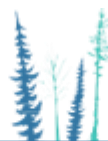


# Northwest Territories Environmental Studies Research Fund

## Annual Report and Budget 2025-2026



# NWT ESRF: ANNUAL REPORT AND BUDGET 2025-26



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## **Message from the Chair**

I am very pleased to present the 2025-2026 annual report for the Northwest Territories Environmental Studies Research Fund (ESRF).

The NWT ESRF continued to provide support to the University of Alberta project titled “**Numerical Modelling of the Permafrost Thawing and its Repercussions in the NWT**” and the University of Waterloo project titled “**Regional hydrologic and ecologic characterization and baseline assessment of remote northern Canadian terrain in advance of shale oil and gas development**”.

As the new Chair, I would like to thank Andrew Applejohn for his time serving as Chair of the Board. I am excited to advance the priorities of the NWT ESRF and look forward to working with the other Board members.



***Ryan Connon***  
*Chair,  
NWT Environmental Studies  
Research Fund*

## **Management Board Membership**

**Chair: Ryan Connon** – GNWT member (appointed October 29, 2025)

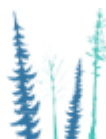
**Viktor Terlaky** – GNWT member

**Chad Grummett** – Industry member

**Alan MacDonald** – Industry member (appointed October 29, 2025)

**Vacant** – IGO member

**Vacant** – Public member



## Introduction

The Northwest Territories Environmental Studies Research Fund (ESRF) is a research program established to finance environmental and social studies relating to oil and gas activity in the NWT that will help inform decision making. The fund is supported through the collection of levies from all interest holders of petroleum lands in the onshore areas of the NWT – Exploration Licences, Production Licences, and Significant Discovery Licences alike. Levy rates are determined by the ESRF Management Board on an annual basis, and interest holders are invoiced based upon their total land holdings (total number of hectares under licence) within the onshore NWT. The Management Board is composed of representatives from government (2), industry (2), a member appointed by an Indigenous Government or Organization (1), and the public (1).

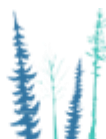
## Summary of Activities in 2025-2026

### Management Board Meetings

For the first half of the 2025-2026 fiscal year, the Board was without quorum. A new representative from the GNWT and a new representative from Industry were appointed in October 2025. In January, 2025, the Board met for a virtual meeting and agreed to an in-person Board meeting in April 2026 to discuss the future of the ESRF and the direction of the fund.

Key program direction for the 2025/2026 fiscal year included:

1. Levy rate for industry would remain the same.
2. ESRF would continue to collect levies and not make any significant funding decisions apart from the projects and research areas previously identified



## **2025-2026 Funded Projects**

### **Numerical Modelling of the Permafrost Thawing and its Repercussions in the NWT**

**Project Lead:** Dr. Vadim Kravchinsky

**Organization:** University of Alberta

#### **Project Summary:**

Permafrost, which underlies about one quarter of the Northern Hemisphere, is rapidly degrading in the Northwest Territories (NWT), particularly in the Mackenzie River Delta (MRD) and along the Inuvik–Tuktoyaktuk Highway (ITH) corridor. This study develops and validates an observation-driven Machine Learning (ML) framework to map spatial and temporal variability in MAGT and ALT in the MRD–ITH study area in the Northwest Territories using a decade of borehole temperature data and environmental predictors. Random Forest and Neural Network models produced high-resolution predictions with strong agreement to field observations, demonstrating robust spatial and temporal generalization, with uncertainty highest in ecotonal and heterogeneous terrain.

Spatial analyses indicate that vegetation cover, proximity to water bodies, and terrain characteristics strongly modulate permafrost thermal regimes. Shallow Active Layer Thickness (ALT) and colder Mean Annual Temperature (MAGT) dominate tundra and upland zones, whereas deeper seasonal thaw and warmer ground temperatures occur in southern lowlands and forested regions. Comparison between two partially overlapping five-year periods (2013–2018 and 2018–2023) reveals measurable decadal warming and active-layer deepening across the MRD–ITH study area, with pronounced change along transportation corridors and deltaic environments. Difference maps and rate-based heatmaps identify emerging thaw hotspots, demonstrating that both absolute thermal thresholds and rates of change are critical early warning indicators of permafrost instability.

The modelling framework assumes stationary relationships between predictors and ground thermal state and does not explicitly simulate subsurface thermodynamics; therefore, results represent spatially informed statistical predictions rather than process-based simulations. Nonetheless, integrating extensive field observations with ML techniques provides an observation-constrained baseline for regional permafrost monitoring. Future work will extend this framework to scenario-based projections using Representative Concentration Pathways (RCPs) and downscaled climate projections to 2100 and beyond, enabling quantitative assessment of infrastructure risk, carbon feedbacks, and long-term permafrost vulnerability in a rapidly warming Arctic.

**NWT ESRF Funding:** \$215,625 over five years.

Full 2025-2026 project report available at <https://www.nwt-esrf.org/publications>



## NWT ESRF: ANNUAL REPORT AND BUDGET 2025-26

Regional hydrologic and ecologic characterization and baseline assessment of remote northern Canadian terrain in advance of shale oil and gas development

**Project Leader:** Dr. David Rudolph

**Organization:** University of Waterloo

### Project Summary:

The research activities associated with the Year 2 of the current project involved laboratory analysis of water, soil gas and sediment samples, advanced interpretation of the air borne electromagnetic survey information (AEM) and terrestrial ERT and EM data along with continued development of the numerical modeling tools and scenario simulations. There was no visit to the field site during Year 2. The laboratory analyses related to the carbon cycling work was completed at the geochemical and isotopic laboratories at the University of Ottawa. The geophysical analysis and numerical modeling were focused at the University of Waterloo.

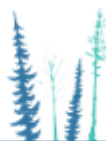


During Year 2, a series of conference presentations were made and peer reviewed journal articles prepared. The combined results of Year 2 have informed the final field campaign of the current project scheduled for July 2026.

The work remains focused within the Bogg Creek watershed, near Norman Wells in the Central Mackenzie Valley (CMV), NWT.

**NWT ESRF Funding:** \$100,000/year for five years (time frame extended due to Covid delays)

Full project update available at <https://www.nwt-esrf.org/publications>



## NWT ESRF: ANNUAL REPORT AND BUDGET 2025-26

### Financial Statement of the NWT ESRF for the Fiscal Year 2025-26

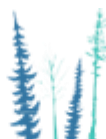
Revenues	
Industry Levies	\$ 198,140
<b>Total Revenues</b>	<b>\$ 198,140</b>
Expenses	
Administration	
Compensation & Benefits	\$ (73,050)
Travel	\$ (1,378)
Communications & Promotions	\$ -
Publications	\$ -
Other	\$ -
<b>Total Administration Expenses</b>	<b>\$ (74,428)</b>
Science Program	
Groundwater	\$ (100,000)
Permafrost numerical modelling	\$ (158,625)
Moose habitat & caribou winter (2024)*	\$ (5,500)
Northern landscape (2024)**	\$ (2,000)
<b>Total Science Program Expenses</b>	<b>\$ (266,125)</b>
<b>Total Expenses</b>	<b>\$ (340,553)</b>
<b>Total 2025-2026 Surplus (Deficit)</b>	<b>\$ (142,413)</b>
Summary	
Opening Balance (April 1, 2025)	\$ 381,423
Revenue	\$ 198,140
Expenses	\$ (340,553)
<b>Closing Balance (March 31, 2026)</b>	<b>\$ 239,010</b>

\* Project ended in 2023-2024 but final payment was made in 2025-26. Information on the project can be found in the 2020-21 ESRF annual report.

\*\* Project ended in 2023-2024 but final payment was made in 2025-26. Northern Landscape Project can be found in the 2022-23 ESRF annual report.

### Proposed Budget of the NWT ESRF for the Fiscal Year 2026-27

Revenues	
Industry Levies	\$ 150,000
<b>Total Revenues</b>	<b>\$ 150,000</b>
Expenses	
Administration	
Compensation & Benefits	\$ -
Travel	\$ (15,000)
Communications & Promotions	\$ -
Publications	\$ -
<b>Total Administration Expenses</b>	<b>\$ (15,000)</b>
Science Program	
Groundwater	\$ (100,000)
Permafrost numerical modelling	\$ (33,000)
Sump characterization project	\$ (93,000)
<b>Total Science Program Expenses</b>	<b>\$ (226,000)</b>
<b>Total Expenses</b>	<b>\$ (241,000)</b>
<b>Total 2026-2027 Surplus (Deficit)</b>	<b>\$ (91,000)</b>
Summary	
Opening Balance (April 1, 2026)	\$ 239,010
Revenue	\$ 150,000
Expenses	\$ (241,000)
<b>Closing Balance (March 31, 2027)</b>	<b>\$ 148,010</b>



## Levy Breakdown 2025-2026

The levy rate is \$0.323 per hectare

Description	Hectares	Amount
Significant Discovery Licenses	607,202	\$ 196,126.25
Production Licenses*	11,711	\$ 1909.70
Pioneer Production Licenses	321	\$103.68
<b>Total</b>	<b>619,234</b>	<b>\$198,139.63</b>

Location	Hectares	Amount
Mackenzie Delta / Arctic Islands	130,173	\$42,045.88
Central Mackenzie Valley*	434,012	\$138,312.90
Southern NWT	55,049	\$17,780.83
<b>Total</b>	<b>619,234</b>	<b>\$198,139.63</b>

\*License PL09 (4,150 ha) expired on 26 March, 2025 and was charged a pro-rated levy of \$312.16.

\*License PL10 (3,818 ha) expired on 25 April, 2025 and was charged a pro-rated levy of \$388.55.

