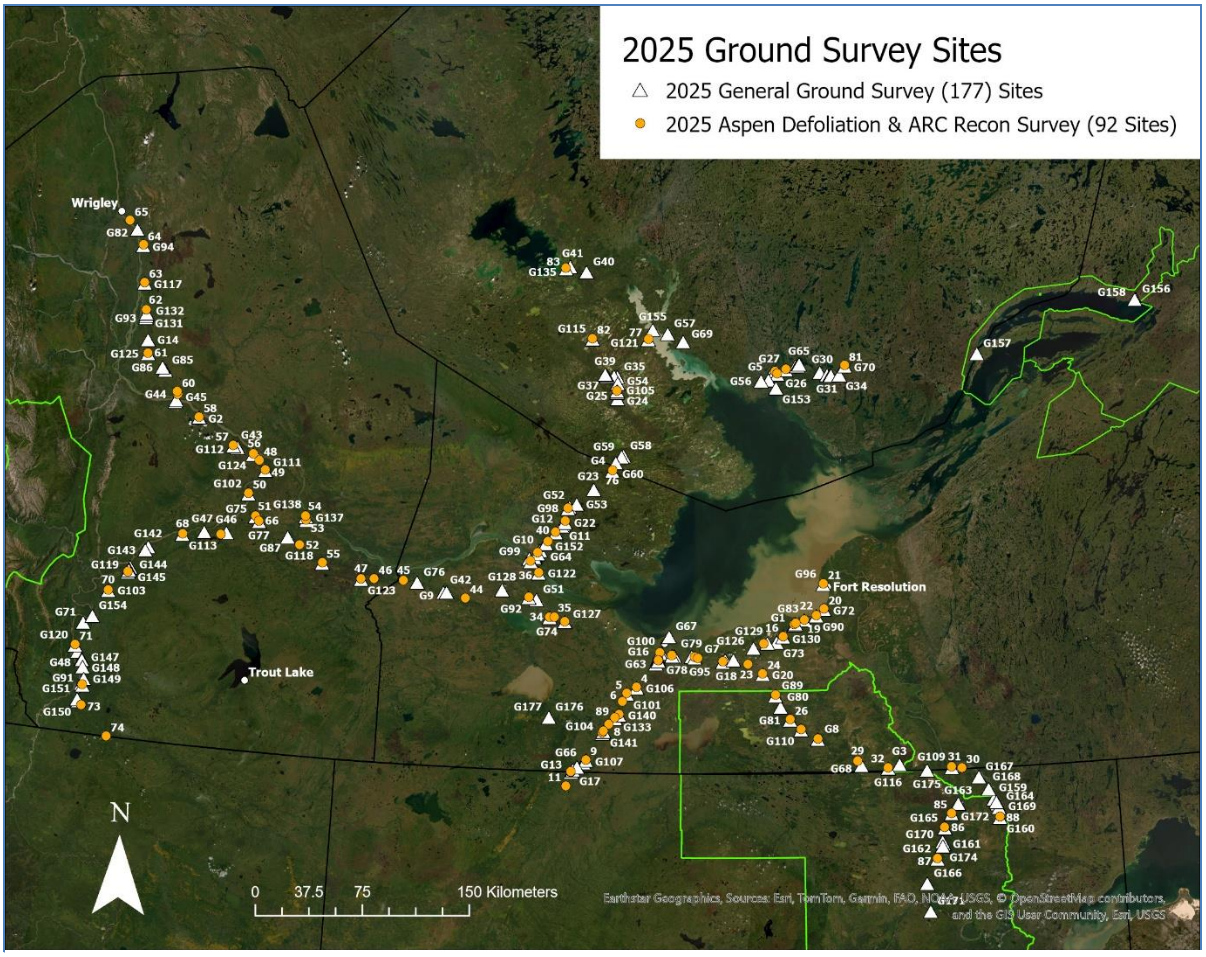

Figure 2. 2025 NWT aspen defoliation & ARC recon survey, ground survey locations.

96,000 ha were covered in the aspen defoliation survey, 125,000 ha by the general ground surveys and 6M ha in the overview aerial survey.

High-resolution satellite imagery was reviewed in the Martin Hills, Ebbutt Hills, and Cameron Hills, and along the Slave River to fine-tune the aerial data and to virtually identify areas that were not captured during the flights (virtually surveyed areas are not included in the total survey area coverage reported).

The 2025 Aspen Defoliation Survey coincided with a reconnaissance survey for aspen running canker in June, during which 92 aspen sites were spot-checked for defoliators throughout the Dehcho, South, and North Slave regions (Fig. 2). A general ground survey conducted in July evaluated all trees and shrubs present on an additional 177 sites throughout the same regions. A targeted ground survey on aspen defoliation in the Cameron Hills, accessed by helicopter, was included in the general ground survey.

All annual ground survey routes were completed in 2025.

Ground Survey Protocols

Aspen defoliator surveys focus on detecting and assessing damage in roadside forests. Defoliators may include various leaf beetles, leaf miners, leaf-tiers, leaf-rollers, and free-feeding caterpillars. Defoliation is investigated to identify population status and severity. Random spot checks are conducted on non-defoliated trees to assess if emerging issues are present. Aspen running canker was discovered in the NWT in 2024 and it is now included as a component of aspen defoliation ground survey sites.

General ground surveys involve investigating forest health observations and conducting spot-checks on all trees and shrubs. General ground surveys and aspen defoliation surveys use a variety of methods to detect forest health issues, including "tree-beating" for defoliators, netting winged insects, pole-pruning, bark beetle sampling, etc. Damaging agents and samples may be collected and sent to NRCan-CFS Northern Forestry Centre in Edmonton if positive identification can't be done in the field.

Observations made during ground surveys identify agents and help calibrate severities observed during the aerial surveys. They also help fill in gaps when aerial survey routes are affected by visibility conditions.

Aerial Survey Protocols

Aerial overview is the primary forest health survey method. It provides a broad scope of conditions across the landscape, including information on population dynamics, impacts, and changes occurring over time. Aerial surveys are typically conducted in July and focus on areas of historic outbreak activity and areas of concern (Fig. 3).

Figure 3. Thaıdene Nëné survey plane, Hoarfrost River 2025.

Observations are digitally mapped and recorded. Severity is based on the level of defoliation or damage affecting trees, or the percent of trees killed. Smaller affected areas are recorded as points, noting the number of trees impacted.

Forest health observations include biotic and abiotic factors such as insect and disease, animal, weather, climate, or pollution damage. Typical examples would be eastern spruce budworm defoliation, western gall rust infections, wind damage, beaver flooding, drought stress and mortality, aspen decline, and road salt damage.

Virtual Survey Protocols

A virtual survey uses satellite imagery to identify forest health issues in key areas needing more detail. Data from aerial and ground surveys are adjusted and enhanced based on results of virtual surveys as needed.

2025 NWT Forest Health Survey Results

Overview of Current Conditions

Parts of the NWT received more rain during the 2025 growing season than last year, however drought conditions persist since beginning in 2022. Forest stress and some tree mortality were observed across regions, particularly in the Dehcho, North Slave and South Slave regions (Fig. 4). Ongoing issues include direct physiological drought effects and indirect effects associated with flooding in some areas. The latter effects may be related to elevated groundwater levels following wildfires and associated permafrost thaw.

Defoliators such as eastern spruce budworm and large aspen tortrix are more active in drought-stressed stands. Surveys revealed increased area of eastern spruce budworm defoliation throughout the southern Dehcho region. Some of the increase is natural population expansion due to drought conditions, however a lot is likely due to clear visibility in 2025. Wildfire smoke prevented comprehensive aerial coverage in 2024 resulting in an underestimate of outbreak area. Notable defoliation associated with a large aspen tortrix complex and drought stress was noted in extensive aspen stands south of Fort Liard along the British Columbia and NWT border, by Fisherman Lake, Trout Lake, and along the slopes of Martin Hills, Ebbutt Hills and Cameron Hills. White spruce

Figure 4 Drought-induced stress & mortality at the Jct. of 1 and 3, 2025.

and aspen decline and mortality may continue to spread in the Dehcho and South Slave if dry conditions persist in 2026.

811,000 ha of forest, with thirty-eight primary forest health issues, was mapped during the 2025 NWT aerial and ground surveys (Table 2), increasing from the 654,200 ha mapped in 2024. As noted above, prevalence of smoke and restricted visibility in 2024 likely skewed the 2024 results downward. 26,000 ha of forest health issues were recorded in cross-border areas mapped within Alberta, British Columbia, and the Yukon (not shown in the table below).

Table 2. 2025 forest health conditions (in hectares)

Agent Names	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Nahanni NPR	Thaıdene Nëné TPA	Thaıdene Nëné NPR	Grand Total
Aspen serpentine leafminer	272,176.24	37,487.88	510.98	2,790.79	52.43	13,789.22	6,419.08			333,226.61
Eastern spruce budworm	145,873.93			5,503.17	8,667.48	879.34	301.52			161,225.44
Drought stress	53,907.36	30,551.25	4,941.45	1,728.41		6,286.64	194.61	2,787.34	977.83	101,374.90
Large aspen tortrix complex	50,965.44	17,929.88					55.12			68,950.44
High-water tables	153.09	38,381.59	70.67	802.58	8,595.61	4,279.49			386.90	52,669.93
Black spruce decline		49.84	4,609.40	21,021.05				215.91	144.94	26,041.14
Willow blotch leafminer	3,703.09	4,561.15	6,390.22	852.96	154.76	5,585.00	36.68	25.55		21,309.42
Drought stress and mortality	4,718.08	2,559.17	5,240.94	248.55	16.97	30.80	64.16			12,878.66
Stress, cause unknown		366.72		7,074.86	1,306.41	870.91				9,618.90
Flooding stress and mortality	1,791.49	1,416.38	5.17	44.06	197.83	3,853.38	73.35	36.60	68.75	7,487.01
Aspen decline	6,158.55	80.80				940.72				7,180.08
Unknown bark beetle					3,494.70					3,494.70
Willow decline		1,433.53	18.56		605.87					2,057.96
SBW-caused mortality				1,350.54	267.52					1,618.06
Red-belt	143.66						237.05			380.70
Permafrost slumping	12.07	2.14		207.36	56.21					277.79
Western balsam bark beetle	265.60									265.60
Western gall rust	110.98	0.85	1.26			11.68				124.77
Wind damage		0.52		26.25				20.48	71.75	119.00
Pine engraver beetle, Ips pini		107.35								107.35
Herbicide		100.90								100.90
Larch sawfly				95.94						95.94
Defoliation, cause unknown					45.26					45.26
Blowdown	45.10									45.10
Porcupine	18.03	6.77	0.75						14.81	40.36
Eastern larch beetle	2.41	29.30	3.12						2.75	37.58
Lodgepole pine dwarf mistletoe						33.82				33.82
White-spotted sawyer beetle	13.78	0.87	0.93							15.58
Stem disease, cause unknown	3.90	10.85				0.47				15.22
Aster yellows phytoplasma	0.09	1.87	7.10			2.64				11.71
Wood bison		0.60	4.15			4.93				9.69
Jackpine resin midge	0.76	2.60				3.07				6.43
Balsam fir mortality						4.51				4.51
Roadsalt, Calcium chloride			3.77							3.77
Yellow-headed spruce sawfly		1.59	0.65			0.87				3.11
Diplodia canker		1.97								1.97
Armillaria root rot						0.33				0.33
Comandra blister rust	0.04									0.04
Grand Total	**540,063.70**	**135,086.40**	**21,809.12**	**41,746.51**	**23,461.03**	**36,577.84**	**7,381.57**	**3,085.88**	**1,667.73**	**810,879.78**

The primary damages recorded in 2025 were defoliation (585,000 ha), stress (111,000 ha) and mortality and decline (114,000 ha). (Table 3)

Most defoliation damage was due to eastern spruce budworm, aspen serpentine leaf miner and new areas of large aspen tortrix complex (combined large aspen tortrix, Enargia sp., and drought stress).

Stress-related observations were predominantly related to drought.

Mortality includes both biotic and abiotic factors such as bark beetles, prolonged eastern spruce budworm defoliation, browsing, stem diseases, waterlogging associated with high water tables and flooding, drought, and wind.

Table 3. 2025 forest health conditions by damage type (in hectares).

Damage Type	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Nahanni NPR	Thaıdene Nëné TPA	Thaıdene Nëné NPR	Grand Total
Defoliation	472,718.70	59,980.51	6,901.85	9,242.85	8,919.92	20,254.44	6,812.40	25.55		584,856.22
Tree Stress	53,907.36	30,917.98	4,941.45	8,803.27	1,306.41	7,157.56	194.61	2,787.34	977.83	110,993.80
Tree Mortality	7,023.55	42,515.02	5,329.50	2,653.10	12,741.73	8,173.91	137.51	36.60	473.21	79,084.13
Tree Decline and Mortality	6,158.55	1,564.17	4,627.96	21,021.05	605.87	940.72		215.91	144.94	35,279.18
Foliar Damage	143.66	100.90					237.05			481.60
Twig/Branch/Stem Damage	111.87	7.82	8.36	26.25		51.21		20.48	71.75	297.73
Grand Total	**540,063.70**	**135,086.40**	**21,809.12**	**41,746.51**	**23,573.93**	**36,577.84**	**7,381.57**	**3,085.88**	**1,667.73**	**810,992.67**

Top Forest Health Issues in 2025

1. Drought

Drought overview

According to the Canadian Drought Monitor (Agriculture and Agri-Food Canada), drought conditions have ranged from abnormally dry to severe in the NWT in every month since June 2022. These conditions continued into 2025 across the territory (Fig. 5) and are associated with stress indicators in forests across the NWT. The cumulative effects may influence forest health over multiple years, particularly in the Dehcho, South Slave, and North Slave regions, where stress symptoms and mortality are more frequently observed.

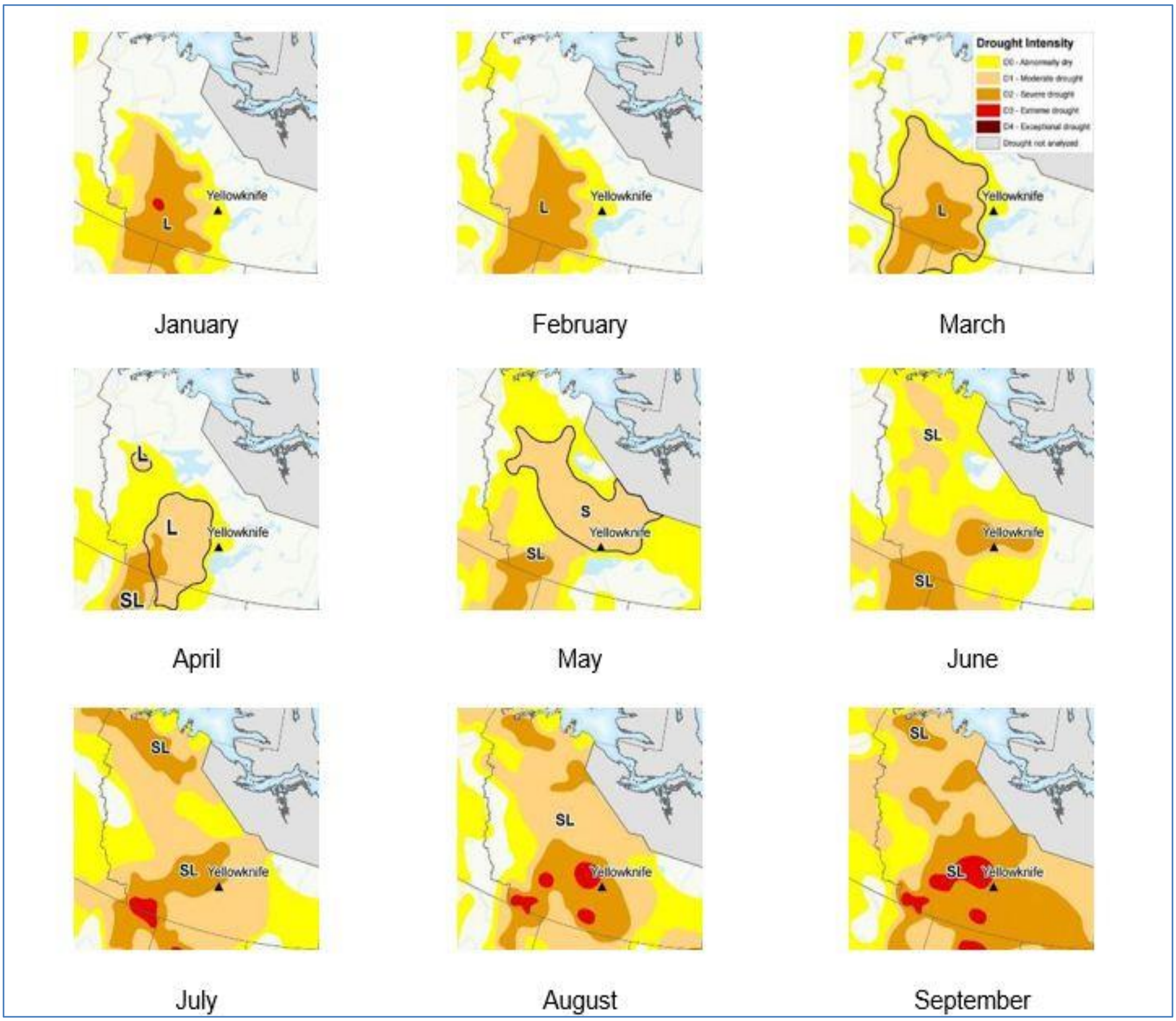

Figure 5. Monthly 2025 NWT drought maps, Agriculture & Agri-food Canada.

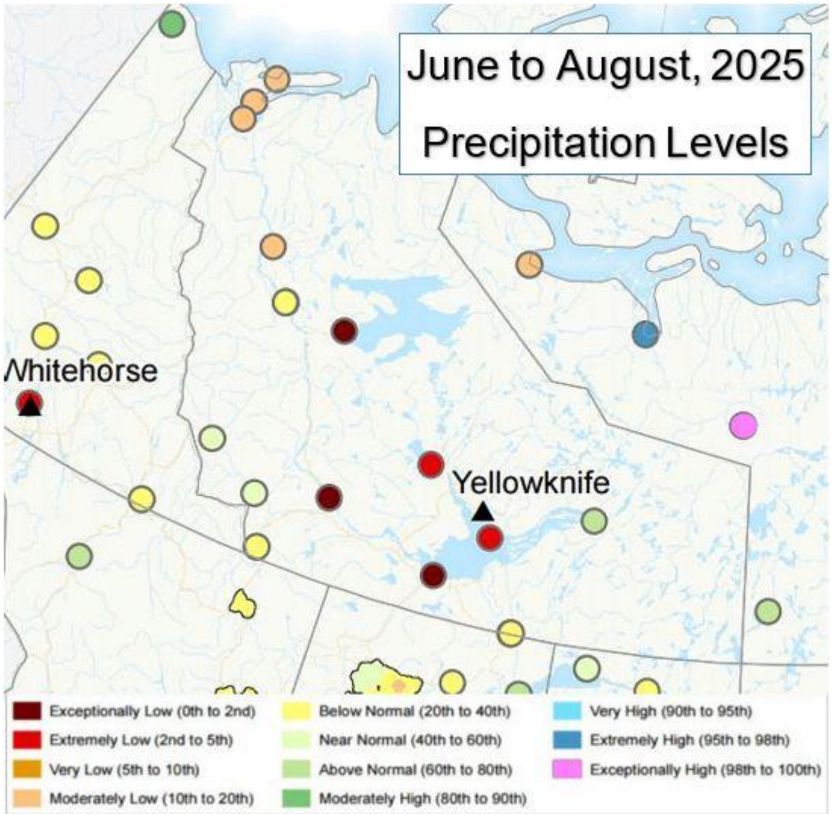

Figure 6. June to August NWT levels, Agriculture & Agri-food Canada.

Areas of severe drought were reported from January to July along the British Columbia border and the Fort Liard area, and in the Hay River, Fort Providence, and Yellowknife areas in August and September

Unseasonably warm temperatures were reported across the NWT in September, on average 3°C above normal, with extremes reaching 5°C above normal in parts of the Dehcho and South Slave regions (Agriculture and Agri-food Canada, 2025).

Summer and fall precipitation in some parts of the NWT reached near-normal levels but the overall average is below normal, particularly in the northern and precipitation south-central regions (Fig. 6). Water levels during the summer were generally low in lakes, ponds, rivers and creeks observed during aerial surveys (Fig. 7).

Figure 7. Dry ponds between Yellowknife & Hay River, 2025.

Drought stress & mortality

Evidence of drought stress, including yellow, brown and red leaf margins and needle tips, stunted foliage, sunscald on branches and stems, dead branch tips, crown dieback and localized tree mortality were observed (Figs. 8, 9).

Figure 8. Drought-killed Jackpine, Ingraham Trail, July 2025.

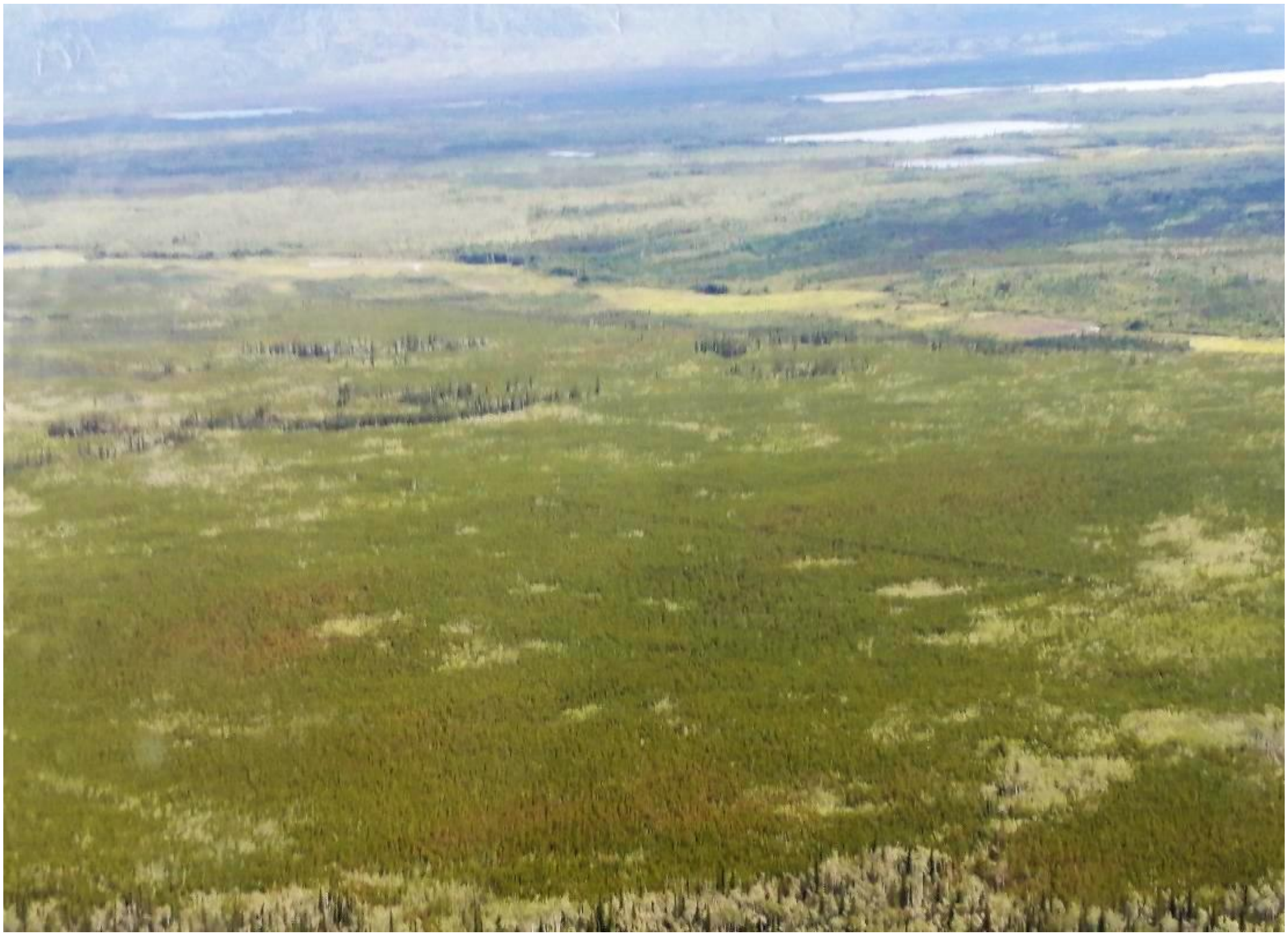

Figure 9. Drought stress & mortality in Jackpine, Mackenzie River south of Tulita, 2025.

Drought effects can take multiple years to manifest. Trees under water stress may have limited recovery time and can be vulnerable to secondary agents. Evidence of this was observed in all regions during 2025. Moderate-to-severe eastern spruce budworm defoliation caused white spruce terminal, branch, and tree mortality in the Liard River area and may continue if drought conditions persist. Large continuous trembling aspen stands along the British Columbia border, near Trout Lake and along slopes of the Martin Hills, Ebbutt Hills, and Cameron Hills are being affected by a defoliator complex led by the large aspen tortrix. Likewise, bark beetle activity is suspected of causing white spruce mortality in parts of the Mackenzie delta and along parts of the Mackenzie and Peele Rivers.

Although drought conditions influence and exacerbate the occurrence, area and impact of pests in an association-complex, they are classed and described separately from areas exclusively impacted by drought.

Table 4. Drought stress & mortality (in hectares) 2025.

Drought Stress and Mortality	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Nahanni NPR	Thaıdene Nëné TPA	Thaıdene Nëné NPR	Grand Total
Drought stress	53,907.36	30,551.25	4,941.45	1,728.41		6,286.64	194.61	2,787.34	977.83	101,374.90
Drought stress and mortality	4,718.08	2,559.17	5,240.94	248.55	16.97	30.80	64.16			12,878.66
Stress, cause unknown		366.72		7,074.86	1,306.41	870.91				9,618.90
Grand Total	**58,625.44**	**33,477.14**	**10,182.39**	**9,051.82**	**1,323.38**	**7,188.36**	**258.77**	**2,787.34**	**977.83**	**123,872.46**

123,900 ha of forest with drought-related observations was recorded in 2025, including 101,400 ha classified as drought stress and 12,900 ha as drought-related mortality and decline, mainly in the Dehcho, South Slave, and North Slave regions. 9,600 ha of forest stress noted in the Sahtu and Beaufort-Delta regions are suspected to be age and drought-related (Table 4, Fig. 10).

High levels of drought induced deciduous seed production were observed across the NWT this summer (Fig. 11). White spruce also produced heavy cone crops in some southern areas.

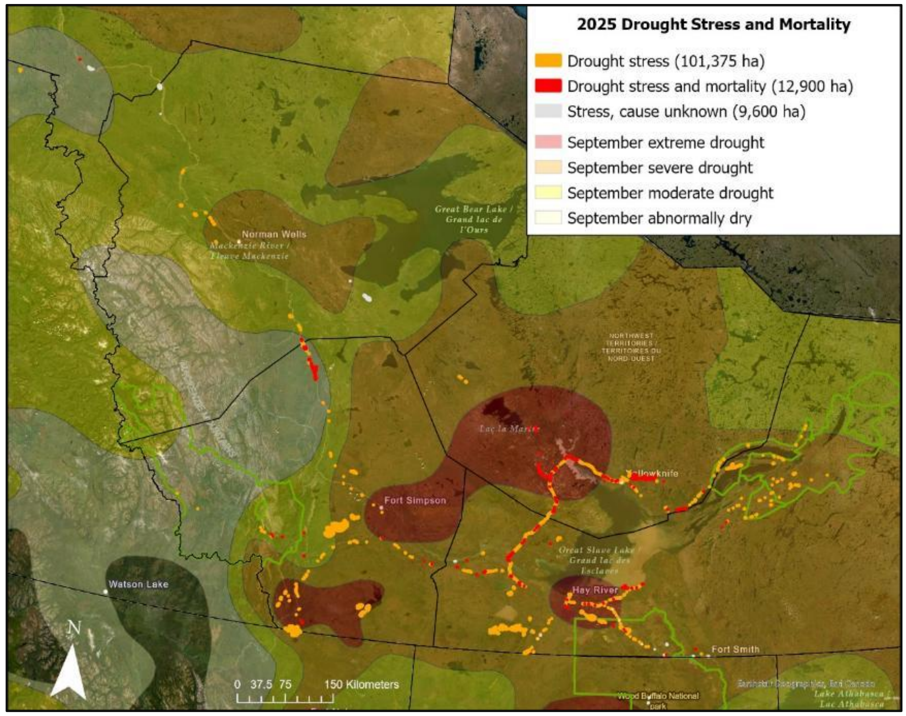

Figure 10. Drought stress & mortality map, 2025.

Although drought has impacted forest health in several regions, 2025 ground surveys noted ample growth of trees and shrubs in many locations. Strong shoot growth was noted in various areas along the Ingraham Trail, Hwy 9, Hwy 5 near Buffalo River and Hwy 6 near Fort Smith; spring and early summer precipitation in these areas likely contributed. As the drought declines in coming seasons increased seasonal precipitation is expected to support recovery in many locations.


Figure 11. Poplar seeds (fluff) looking like snow in the Hay River area, July 2025.

2. Defoliation

Aerial and ground surveys recorded four primary defoliators in the NWT in 2025: aspen serpentine leaf miner, eastern spruce budworm, willow blotch leaf miner and a large aspen tortrix/drought complex (Table 5, Fig. 12). The defoliating insects are being opportunistic, taking advantage of drought-weakened forests, especially in the Dehcho and South Slave regions.

Table 5. 2025 NWT defoliation areas (in hectares).

Defoliators	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Nahanni NPR	Thaidene Nënë TPA	Grand Total
Aspen serpentine leafminer	272,176.24	37,487.88	510.98	2,790.79	52.43	13,789.22	6,419.08		333,226.61
Eastern spruce budworm	145,873.93			5,503.17	8,667.48	879.34	301.52		161,225.44
Large aspen tortrix complex	50,965.44	17,929.88					55.12		68,950.44
Willow blotch leafminer	3,703.09	4,561.15	6,390.22	852.96	154.76	5,585.00	36.68	25.55	21,309.42
Grand Total	**472,718.70**	**59,978.92**	**6,901.20**	**9,146.91**	**8,874.66**	**20,253.56**	**6,812.40**	**25.55**	**584,711.91**

Other defoliators mapped during aerial surveys included the yellow-headed spruce sawfly found along NWT highways 1 and 3 and the Ingraham Trail and larch sawfly, found in the Sahtu region by Stewart Lake. More larch defoliation was noted along the Peele River near the Yukon Border but the variety of species involved wasn't determined.

Trace amounts of other aspen defoliators were observed at scattered locations in the southern regions during ground surveys. They included forest tent caterpillar found in the Fort Liard area and along Hwy. 5 and various species of aphid, mite, midge, sawfly, leaf beetle, and leaf miner.

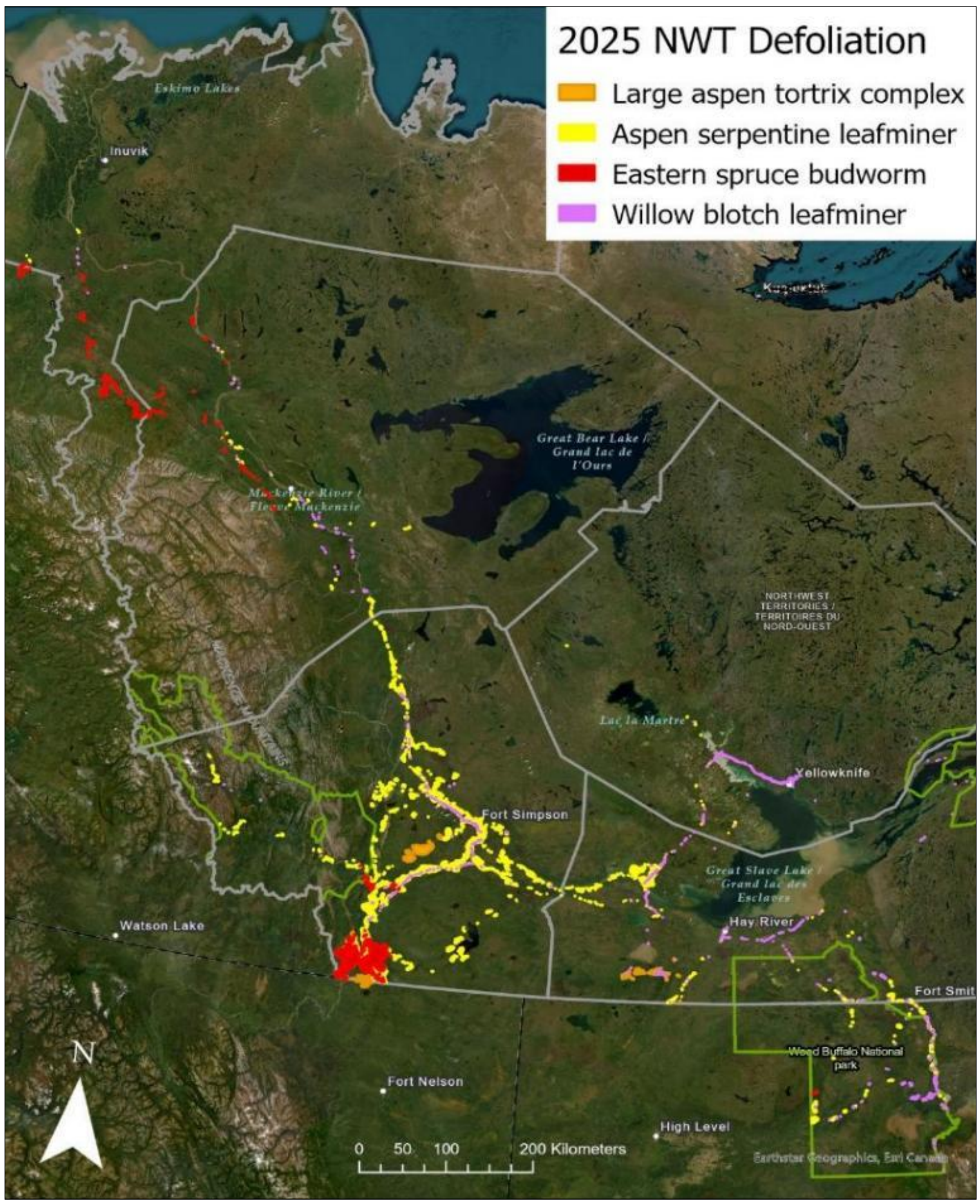

Figure 12. 2025 primary defoliators in the NWT.

Eastern spruce budworm

161,225 ha of eastern spruce budworm defoliation was recorded in 2025, which is double from 85,412 ha in 2024. Increases were in the Dehcho, Sahtu, and

Beaufort-Delta regions, while decreases occurred in the South and North Slave regions where no spruce budworm defoliation was recorded.

Spruce budworm-caused mortality is likely being worsened by the current drought. White spruce terminal, branch, and tree mortality are becoming more prevalent along the Arctic Red River, Ramparts, Hume, and Carcajou Rivers in the north, and more recently in the Liard River valley, especially by the Blackstone, Liard, and Muskeg Rivers. Increased spruce budworm-caused mortality is anticipated in the coming years.

The majority, 145,873 ha, was mapped in the Fort Liard area of the Dehcho region. Moderate and severe defoliation occurred throughout white spruce stands in the southwest corner of the territory, extending east along the Muskeg River and as far north as the Nahanni Butte area along the Liard River (Fig. 13).

Figure 13. Moderate to severe spruce budworm defoliation, Fort Liard, 2025.

5,500 ha of moderate to severe defoliation were observed In the Sahtu region along the Ramparts, Hume, and Carcajou Rivers. Scattered new areas were mapped along the Mackenzie River north of Fort Good Hope.

Defoliation expanded in the Beaufort-Delta region along the Peele River by the Yukon border and along the Arctic Red River, with a total of 8,867 ha recorded (Fig. 14).

Figure 14. Moderate spruce budworm defoliation, Arctic Red River, 2025.

Regional staff established four pheromone trap locations before the budworm flight that typically occurs in July. The sites were located near Tsiigehtchic, Fort McPherson, the Fort McPherson Airport, and on the east side of the Peele River Ferry crossing. Trap counts revealed endemic populations, and only 10 moths were trapped from all the sites.

No spruce coneworm was observed in 2025. Given its prominence in 2023 and 2024, this suggests that activity has declined substantially. Spruce coneworm is often associated with spruce budworm activity.

Aspen serpentine leaf miner

333,227 ha of aspen serpentine leaf miner damage were recorded throughout all forested regions of the NWT, increasing from 297,500 ha recorded in 2024. Almost 90% of the damage (272,176 ha) occurred in the Dehcho region where most aspen forests are located. 37,487 ha were recorded in the South Slave and 13,789 ha in Wood Buffalo National Park.

All defoliated aspen stands showed signs of drought stress, such as stunted leaves with discolouration and thin crowns. Drought, in combination with defoliation and stem disease, has been associated with aspen decline. If dry conditions persist, aspen decline may continue in the Dehcho and South Slave.

Large aspen tortrix & drought complex

68,950 ha of new aspen defoliation was mapped in large aspen stands along hillsides in both the Dehcho and South Slave regions in 2025 (Fig. 15). Areas included the Martin Hills, Ebbutt Hills, Cameron Hills, along the BC border south of Fort Liard and near Trout Lake.

A ground investigation was conducted in the Cameron Hills to investigate the spread. A pest/drought complex comprised mainly of the large aspen tortrix, an *Enargia* species (two-leaf tier), and the aspen leaf beetle (*Chrysomela crotchi),* was found. Additional drought stress symptoms were evident: trees exhibited stunted and discoloured foliage and thin crowns. The observations are consistent with those near Fort Liard, suggesting similar conditions may be present in other remote areas.

Figure 15. Large aspen tortrix complex defoliation & drought stress, Cameron Hills, 2025.

51,000 ha of the total large aspen tortrix complex area were recorded in the Dehcho region along the BC border, along the south-facing slopes by Fisherman Lake, in Nahanni National Park Reserve, at Trout Lake area near the Fire Tower and along the slopes of the Martin Hills and Ebbutt Hills.

In the South Slave region, approximately 17,900 ha were recorded along the north-facing slopes of the Cameron Hills and along the Hay River near the Alberta border.

Willow blotch leaf miner

Areas of willow blotch leaf miner increased in 2025, with 21,300 ha recorded (Fig. 16). Leaf-mining damage from this pest was spread across all regions, the majority found in the North Slave (6,390 ha), Wood Buffalo National Park (5,585 ha), the South Slave (4,560 ha), and the Dehcho regions (3,700 ha).

Figure 16. Willow blotch leaf miner damage, Ingraham Trail, 2025.

A heavy willow seed crop was observed across the NWT this summer, which hampered aerial detection of leaf miner damage (Fig. 17). Drought stress also browned willow foliage in some areas, making detection difficult.

Figure 17. Drought-induced willow seed production observed throughout the NWT, 2025.

3. Flooding & High-Water Table

Northern processes leading to waterlogged forests

Warming trends in northern climates raise air and soil temperatures, leading to permafrost thaw (Fig. 18). Multi-year droughts can further accelerate thawing, amplifying its rate and extent.

Droughts also increase the risk and frequency of large, severe wildfires, which kill forests and cause transpiration (a plant's natural transfer of water from soil to the air) to decrease sharply. This results in more precipitation and groundwater remaining in the soil after fires and more water drainage from burned areas. Wildfires further influence air and soil temperatures by removing ground-insulating vegetation and by darkening the ground surface, which also increases heat absorption and thawing.

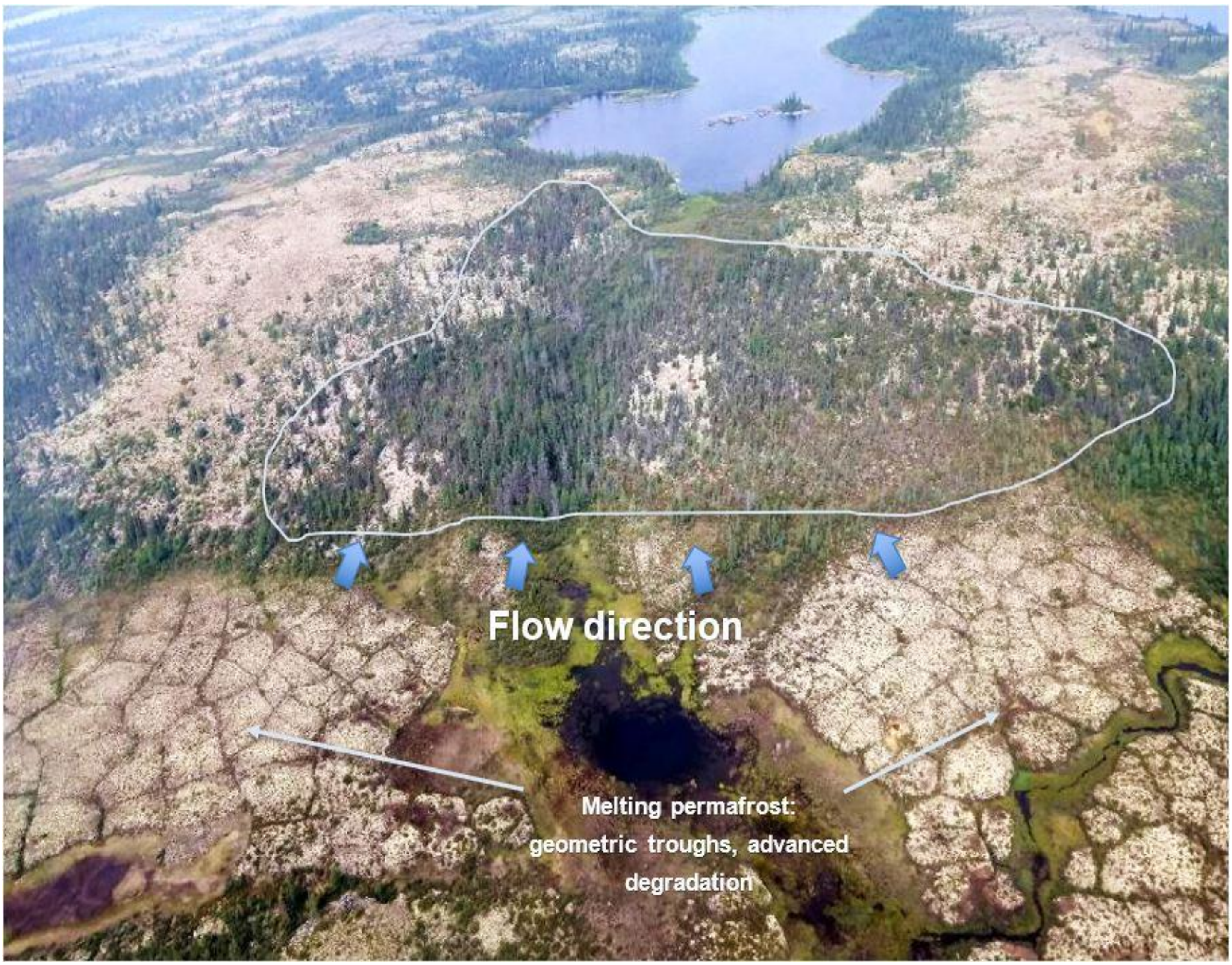

Figure 18. High water table mortality caused by permafrost melt, Tent Lake, Thaidene Nene National Park Reserve, 2025.

Periods of heavy precipitation, whether seasonal or annual, can saturate soils and exceed a basin's drainage capacity. When a water basin's ability to absorb and temporarily store water is exceeded, excess runoff flows to streams, rivers and lakes, increasing peak flows and raising water levels (Fig. 19).

Figure 19. Flooding & high water table mortality, Mackenzie River by Mills Lake, 2025.

Blockages within rivers further exacerbate the high-water conditions. During spring breakup ice jams can block the flow, rapidly raising upstream water levels and overflowing riverbanks. Beavers cause similar flooding in stream systems. Permafrost degradation also plays a direct role in blocking river systems or diverting channels. Permafrost slumping and bank failures are common in the north and can block rivers, causing floodplain damage or overflow into adjacent forest.

These factors interact and contribute to flooding and high-water table issues in various areas across the NWT. They cause waterlogging of forest soils, depriving root systems of oxygen and causing stress and mortality. Depending on the cause and site conditions, waterlogging events may be temporary or long-term. Forests affected by temporary events have the chance to recover, however longer events often lead to mortality.

Incidents of high water tables and flooding are both recorded in the NWT surveys. The primary difference between flooding and high water tables is their cause. Flooding is typically caused by an observable temporary surface event as described above, and can be stagnant or flowing, temporarily suffocating root systems and/or damaging root collars and stems (i.e. damage from moving ice, rocks, and debris). High water tables are a rise in groundwater level, saturating the soil and suffocating roots. It may become visible surface water. The results of both are often the same: tree stress and mortality.

Historic overview

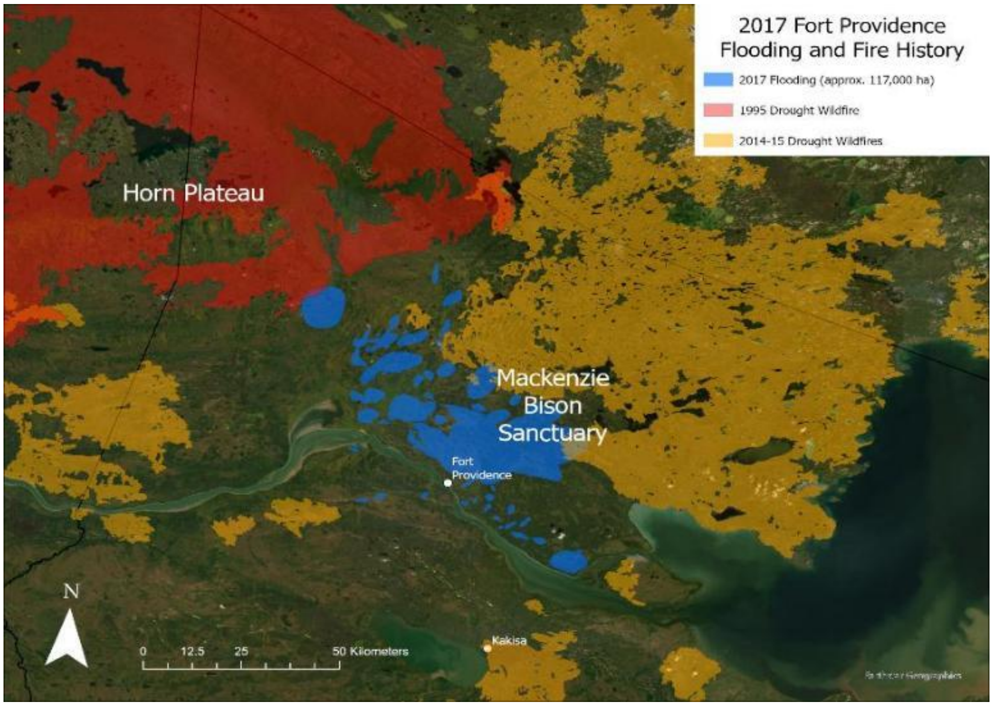

Figure 20. Fire history & flooding, Fort Providence area.

1995 and 1996 were very dry and active fire years. A large, severe wildfire burned the Horn Plateau, increasing drainage from the plateau to low-lying forests north of Fort Providence. Above average drainage continued into the 2000s (Fig. 20, 21). The wildfire stimulated permafrost melting in the burned area, contributing to the increased water yield. Tree mortality in the low-lying forests slowly increased from the mid-2000s to 2014.

Another drought in 2014 and 2015 brought more severe wildfires, this time throughout the Mackenzie Bison Sanctuary, extending north and east of Fort Providence. The wildfires resulted in another influx of groundwater to the previously affected forests north of Fort Providence and forests to the east near Falaise Lake, dramatically increasing tree mortality. An aerial survey in 2017 recorded 117,000 ha of flooding in the Fort Providence and Mackenzie Bison Sanctuary areas.

Starting around 2016, forest soils in many parts of the NWT became increasingly saturated with water. Over the summers that followed, many upland forests began to show signs of stress, eventually leading to tree mortality.

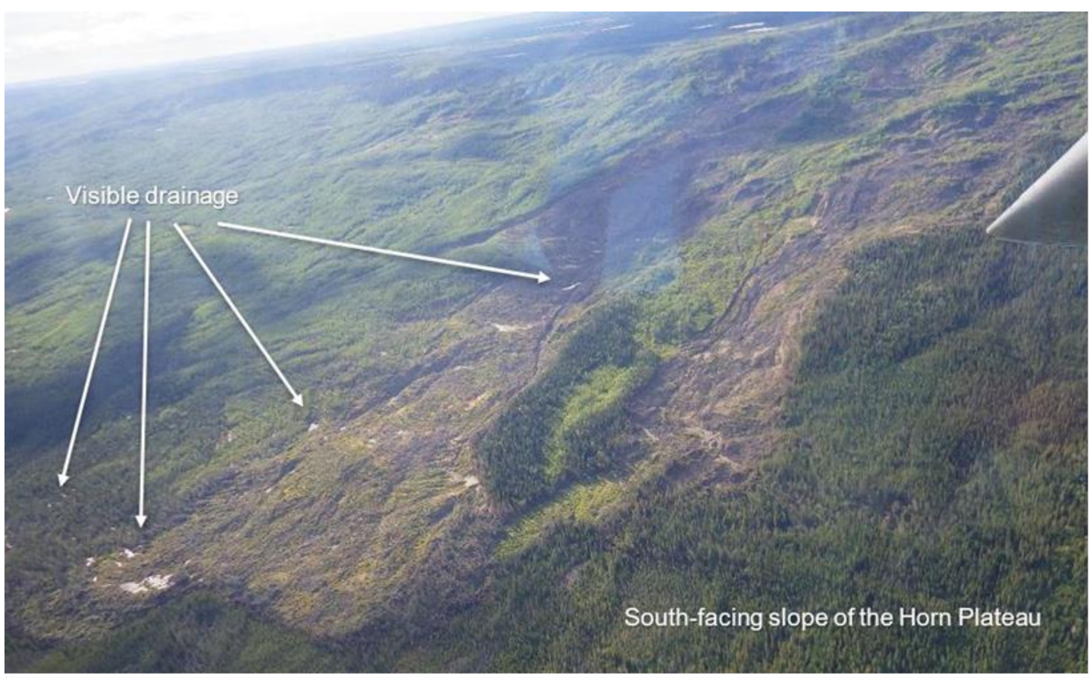

Figure 1. Old slumping from the 1995 Horn Plateau wildfire was still draining visible surface water in 2017.

In 2020, Great Slave Lake water levels were the highest on record since monitoring began in 1939. A hydrological study found above-normal rainfall in nearly all basins feeding into Great Slave Lake (ECCC/GNWT Report on 2020 Water Levels). Water volume flowing into the lake was consistently more than water draining out through the Makenzie River; all major tributaries were above normal, including the Peace, Athabasca, and Slave Rivers, as well as Lake Athabasca and the Peace–Athabasca Delta. Smaller rivers feeding into Great Slave Lake and the Mackenzie, such as the Taltson, Lockhart, Kakisa and Hay Rivers were all at very high water levels.

Major spring breakups caused significant, massive flooding along the Makenzie River including the Jean Marie River and Fort Simpson areas in 2021, and in the Hay River and Slave River areas in 2022. Substantial mortality occurred along the Slave and Taltson Rivers during this period (Fig. 22).

Another drought began in 2022 resulting in extreme wildfire seasons in 2023 and 2024 and affecting large areas of forest in the Dehcho, South Slave and North Slave regions. Post-fire drainage from these burns has continued to impact water tables in local forests since then.

Figure 22. Advancement of high water table mortality, Slave River, 2017, 2021, & 2025.

Slave River flooding virtual survey

A virtual survey was conducted in the Slave River area to calibrate tree mortality records associated with rising water tables. The water tables began to rise around 2016 and tree mortality appeared to begin around 2017-18. The mortality occurred after major 2014-17 wildfires near the Slave River. Significant rainfall in southern NWT, northern Alberta and British Columbia contributed to the saturated soils and drowned forests.

Current high-resolution imagery was analysed for the 2025 virtual survey (Fig. 23) to identify areas of drowned, mature forest along the Slave River. 35,800 ha of recent forest mortality due to high water tables and flooding was identified.

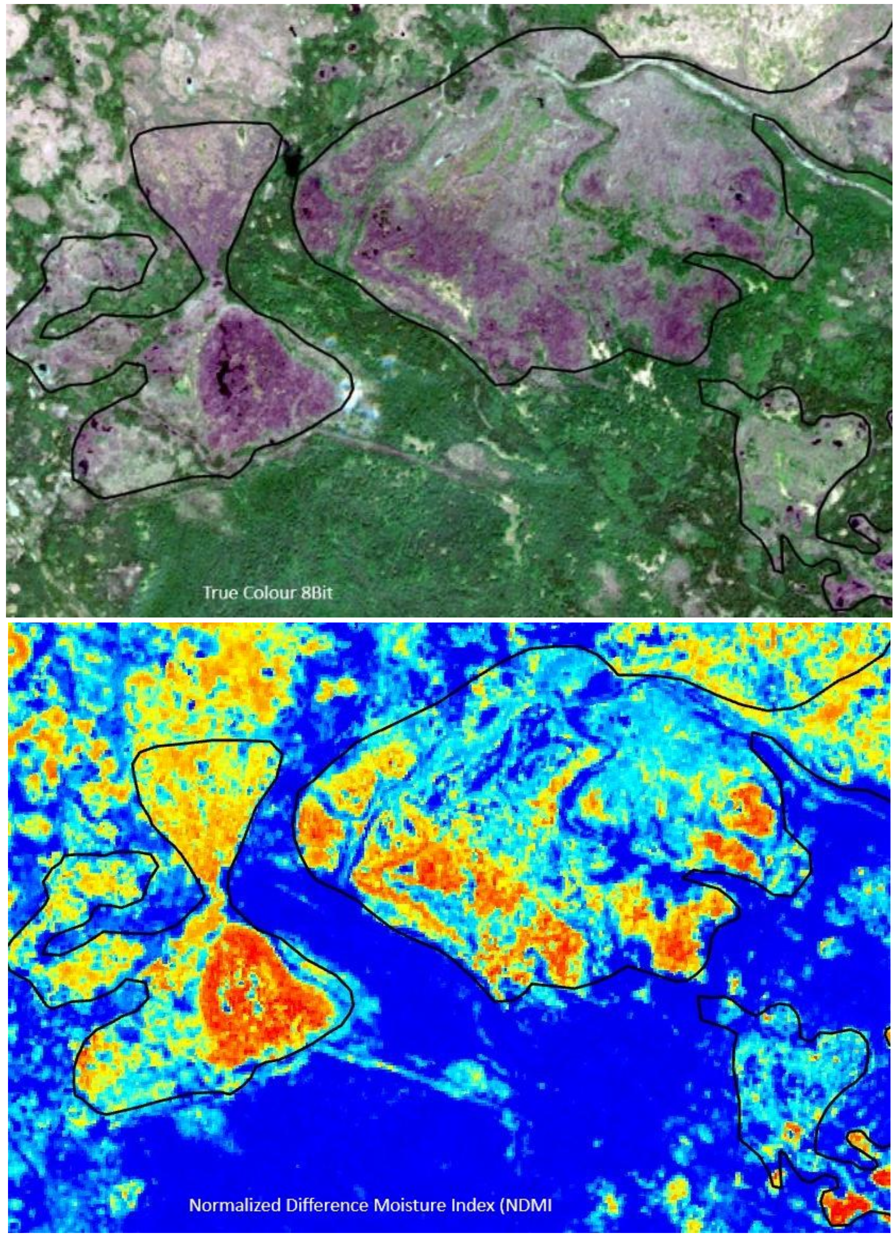

Figure23. Sentinel-2 True Colour and NDMI used for the virtual survey of cumulative flooding mortality along the Slave River, 2025.

Current conditions

60,160 ha of flooding and high-water table mortality were recorded during surveys in 2025 (Table 6, Fig. 24). Most was recorded in the South Slave region, totalling roughly 38,382 ha. New areas of high-water table stress and mortality were observed and recorded in the southeastern NWT scattered along the north end of the Slave River from the Ring Lake to Fort Resolution and in Wood Buffalo National Park.

Table 6. 2025 flooding and high-water table summary (in hectares).

Hydrologic Issues	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Nahanni NPR	Thaıdene Nëné TPA	Thaıdene Nëné NPR	Grand Total
High-water tables	153.09	38,381.59	70.67	802.58	8,595.61	4,279.49			386.90	52,669.93
Flooding stress and mortality	1,791.49	1,416.38	5.17	44.06	197.83	3,853.38	73.35	36.60	68.75	7,487.01
Grand Total	**1,944.58**	**39,797.97**	**75.84**	**846.65**	**8,793.44**	**8,132.87**	**73.35**	**36.60**	**455.65**	**60,156.95**

8,600 ha of suspected high-water table-related mortality was mapped in the Mackenzie Delta, however it is likely underestimated due to limited survey coverage and the duration of the issue. Tree decline and mortality have been observed in the centers of some delta islands and along shorelines, consistent with rising water tables. The patterns suggest thermokarst lake development, a process associated with permafrost thaw.

8,133 ha was mapped in Wood Buffalo National Park, much of which was found within the Alberta portion.

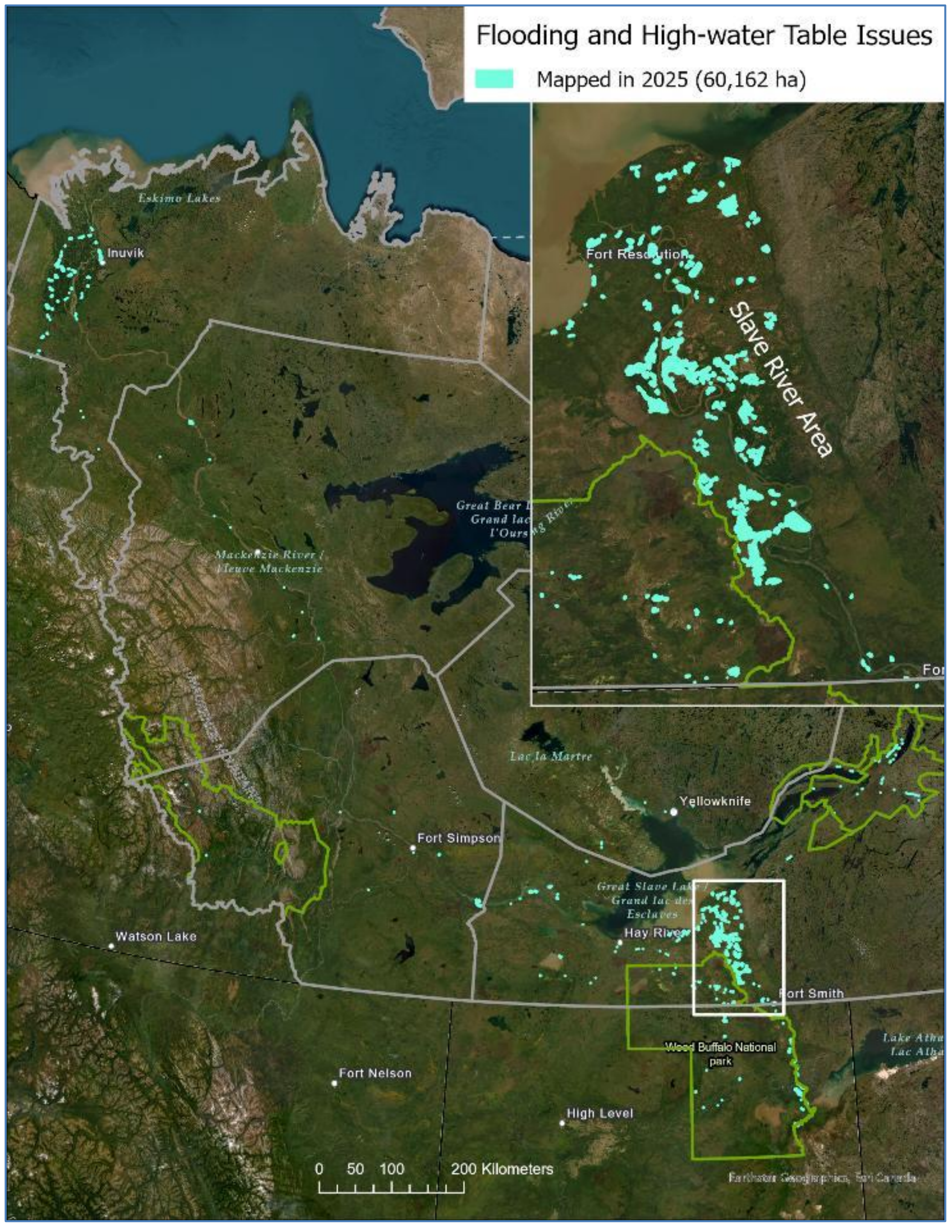

Figure 24. 2025 Flooding & high-water table mortality in the NWT.

4. Forest Decline

Dieback and mortality associated with biotic agents and drought have been observed in the NWT for many years. The primary tree species showing dieback and stand decline are trembling aspen (defoliators, stem disease, and drought), black spruce (drought), white spruce (eastern spruce budworm) and willow (ice-dam events, defoliation, and drought) (Fig. 25, 26, Table 7). Balsam poplar also exhibits dieback, however it is typical for its range in Canada and is associated with age.

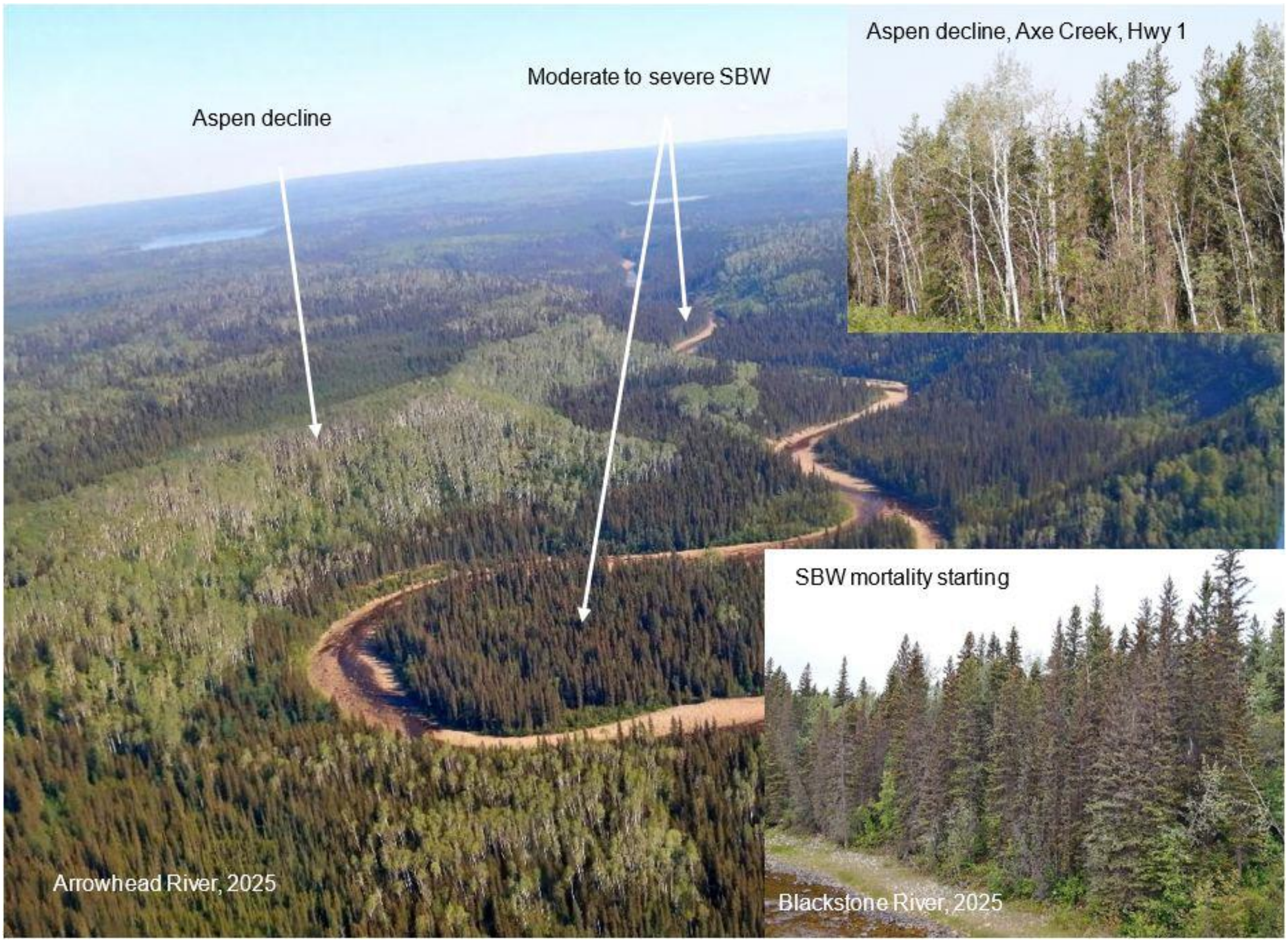

Figure 25. Aspen decline & SBW-caused dieback in the Dehcho region in 2025.

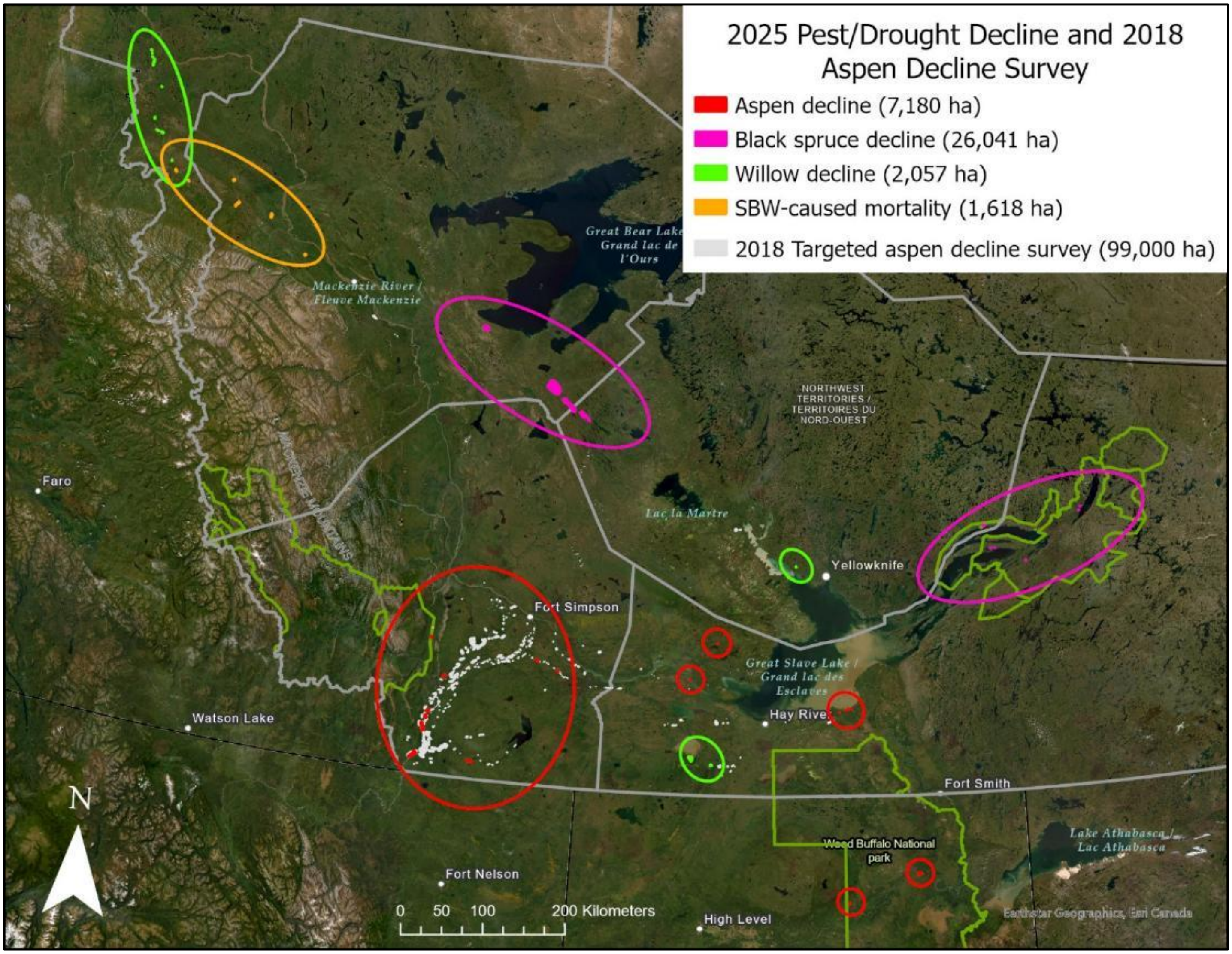

Figure 26. The 2025 aspen, spruce & willow decline recorded in the NWT, & the 2018 targeted aspen decline survey.

Table 7. Decline and SBW-caused mortality (in hectares).

Decline	Dehcho	South Slave	North Slave	Sahtu	Beaufort-Delta	Wood Buffalo NP	Thaıdene Nëné TPA	Thaıdene Nëné NPR	Grand Total
Black spruce decline		49.84	4,609.40	21,021.05			215.91	144.94	26,041.14
Aspen decline	6,158.55	80.80				940.72			7,180.08
Willow decline		1,433.53	18.56		605.87				2,057.96
SBW-caused mortality				1,350.54	267.52				1,618.06
Grand Total	**6,158.55**	**1,564.17**	**4,627.96**	**22,371.59**	**873.38**	**940.72**	**215.91**	**144.94**	**36,897.23**

Aspen decline

7180 ha of aspen decline was mapped in 2025, of which 6,158 ha was in the Dehcho region (Fig. 27).

The annual extent of aspen decline has increased since the early 2000s. It occurs when insects and diseases attack drought-weakened forests. It can occur in any aspen forest, young or old.

Most over-mature aspen forests occur in the Dehcho region where there have been repeated defoliation events and droughts. A severe forest tent caterpillar outbreak occurred in the late 1990s and aspen serpentine leaf miner has been ongoing for decades.

A targeted aspen decline survey was done in the Dehcho in 2018 (Climate Impacts on Productivity & Health of Aspen, NRCan). It showed 99,024 ha of aspen decline that year, most associated with the 2014/15 drought (Fig. 28). The study clearly showed increased mortality in the Poplar River area of the Dehcho since the early 2000s.

Figure 27. Aspen decline along the Liard River, July 2024.

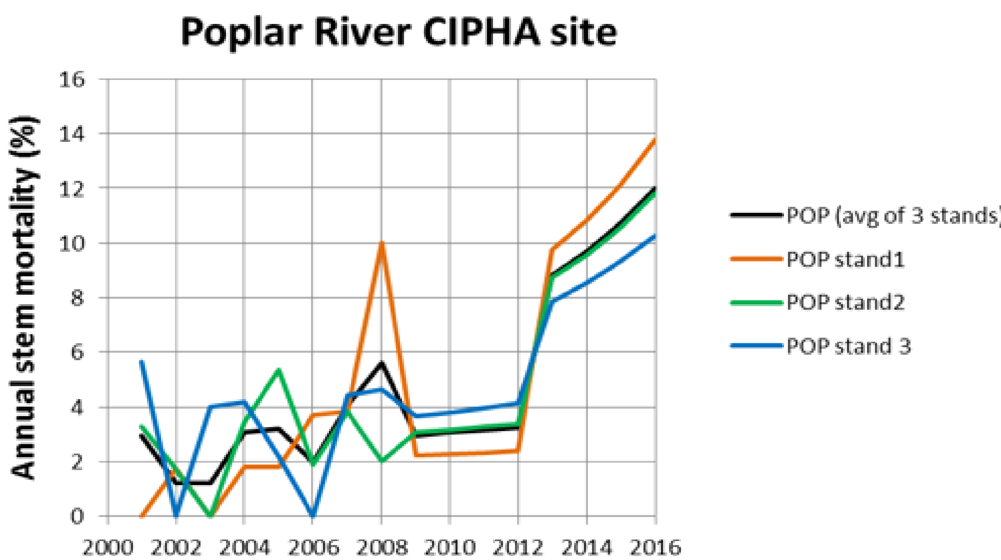

Figure 28. Increase in Aspen decline since the early 2000s, NRCan CIPHA study.

Black spruce decline

Figure 29. Typical black spruce decline found along the Mackenzie River, north of Fort Good Hope, 2025.

Sahtu ECC staff noticed black spruce decline near Norman Wells in 2009. A ground survey that year showed age and stress-related factors. Vegetation and soil samples sent to the Northern Forestry Centre in Edmonton didn't show contamination or nutrient deficiencies.

Symptoms of decline in Black spruce forests begin with stress, evident through yellow and red needle tips, the color gradually advancing and greying as foliage dies. Eventually, after prolonged stress the tree dies. Mature trees along the edge of water bodies fare better than interior trees (Fig. 29). This slow process advances over many years and is now observed in many places. Areas where it is most notable remain in the Norman Wells area, north along the Mackenzie River, and south of Great Bear Lake between Deline and Whati.

26,000 ha of black spruce decline were recorded in 2025, most (21,000 ha) being in the Sahtu and North Slave, south of Great Bear Lake.

Willow decline

Willow dieback was noted in small areas scattered in the Beaufort-Delta, Dehcho, South Slave and North Slave regions. Willow usually recovers quickly from disturbances however some areas have slow recovery, possibly associated with drought stress.

Along the Arctic Red River, ice damaged willow from 2023 is still evident (Fig. 30). Pockets of willow decline were noted in the Dehcho region near Trout Lake and Fort Liard, and along the Mackenzie River. Willow decline noted in the southern regions may be linked to droughts and defoliator activity such as the gray willow leaf beetle and the ongoing willow blotch leaf miner damage.

In 2025, 2,058 ha of willow decline was mapped along the Cameron Hills in the South Slave and along the Arctic Red River in the Beaufort-Delta regions.

Eastern spruce budworm mortality

Eastern spruce budworm related mortality has been observed for several years along the Arctic Red, Ramparts, and Hume Rivers in the Sahtu and Beaufort-Delta regions (Fig. 31). Tree terminal and branch mortality are now appearing in outbreak areas near the Liard River in the southern Dehcho region. Five to seven years of moderate to severe spruce budworm defoliation can cause White spruce mortality; drought conditions may shorten this rate. 1,618 ha was recorded in 2025.

Figure 30. Willow dieback & decline, Arctic Red River, July 2025.

Figure 31. Severe SBW-caused mortality, Ramparts River& mortality beginning, Blackstone River, 2025.

Aspen Running Canker

Background

Aspen Running Canker (ARC) disease is caused by the *Neodothiora populina*, a fungus not identified until 2020 (Fig. 32, 33). It is an aggressive, fast-spreading pathogen that infects trembling aspen forests across northern boreal and taiga forests. It was first discovered in Alaska in 2014.

Infected trees may not have any symptoms. It may also be native, given its remote and widespread occurrence. There appears to be a strong link between the spread of the disease and drought, combined with ongoing aspen serpentine leaf miner outbreaks.

Figure 32. Suspected aspen running canker, straight pattern, Hay River Golf Course, 2025.

Aspen running canker was discovered in the NWT in 2024 near Kakisa Lake and confirmed by DNA sequencing. Another suspected infection was found south of Enterprise during the forest health ground surveys. This was the first time ARC was found in the NWT, however it may have always been present in at low levels.

Figure 33. Suspected aspen running canker, spiral pattern, near Sambaa Deh Falls Territorial Park, 2025.

2025 ARC survey & DNA results

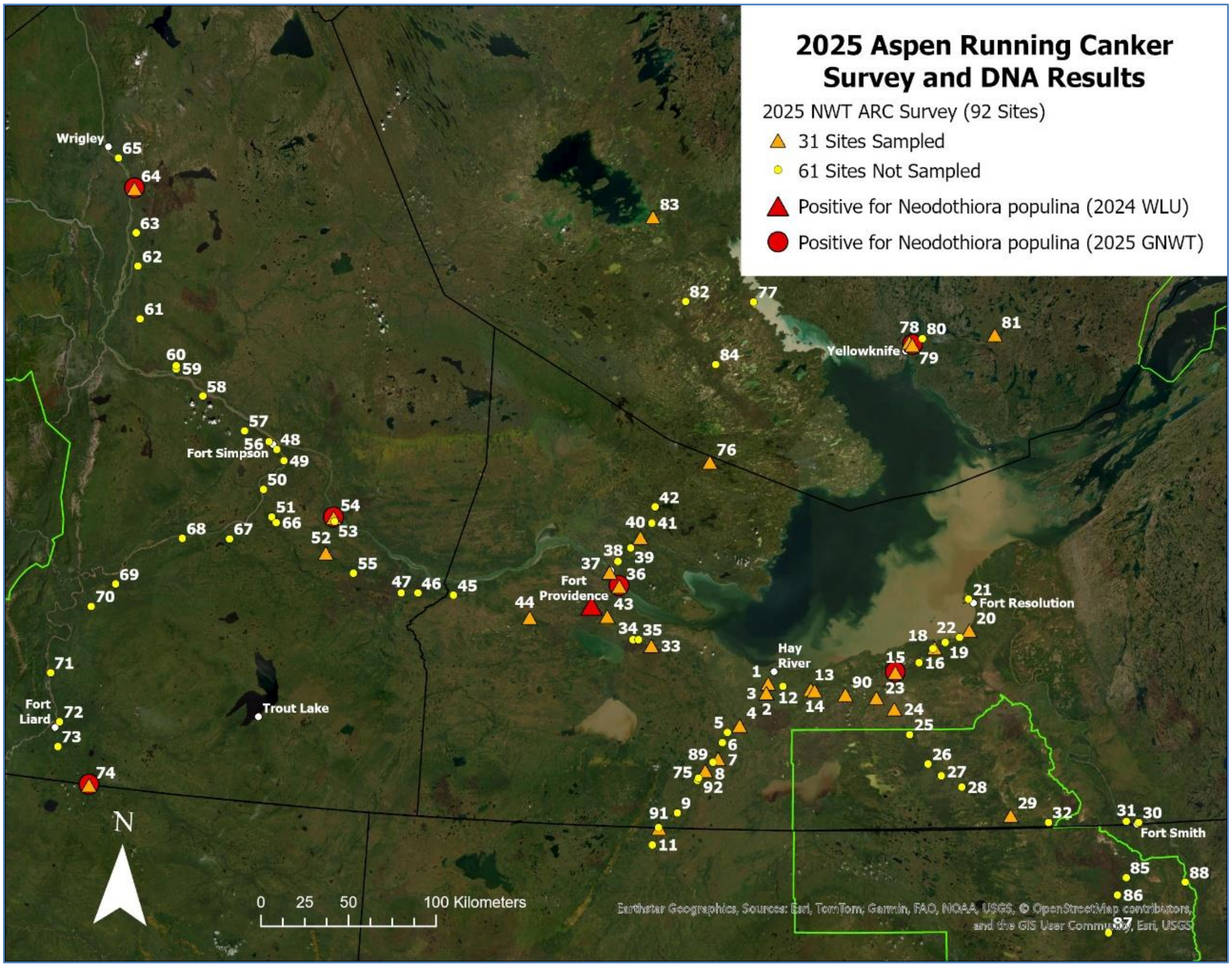

Figure 34. 2025 Aspen running canker survey, sample locations & confirmed ARC locations.

Survey Scope

An aspen running canker ground survey was conducted in June 2025 as part of the aspen defoliation ground survey (Fig. 34). Aspen stands throughout the Dehcho and South Slave regions were assessed to identify infections, collect samples and determine the potential extent of spread. Assessments were conducted on 92 sites. 37 samples from 29 of the sites were sent to Wilfrid Laurier University for DNA sequencing and three samples from two additional sites were sent to the Northern Forestry Centre, Canadian Forest Service, NRCan, in Edmonton.

Symptoms

Figure 35. Flagging a suspected ARC infection, ARC site 8, 2025.

Young aspen stands are the preferred host for ARC (Fig. 35, 36). Cankers can be difficult to see when white powder on aspen stems, dust and lichen cover them, so stems suspected of being infected can be scrubbed to expose cankers (Fig. 37).

Figure 36. Young aspen stand in decline, ARC site 66, Checkpoint, June 2025.

DNA analysis results

DNA analysis has confirmed the presence of ARC at seven locations across the NWT (Fig. 34).

Six of 31 sites tested at Wilfred Laurier University were positive for ARC in 2025.

One site tested at Wilfred Laurier University was positive for ARC in 2024.

The samples sent to the Northern Forestry Centre were <u>negative</u> for ARC.

Figure 37. Before and after pictures of washed stems revealing cankers.

The seven confirmed infections are evenly distributed across the major aspen-growing regions of the Dehcho, South Slave, and North Slave, confirming that ARC is established throughout the range of aspen in the NWT. The widespread distribution suggests that it has been present in NWT forests for some time but was unrecognized, as during aerial surveys ARC is indistinguishable from other agents that cause aspen decline. Ground-based surveys are scheduled for 2026 to assess for ARC presence and distribution.

Primary Damaging Agents

Several other primary damaging issues were recorded during 2025 surveys (Fig. 38). Approximately 54% of aerial survey observations recorded were insect, 42% abiotic, 2% disease, 1% animal, and another 1% both abiotic and biotic-related damage.

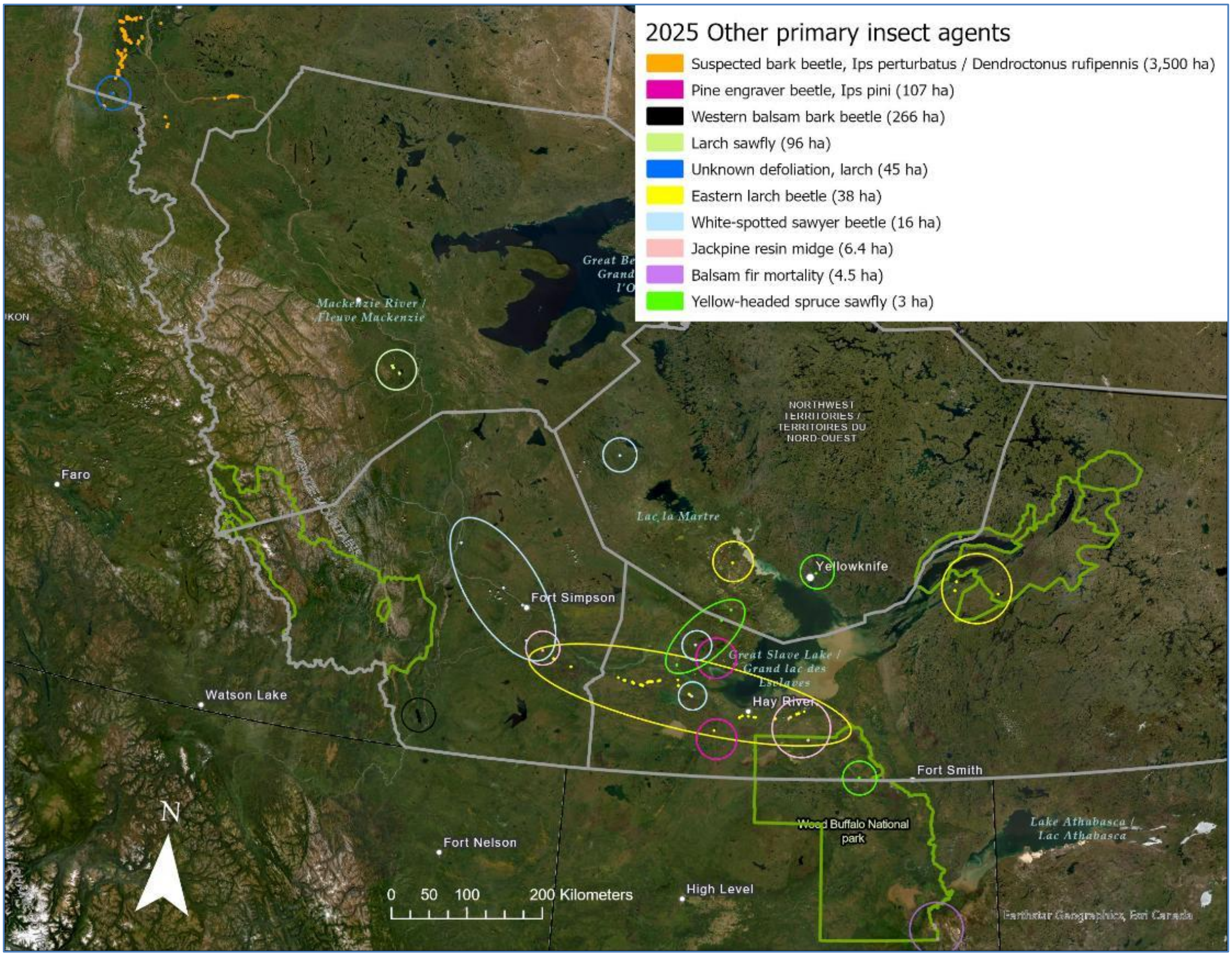

Figure 38. Primary insect agent areas recorded during aerial and ground surveys, 2025.

Primary Insects

Bark beetle

Two areas of white spruce mortality, totalling 160 ha, were recorded in the Beaufort-Delta region in 2024. 3,500 ha of yellow and red-phase spruce mortality were recorded along the Mackenzie, Arctic Red, and Peele Rivers in 2025 (Fig. 39). Most of the mortality was found in the Mackenzie delta and the Peele River valley. A ground survey is planned for 2026 to verify the agents responsible, currently thought to be caused by a bark beetle or a complex of bark beetles and wood borers. Likely suspects include *Ips perturbatus, Dendroctonus punctatus, D. rufipennis*, and possibly the white-spotted sawyer beetle.

Figure 39. Yellow fading and red spruce. Suspected bark beetle mortality, west side of the Ferry crossing by Fort McPherson, 2025.

Pine engraver beetle

107 ha of Jack pine mortality caused by the pine engraver beetle (*Ips pini*) and likely wood borers such as the white-spotted sawyer beetle (*Monochamus scutellatus*) and the black fire beetle (*Melanophila acuminata)* was noted in 2025. It was observed north of Fort Providence and northeast of the Cameron Hills, near the 2023 and 2024 wildfire burns (Fig. 40).

Figure 40. New, yellow fading & red jackpine caused by Ips and possible wood borers, east of Tathlina Lake, 2025.

Western balsam bark beetle

Subalpine fir mortality caused by the western balsam bark beetle (*Dryocoetes confusus*) has been spotted along the west-facing slopes of Mount Cody, north of Fort Liard, for several years. 266 ha of light subalpine fir mortality was recorded in 2025. The mortality rate for *D. confusus* is typically < 5% annually, its pattern is scattered throughout a stand. Subalpine fir trees have longer than normal needle retention, so when trees turn red they will remain red for 2 to 3 years. This makes annual detection of extent and severity difficult, so outbreaks are assessed over a time frame. The western balsam bark beetle is commonly found throughout the range of subalpine fir in Western Canada.

Larch sawfly

96 ha of larch defoliation were recorded in the Stewart Lake area of the Sahtu region. Defoliation is suspected of being caused by the larch sawfly (*Pristiphora erichsonii*) (Fig. 41) which caused a large outbreak throughout the South Slave in the late 1990s. It is not often seen annually but it is native (always present at endemic levels).

Tamarack loses and replaces its foliage annually, so it is resistant to occasional, random defoliation events.

Figure 41. Larch sawfly on tamarack, NRCan-CFS, Jean-Francois Mouton.

Unknown defoliation

45 ha of larch defoliation was mapped near the Yukon border along the Peele River in the Beaufort-Delta Region (Fig. 42). The moderate damage may have been by a defoliating insect or by drought; the actual cause was unconfirmed.

Figure 42. Tamarack defoliation or abiotic damage, Yukon border along the Peele River, 2025.

Eastern larch beetle

Eastern larch beetle (*Dendroctonus simplex)* killed 38 ha of drought weakened tamarack in small pockets along NWT highways 1, 5, 6 and 9, and in the Thaidene Nëné Indigenous Protected Area (Fig. 43).

White-spotted sawyer beetle

16 ha of Jack pine mortality was recorded in small pockets within the Dehcho, South Slave, and North Slave. Damage is suspected to be white-spotted sawyer beetle. This pest often occurs in a complex of secondary bark beetles and woodborers. They are often associated with recent wildfires and are drawn to fire-killed or weakened trees.

Figure 43. Eastern larch beetle mortality, adults, and pupae, Hwy. 6, 2025.

Jack pine resin midge

Figure 44. Jackpine resin midge shoot damage, Hwy 1, 2025.

Jack pine resin midge (*Cecidomyia resinicola*) caused 6.4 ha of minor shoot tip mortality in some pine stands in the Dehcho and South Slave regions in 2025 (Fig. 44). Affected areas were near the Hwy 1 and the Jean Marie River turnoff and along Hwy 5 and 6.

Damage from this pest is caused by the midge chewing on the vascular tissues of Jack pine shoots and feeding on the resin flow, which girdles and kills the shoot. When outbreaks do occur, tip mortality can be up to 75%, however, the midge rarely causes tree mortality.

Balsam fir mortality

Balsam fir mortality declined in the southeast corner of Wood Buffalo National Park in 2025, opposite of expectations under the current drought conditions. Only 4.5 ha of moderate mortality was recorded. Balsam fir mortality affects the western range of balsam fir in Canada, where drought, bark beetle, woodborers and Armillaria root rot have caused ongoing mortality since first being observed in Alberta in the 1990s.

Yellow-headed spruce sawfly

3 ha of yellow-headed spruce sawfly (*Pikonema alaskensis*) damage was mapped in 2025 (Fig. 45). Areas of defoliation on roadside spruce were found in the same areas as in 2024. A small patch is along Hwy 3 by Chan Lake in the South Slave region, with larger patches north along Hwy 3 in the North Slave region, along Hwy 4 on the Ingraham Trail, and along Hwy 5 in Wood Buffalo National Park.

Preferred trees for this pest are young, open-grown spruce and damage can become severe when populations are high. It feeds on both new and older growth so it can cause top-kill and tree mortality when repeated annually.

Figure 45. Yellow-headed spruce sawfly larvae, Chan Lake, Hwy 3, 2025.

Primary Diseases

188 ha of forest diseases were recorded in 2025 (Fig. 46).

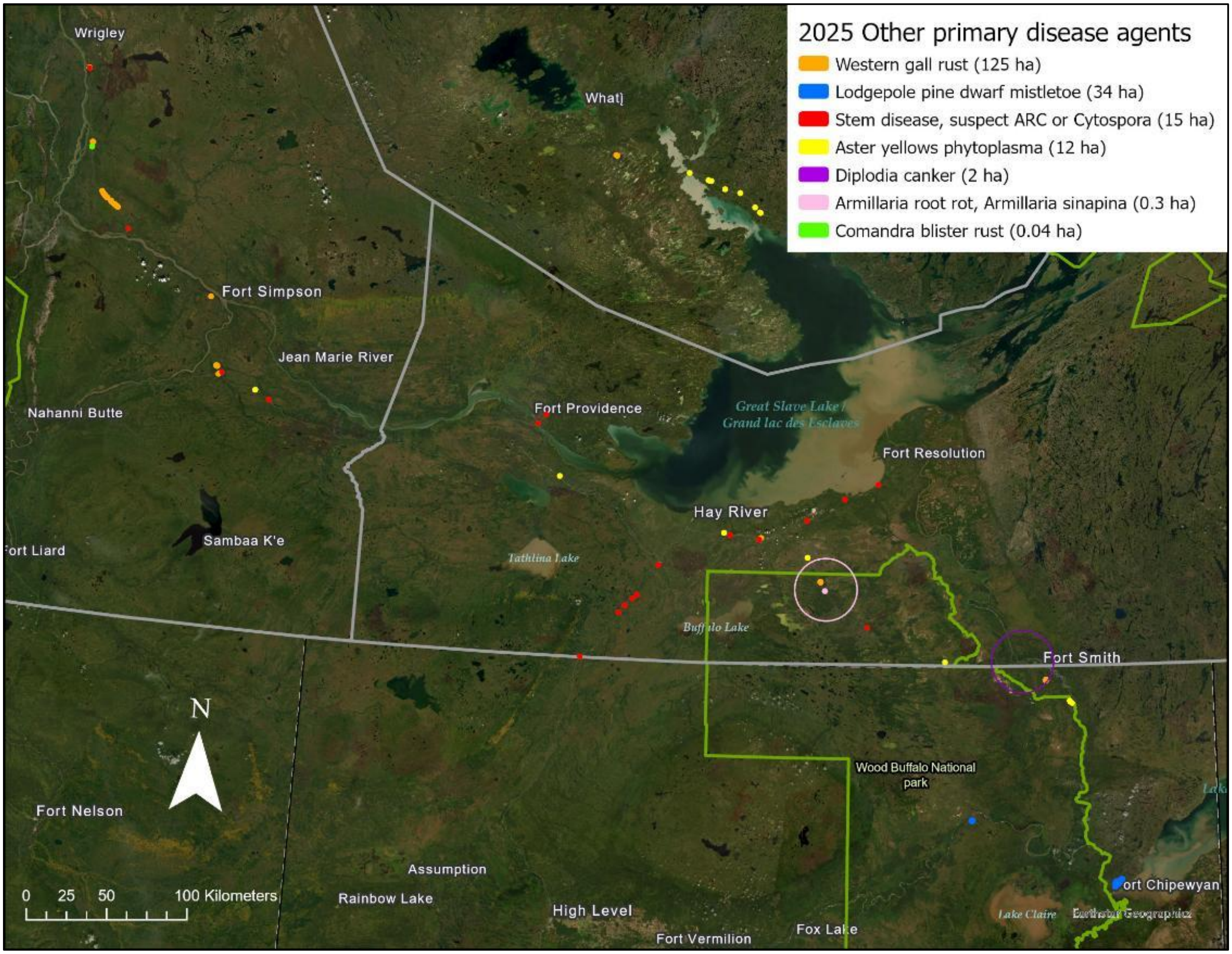

Figure 46. Primary disease agent areas, aerial and ground surveys, 2025.

Western & Comandra gall rust

Figure 47. WGR & CBR branch mortality in jackpine, Hwy 1 south of Wrigley, 2025.

Western gall rust (*Endocronartium harknessii*) and Comandra blister rust (*Cronartium comandrae*) are common throughout the range of pine in the NWT. 125 ha of western gall rust was recorded during ground surveys along Hwy 1, 5, and 9, while 0.4 ha of Comandra blister rust was recorded along Hwy 1 south of Wrigley. Branch mortality from these rusts typically increases during droughts (Fig. 47).

Both species are common on pine branches and stems throughout the NWT. Western gall rust forms round globular galls, while Comandra causes elongated swelling. The rust infections stimulate the abnormal tissue growth (galls) which help protect the rust from the tree's defences. The galls restrict water and nutrient flow. Severe infections can weaken trees causing significant growth loss. Branch and tree mortality from stem infections can result, especially when combined with droughts.

Lodgepole pine dwarf mistletoe

34 ha of the lodgepole pine dwarf mistletoe (*Arceuthobium americanum)* have been recorded in Wood Buffalo National Park for many decades. The mistletoe in this area is one of the most northern points of its range in Canada. It is a parasitic plant that infects branches and stems, feeding on the host's nutrients.

Stem diseases: ARC / Cytospora

15 ha of young stands infected by stem disease were recorded in various stages of decline during the aspen running canker survey (Fig. 48). DNA test results confirm that they may include ARC and/or Cytospora canker (*Cytospora chrysosperma*).

Figure 48. Suspected aspen running canker or Cytospora canker, Checkpoint, 2025.

Aster-yellows phytoplasma

Aster-yellows phytoplasma is a very tiny, bacteria-like organism that lives inside a willow's phloem, causing broom-like growth deformities and is spread by sap-sucking insects. This disease causes little health impact but it can weaken the shrubs over time, predisposing them to other insects and diseases (Fig. 49). 12 ha of heavily infected willows were recorded in areas along Hwy 1 and 5, and along the Ingraham Trail. Lighter infections of the broom-like damage can be found throughout the range of willow.

Figure 49. Aster-yellows phytoplasma on willows, near Hay River, 2025.

Diplodia canker

Diplodia canker (*Diplodia tumefaciens)* was recorded scattered throughout 2 ha of trembling aspen along Hwy 5 west of Fort Smith (Fig. 50). Diplodia canker on aspen can cause dieback and eventual tree mortality. It is common in the Dehcho and South Slave regions, especially in the Fort Smith area.

Figure 50. Diplodia tumefaciens, west of Fort Smith, 2025.

Armillaria root rot

0.3 ha of Armillaria root rot (*Armillaria sinapina)* was recorded along Hwy 5 at the north end of Wood Buffalo National Park (Fig. 51). *A. sinapina* causes scattered individual mortality among young Jack pine, infecting stressed and weakened trees.

Figure 51. Armillaria sinapina, Hwy 5 WBNP, 2025.

Primary Abiotic & Animal Forest Impacts

1,040 ha of primary abiotic damage and 50 ha of primary animal damage was recorded in 2025 (Fig. 52).

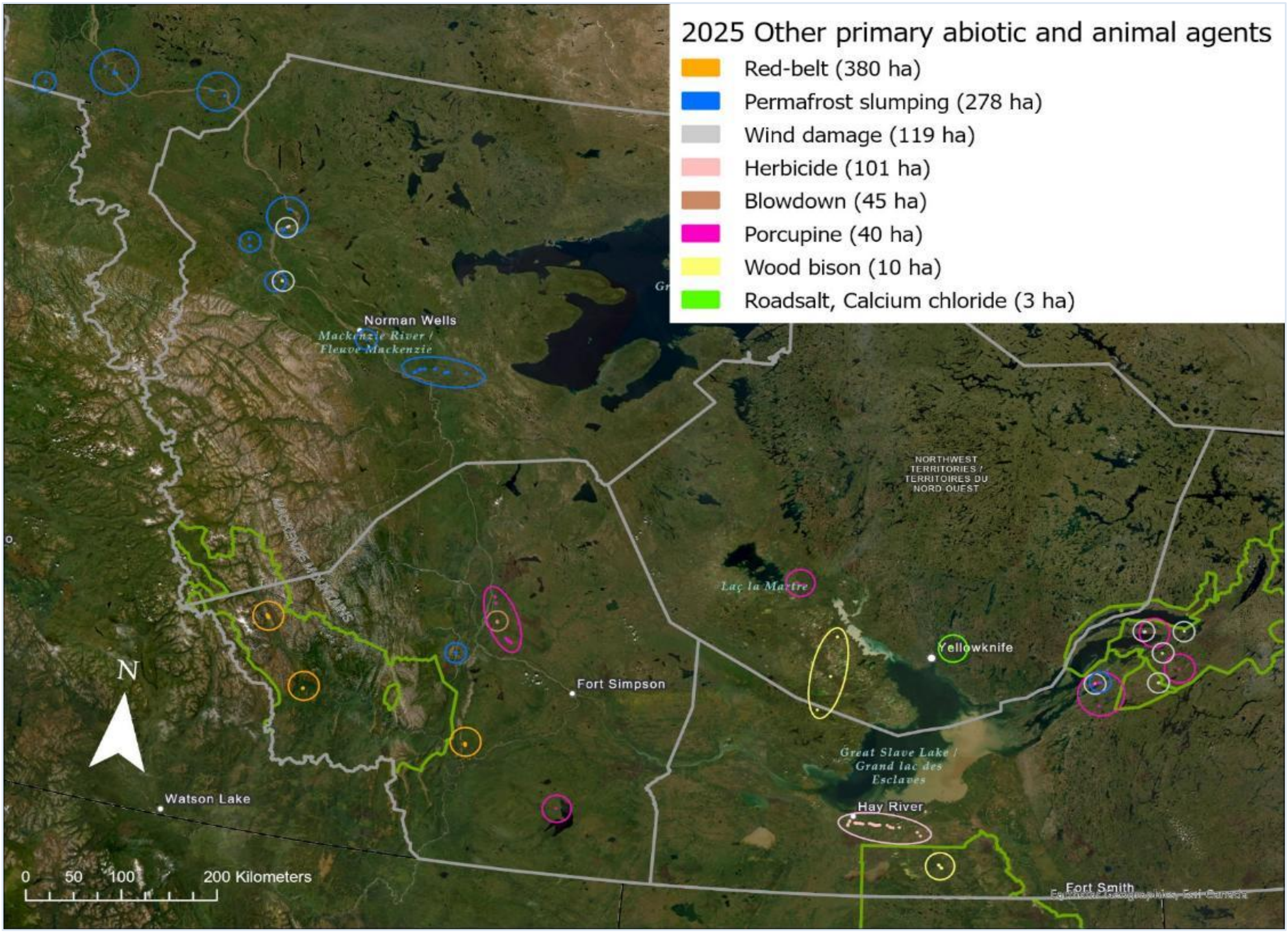

Figure 52. Primary abiotic issues & animal damage, 2025.

Red belt

380 ha of red belt damage occurred along the east-facing slopes of the Nahanni range north of Nahanni Butte, in Nahanni National Park Reserve along the Flat River near its confluence with Irvine Creek, and along the South Nahanni River (Figs. 53).

Figure 53. Red belt damage, Flat River, NNPR, 2025.

Red belt occurs in the winter when Chinook winds warm the trees causing them to bud and flush as if for spring, however the ground and roots are still frozen so the tree foliage dries out and turns red. Jack pine is sensitive to red belt, but all species can be affected. Up to 10% of pine foliage typically remains unaffected and damaged trees may survive. The 2025 damage did not appear severe and the affected pine will likely recover.

Permafrost slumping

278 ha of permafrost slumping damage was mapped in 2025, including 207 ha in the Sahtu region and 56 ha in the Beaufort-Delta region. (Fig. 54). Many new slumps form where wildfires have encroached along riverbanks, especially along the Great Bear River east of Tulita.


Figure 54. New permafrost slump, Mackenzie River & Ramparts River, 2025.

Permafrost thaw-slumping events in the NWT typically occur along riverbanks, elevated lake shores, or on the slopes of hills and plateaus. Slumping mapped during aerial surveys is incidental but often included when forested areas are affected.

Wind damage

119 ha of bent and broken tops caused by strong winds were recorded in the Thaidene Nëné Indigenous Protected Area and along the Mackenzie River near the Ramparts and Fort Good Hope. 45 ha of blowdown occurred along the west end of the Ebbutt Hills.

Herbicide

100 ha of suspected herbicide damage to balsam poplar was noted along the south side of Hwy 5 in 2025 (Fig. 55). The damage was characteristic of herbicide treatment and tracks from a suspected spray vehicle were present in the ditch. This type of collateral damage is common during invasive vegetation control.


Figure 55. Suspected herbicide damage to balsam poplar saplings, Hwy 5, 2025.

Road salt damage: calcium chloride

3 ha of roadside dead trees and shrubs were recorded in 2025 in Prelude Lake Territorial Park due to road salt contamination (Fig. 56). Damage was spread along the main road past the park gate, toward the marina. The area also showed damage last year. Symptoms included curled leaves, “scorch leaf” (dried red leaf margins and needle tips), sloughing bark, and twig, branch, and tree mortality. Trees affected were spruce, birch, and willow, along with lesser herbs, grasses, and shrubs.

Figure 56. Continued road salt damage at prelude Lake Territorial Park, 2025.

Figure 57. White spruce mortality caused by bison rubbing, north of Fort Providence, 2025.

Bison damage

10 ha of roadside Jack pine and poplar mortality from bison damage along NWT highways 3 and 5. Incidents were localized but numerous enough to map (Fig. 57).

Porcupine damage

40 ha of porcupine-caused Jack pine mortality was mapped near Trout Lake, east of Whati, in the Thaidene Nëné Indigenous Protected Area and north of the Mackenzie Ferry crossing along Hwy 1 to Wrigley (Fig. 58).

Figure 58. Jack pine damage caused by porcupine, south of Wrigley, 2025.

Secondary Damaging Agents

Secondary damage was recorded at 447 locations during the 2025 ground surveys (Fig. 59). 56% of the

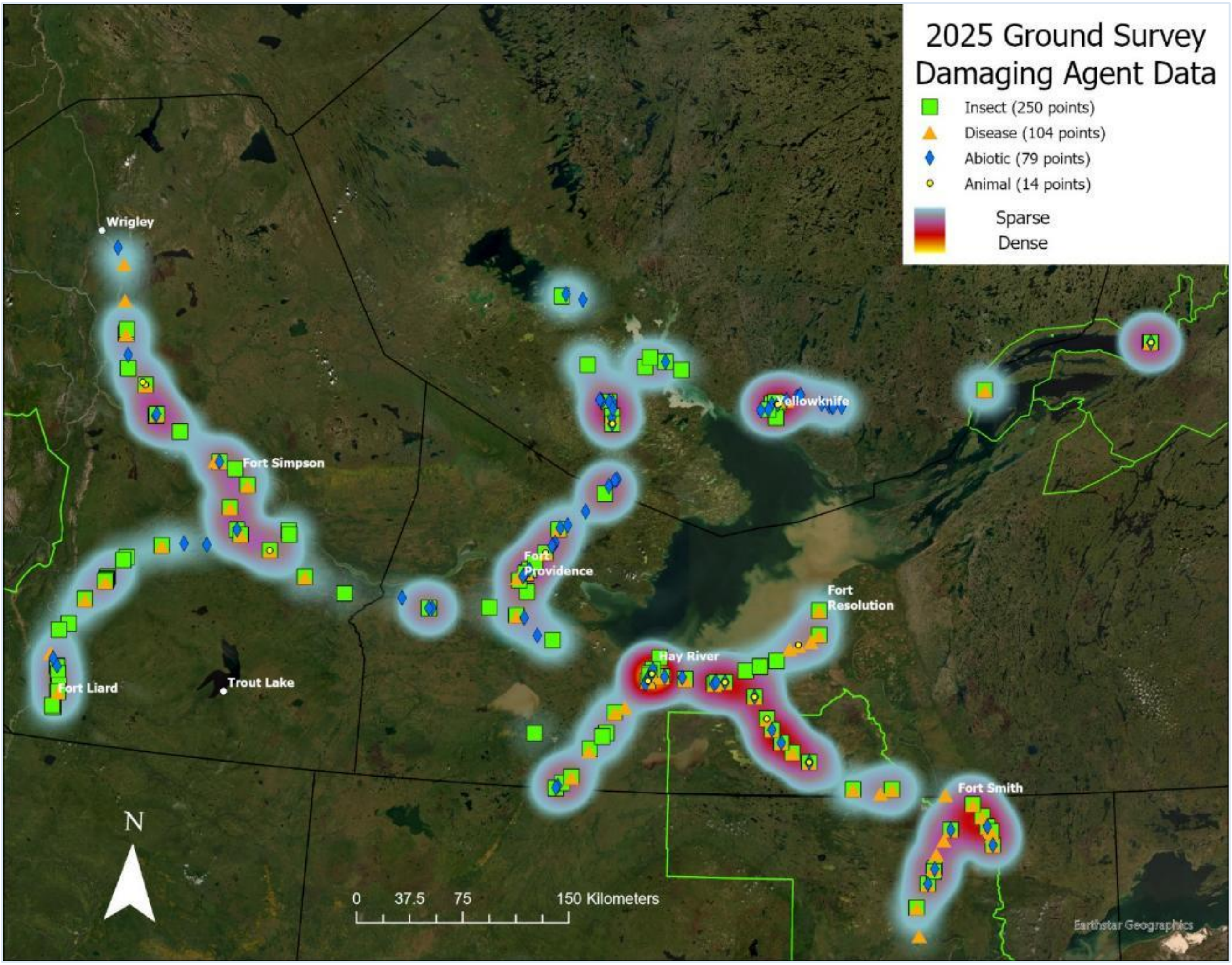

Figure 59. Ground survey point damage observations, 2025.

observations were insect, 20% disease, 16% abiotic, and 8% animal.

Ground surveys are limited to a fixed number of days so most sample points are in the South Slave region and Wood Buffalo National Park where more stops are possible within the survey time-frame. Other regions have fewer and more spread out survey points because of the longer travel time required.

Most secondary insect agents were mites, midges, aphids and adelgids, many of which proliferate during drought, targeting weakened trees and shrubs (Table 8). Stem diseases such as the false tinder conk, cork bark disease, and *Ceratocystis* canker led the disease observations (Table 9). Abiotic and animal damage included frost brooms and cracks, bear, hare, vole and other minor agents (Tables 10 and 11).

Table 8.Secondary insect agents by host.

Host and Agent	Alberta	Dehcho	South Slave	North Slave	Wood Buffalo NP	Thaıdene Nëné TPA	Grand Total
Alder		**3**		**1**		**2**	**6**
Alder Erineum Mite, Acalitus brevitarsus		1		1		1	3
Aphids						1	1
Chrysomela sp		1					1
Alder Flea Beetle, susp. Altica ambiens		1					1
Balsam poplar	**1**	**21**	**16**	**7**	**8**		**53**
Folded leaf poplar aphid, suspected Thecabius affinis	1	3	3	1	4		12
Cecidomyiidae galls, Harmandiola sp		5	4	1	2		12
Bead-like Cottonwood Gall Aphid, Thecabius populimonilis		3	1	4			8
Cottonwood leaf beetle, Chrysomela scripta		4	1				5
Folded leaf sawfly, poss. Euura agama formerly Phyllocolpa agama		1	4				5
Poplar Leaf-base Gall, Pemphigus populicaulis		1		1	2		4
Elongated leaf gall aphid, Pemphigus populivenae		1	2				3
Suspected Smoky Poplar Aphids, Chaitophorus populicola		1					1
Suspected Small Poplar Borer, poss. Saperda populnea moesta			1				1
Suspected Sarrothripus larvae		1					1
Sawfly, Euura sp		1					1
Birch		**1**	**2**	**1**		**1**	**5**
Birch-Aspen leafroller, Epinotia solandriana		1	1				2
Aphids						1	1
Erineum mites, unk sp				1			1
Edge-striped Shield Bug, Elasmucha lateralis			1				1
Canadian buffalo berry	**2**						**2**
Canadian buffalo berry leaf rust, Puccinia caricis-sheperdiae	2						2
Jackpine				**1**	**1**		**2**
Northern pitch twig moth, Retinia albicapitana				1	1		2
Trembling aspen	**2**	**7**	**31**	**10**	**18**		**68**
Poplar bud gall mite, Aceria parapopuli		1	5		2		8
Cherry-like midge leaf galls, Cecidomyiidae sp			5	1	2		8
Aspen Leaf Gall Midge, Harmandiola tremulae			2	2	2		6
Bladder gall mites, Phyllocoptes didelphis			3	1	2		6
Poplar leafcurl midge, Prodiplosis morrisi		1	1	1	2		5
Bark-mining fly, Phytobia sp	1		4				5
Poplar twig gall fly, Euhexomyza schineri			1	1	2		4
Aspen Leafgall Mite, Aceria dispar			2	1	1		4
Folded-leaf aspen sawfly, Euura sp. looks like E. populla			1	3			4
Red basal leaf galls, Cecidomyiidae sp		1	1		1		3
Flatheaded poplar borer, Dicerca tenebrica		2	1				3
Forest tent caterpillar, Malacosoma disstria		2	1				3
Galerucella sp. on aspen			2				2
Large aspen leaf gall aphids, Pachypappa sacculi					2		2
Petiole gall midge, Cecidomyiid sp					1		1
Aspen blotch leaf miner, Phyllonorycter salicicolella					1		1
Bagworm sp., possibly Dahlica triquetrella	1						1
Aphids, poss. Chaitophorus sp			1				1
Leaf beetle, susp. Genus Zeugophora			1				1
White and black spruce		**1**	**7**	**1**	**5**	**3**	**17**
Spruce gall adelgid, Adelges lariciatus		1	6		4		11
Cooley spruce gall adelgid, Adelges cooleyi				1	1		2
Spruce cone maggot, susp. Strobilomyia sp						2	2
Suspected Pine leaf adelgid, Pineus pinifoliae						1	1
Ragged Spruce Gall Adelgid, Pineus similis			1				1
Wildrose	**1**	**2**	**2**				**5**
Spiny Leaf Gall Wasp, Diplolepis polita		2	2				4
Unk Rose defoliation	1						1
Willow		**2**	**2**			**3**	**7**
Aphids			1				1
Willow leaf galls, Eriophyes sp						1	1
Willow leaf galls, Cecidomyiid sp						1	1
Mourning Cloak, Nymphalis antiopa		1					1
Willow stem gall sawfly, Euura sp						1	1
Suspected Willow leaf beetle, Chrysomela aeneicollis			1				1
Willow Beaked Gall Midge, Rabdophaga rigidae		1					1
Grand Total	**6**	**37**	**60**	**21**	**32**	**9**	**165**

Table 9. Secondary disease agents by host.

Host and Agent	Alberta	Dehcho	South Slave	North Slave	Wood Buffalo NP	Thaıdene Nëné TPA	Grand Total
Balsam poplar		**1**	**1**		**2**		**4**
Poplar Leaf and Shoot Blight, Venturia populina		1	1		1		3
Septoria leaf blight of Cottonwoods, Septoria populicola					1		1
Canadian buffalo berry					**2**		**2**
Canadian buffalo berry leaf rust, Puccinia caricis-sheperdiae					2		2
Saskatoon berry					**3**		**3**
Saskatoon black leaf, Apiosporina collinsii					3		3
Trembling aspen	**4**	**8**	**20**	**2**	**16**		**50**
False tinder conk, Phellinus tremulae	2	3	5	1	6		17
Corky bark disease, Rhytidiella baranyayi		3	5	1	1		10
Ceratocystis canker, Ceratocystis fimbriata		1	7		1		9
Poplar Leaf and Shoot blight, Venturia macularis	1		3		4		8
Fire damaged base - disease ingress					4		4
Suspected Hypoxylon canker, Entoleuca mammata		1					1
Mechanical	1						1
White and black spruce		**1**			**2**	**1**	**4**
Yellow witches broom of spruce, Chrysomyxa arctostaphyli		1			1	1	3
Suspected Cytospora canker, primarily Leucostoma kunzei					1		1
Wildrose	**1**	**5**	**2**		**1**		**9**
Wild rose rust, Gymnosporangium sp	1	5	2		1		9
Willow		**1**	**1**		**1**		**3**
Willow leaf rust, suspected Melampsora epitea			1		1		2
Willow tar spot, Rhytisma salicinum		1					1
Grand Total	**5**	**16**	**24**	**2**	**27**	**1**	**75**

Table 10. Secondary abiotic agents by host.

Host and Agent	Dehcho	South Slave	Wood Buffalo NP	Grand Total
Jackpine		**1**		**1**
Frost		1		1
Trembling aspen	**1**	**1**	**1**	**3**
Frost	1	1		2
Mechanical			1	1
White and black spruce		**1**		**1**
Frost		1		1
Grand Total	**1**	**3**	**1**	**5**

Table 11. Secondary animal agents by host.

Host and Agent	Dehcho	South Slave	North Slave	Wood Buffalo NP	Thaıdene Nëné TPA	Grand Total
Birch		**1**				**1**
Sapsucker		1				1
Jackpine	**1**	**1**				**2**
Squirrel	1					1
Hare		1				1
Juniper		**1**				**1**
Vole		1				1
Trembling aspen		**2**	**1**			**3**
Bear		2				2
Hare			1			1
White and black spruce				**1**		**1**
Woodpecker				1		1
Willow					**1**	**1**
Muskox					1	1
Grand Total	**1**	**5**	**1**	**1**	**1**	**9**

Conclusion

The 2025 NWT forest health surveys covered 6.2 million ha through coordinated aerial and ground surveys, providing a thorough overview of current conditions. Results show continued, variable effects associated with drought conditions (since 2022), with more pronounced observations in the Dehcho, South Slave, and North Slave regions. Defoliation has spread in several areas, including an eastern spruce budworm outbreak in the Liard River area and a large aspen tortrix/drought complex on the Martin Hills, Ebbutt Hills, Cameron Hills and near Fort Liard, while aspen serpentine leaf miner remains widespread. High water tables and flooding-related tree mortality were also observed along the Slave River corridor and parts of the Mackenzie Delta.

811,000 ha of primary forest health observations were mapped, with most damage related to defoliation but with various areas showing stress and mortality. Some localized recovery and fresh shoot growth were observed where early-to-mid-season precipitation occurred, supporting the premise that drought conditions are a contributing factor to many of the observations.

Ongoing monitoring, targeted ground checks and continued use of high-resolution imagery and remote sensing will improve data accuracy and trend detection.

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NRCan-CFS- NoFC diagnostics:

Tod Ramsfield
Michael Mbenoun

SKOG Forest Health:

Roger Brett
Forest Health Consultant
Skog Forest Health
Email: roger.brett@gmail.com
Phone: 780-405-6150