

InfoNorth

Celebrating the 50th Anniversary of the Inuvik Research Laboratory

by Jolie Gareis and Ashley Mercer

ON ANY GIVEN DAY, if you walk into the grey metal building next door to the Post Office on Inuvik's main street, you will find a bustling research centre brimming with activity. The loading bay will be filled with researchers organizing their field gear and processing samples, all the while leaving their footprints—either snowy or muddy, depending on the season—on the floor. Down the hall, you might happen upon a community meeting or a research lecture in the centre's meeting rooms, or local residents and researchers working in the library. Upstairs, you will find the offices where both permanent staff and visiting researchers are studying a range of topics relevant to northern Canada and the wider circumpolar Arctic. For the past 50 years, this has been the daily routine at the Inuvik Research Laboratory, a hub for research, discovery, and innovation in the western Canadian Arctic. Built in 1964, the Inuvik Lab has become one of Canada's most active and productive northern research stations.

THE ORIGINS OF INUVIK AND "THE LAB"

Inuvik was considered...suitable for a research station because of its proximity to the fresh-water lakes and rivers of the Mackenzie Delta, the Arctic coast, mountain ranges to the west and south, and tundra to the east with its reindeer herd.

(Kerr, 1974:23)

The community of Inuvik was founded on the eastern shores of the Mackenzie Delta in 1955. It was a planned community that was intended to replace the hamlet of Aklavik, which was prone to flooding and had limited room for expansion. Several potential town sites were considered before the one called "East Three" was chosen for its location next to the East Branch of the Mackenzie River, with access to raw resources and a nearby flat area that was suitable for an airport. When the town officially opened in 1958, it was named "Inuvik" which means 'place of people' in Inuvialuktun. From its earliest days, Inuvik has been an active centre of government, administration, and commerce in the western Canadian Arctic.

The plans for Inuvik included a research centre that would support and facilitate northern research by government, university, and industry scientists. Poole Construction, an Edmonton-based company, was awarded the \$292,000 building contract, and after several months of construction the original research centre opened in January 1964 (Fig. 1). It was one of the first non-residential buildings in town and Canada's first permanent scientific research station north of the Arctic Circle. The facility, originally called the Scientific Research Laboratory, was initially administered and operated by the Government of

Canada's Department of Northern Affairs and National Resources (now Department of Aboriginal Affairs and Northern Development). The first staff members felt that the name of the facility was repetitive and uninformative, but Ottawa refused to change the name. Regardless, within the community the facility became known as the Inuvik Research Laboratory, or more simply, as just "the Lab."

The first Lab manager, Richard (Dick) Hill, oversaw all aspects of the facility, including the labs, loading bay, deep freeze, darkroom, greenhouse, and research library. By all accounts, the Lab was remarkably well equipped for the time, with state-of-the-art amenities that quickly drew researchers from across Canada and around the world. A large proportion of the earliest research supported by the Lab was field-based sampling and surveys, just as it is today. Facilities were modified on the fly to meet the unique and unanticipated demands of the research community as the Lab became the base for several major field programs. The labs were altered to accommodate animal and fish dissections, vegetation sampling, and soil water content analyses, while the large yard surrounding the facility was fenced in to provide storage space for the ever-expanding fleet of field vehicles, including trucks, snowmobiles, and motorboats.

The rapid growth in research activity during the Lab's early years gave rise to some interesting challenges. For example, when visiting researchers were not in the field, they needed a place to sleep and live in Inuvik. The Lab found a creative solution to this problem: several surplus trailers were purchased and parked in the yard behind the building. They were used as bunks and living space for many years, until demand for accommodations became too high and the trailers were replaced with a set of row houses



FIG. 1. The Scientific Research Laboratory shortly after its opening in 1964. The building with the cone-like roof to the left of the main facility houses the cosmic ray detectors owned by the Bartol Institute (University of Delaware).

located on Nanuk Place, a residential street just a few blocks away from the main facility. The Nanuk row houses remain in use, and in high demand, to this day.

As the years passed, the building began to show not only its age, but also the inevitable wear and tear produced by decades of hard use. In 2009, \$11 million (CAD) was received from the Government of Canada's Arctic Research Infrastructure Fund, a stimulus package that recognized the need to replace Canada's aging Arctic research facilities. Research centre staff, long-term facility users, and community members collaborated to design a new state-of-the-art research centre that would meet the diverse needs of its many user groups. Ground was broken on 15 March 2010, and the new facility was built over the following year.

The doors of the new Western Arctic Research Centre (WARC; Fig. 2) opened in late April 2011, and an official grand opening and community celebration took place on 20 September. WARC is roughly the same size as the old Lab building, but because it was specifically designed to meet the needs of both researchers and the local community, it has a more spacious feel. The new building includes three specialized labs: a wet lab for dissections and water sampling, a clean lab for contaminant work, and a soils lab for soil and vegetation analysis. Facilities that were not frequently used, such as the darkroom and greenhouse, were eliminated from the design to allow for the expansion of more heavily used spaces, such as the loading bay and gear storage lockers. With these expanded staging and storage areas for field equipment, as well as modern communications infrastructure, increased space allotted to the research library, and dedicated classroom and meeting space, WARC can comfortably accommodate many more users than the old facility

could handle. Also, in recognition of the increasing frequency of social science, health, and traditional knowledge research, the new facility contains large areas of flexible desk space that can accommodate teams of all sizes. These infrastructure enhancements have kept WARC on the front line of Arctic research, and have provided continued support for many projects in the Inuvik region.

THE CHANGING ROLE OF THE INUVIK LAB

While other laboratories were considered when the Inuvik establishment was built, it was felt at that time that the idea should be proved out first.

A. Kerr (pers. comm. 1974)

For its first 20 years, the Lab was administered by the federal government, which meant that staff in Inuvik reported to supervisors thousands of kilometres away in Ottawa. The early years of Lab operations were closely monitored by Ottawa, probably because the facility was viewed as a prototype that would guide the development of future northern research stations. As Iris Kerr wrote in a 1974 report summarizing the Lab's first decade, "on the basis of the operation of the Inuvik station, would be determined the feasibility of establishing other stations of a similar or modified nature in other places" (Kerr, 1974:22). The quick expansion of research programs and services at the Inuvik Lab signaled a strong demand for facilities and logistics to support northern research, and new federal research stations were opened in Igloolik in 1975 and in Iqaluit in 1978.



FIG. 2. The Western Arctic Research Centre (WARC), which replaced the original facility in 2011. WARC was built using funding received from the Government of Canada's Arctic Research Infrastructure Fund.

In 1984, the Legislative Assembly of the Northwest Territories established the Scientific Institute of the Northwest Territories (SINT). At that time, the Inuvik, Igloodik, and Iqaluit labs were transferred from the federal government to the territorial government of the Northwest Territories while the headquarters for SINT was established in Yellowknife. Each of the three satellite stations supported regional field research, while the headquarters developed policy and advised territorial government departments on matters related to science, technology, and research.

By the early 1990s, the impending division of the Northwest Territories with the creation of Nunavut was looming, and preparations were underway to smooth the transition. In 1995, the Inuvik SINT office merged with Aurora College and changed its name to the Aurora Research Institute (ARI). This merger provided research capacity within the territorial college system and allowed ARI to establish additional offices on the college campuses serving the North Slave region (in Yellowknife) and the South Slave region (in Fort Smith). With the college merger, ARI staff gained the opportunity to collaborate with instructors to provide post-secondary education and training opportunities. ARI remains part of the college to this day, with the mandate to improve the quality of life for all Northwest Territories residents by applying scientific, technological, and indigenous knowledge to solve northern problems and advance social and economic goals. The role of the Lab had expanded since the 1974 implementation of the Northwest Territories Scientists Act, which required that all territorial research be licensed via a community consultation process that would give local organizations the opportunity to review and provide comments on proposed research. As the primary territorial agency that has overseen and facilitated the Northwest Territories research licensing process for the past 40 years, ARI has become a repository for a large volume of license applications and research reports that detail trends in research activity (Fig. 3). While this information has always been public, in the last several years ARI has focused on making the research licensing database more widely available online.

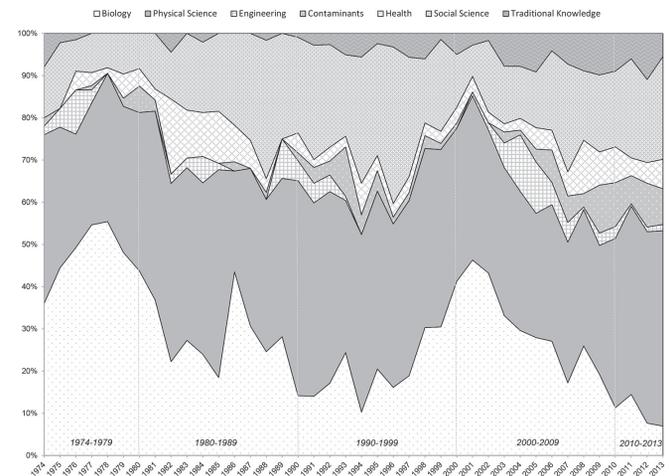
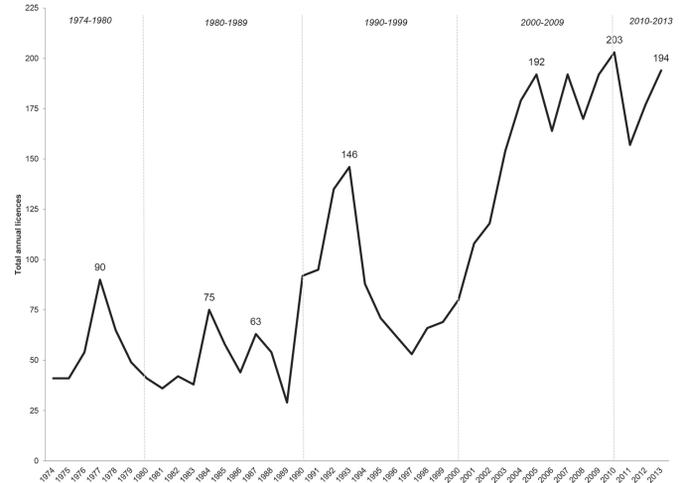


FIG. 3. A summary of 40 years of research licensing in the Northwest Territories. a) The total number, and b) the breakdown by category of scientific research licenses issued each year from 1974 to 2013.

In 2014, ARI and Aurora College became eligible to receive funding from both the Social Sciences and Humanities Research Council and the Natural Sciences and Engineering Research Council of Canada (NSERC), which will support the future development and expansion of research programs within the territorial college system. This support will allow college and ARI staff to initiate and lead research projects on topics that are important to northern communities and will encourage future research partnerships with other academic institutions.

LOOKING BACK ON 50 YEARS OF RESEARCH AND DISCOVERY IN INUVIK

The government supports [the Lab's] operation with the expectation of improving conditions and resource utilization in Canada's northern lands through enriched knowledge obtained by more sophisticated research.

R. Hill (pers. comm. 1966)

Since its inception, the Inuvik Lab has had a wide-ranging mandate to both support research taking place in the western Arctic region and conduct research that is relevant to Northerners and supports northern priorities. Over the past 50 years, the Lab has served as the base for numerous research projects investigating the physical, biological, and social environments of Inuvik and the surrounding western Arctic.

Supporting Research

Since opening in 1964, the Lab has provided critical logistical support for many research projects that have made substantial contributions within their field. Growth in research activity was immediate and rapid; during its first year of operation, the Lab supported more than 100 researchers working on dozens of projects, while less than a decade later, during the 1971–72 fiscal year, more than 250 researchers traveled to the Lab to work on more than 100 projects. In April 1984, the research centre celebrated its 20th anniversary by hosting an open house for the public. In the official invitation to the open house, scientist in charge David Sherstone wrote: “The Department of Indian Affairs and Northern Development established this facility to provide support to government, university, and private industry scientists working in this region. During the first 20 years, more than 2000 researchers have received scientific, technical, and logistics support here.” In a publication compiled for the 20th anniversary, it was estimated that 973 publications, such as graduate theses and papers, had resulted from research supported by the Centre (Sherstone, 1986). In spite of some temporary declines in research activity, the numbers have generally continued an upward trajectory over the past half-century, with more than 1900 user-nights of accommodation and 1000 user-days of facility use (lab, desk space, and conference room) provided during 2013–14, the most recent fiscal year.

The longest-running project at the Inuvik Lab also celebrated its 50th anniversary in 2014. Since 1964, sensitive instruments housed in an outbuilding next door to the research centre have measured the number of high-energy cosmic rays (generated by the sun and other celestial events like supernovae) impacting the Earth’s surface. Project coordinators at the Bartol Institute, University of Delaware, sent the required equipment and building materials to the research centre site in late 1963. Dick Hill recalled that when he first arrived in Inuvik to open the Lab, “there was a large pile of boxes and pallets stacked with lead bars sitting by the front door.” He and Ernie Moore assembled the cosmic ray detectors, which are now part of an international network of 11 polar observation sites. Lab staff perform maintenance and equipment checks to ensure that the Inuvik cosmic ray detectors run properly and that no data are lost. The data collected over the past 50 years have been used to identify times of high cosmic activity in order to protect satellites, computers, and electricity transformers, all of which can be damaged by these particles.

The western Arctic has a long history of permafrost research in the deltaic, coastal, montane, and tundra environments that make up its diverse landscape. In the 1960s, leading permafrost researcher Dr. J. Ross Mackay thought of a field experiment that would further our understanding of how new permafrost forms. A small tundra lake underlain by unfrozen ground would be drained, and ground temperature and active-layer depth measurements would be taken as the lake bed slowly froze. On 13 August 1978, Dr. Mackay and his colleagues drained a lake on Richards Island on the Beaufort Sea coastline of the Mackenzie Delta, founding a research site known as Illisarvik (an Inuvialuit word that means ‘place of learning’). With the support of the research centre, the Polar Continental Shelf Project, the Geological Survey of Canada, and NSERC, the team has continually studied the growth of permafrost in the drained lake bed, as well as how ground temperature, vegetation cover, and water content change as permafrost slowly forms. The project has now been running continuously for 36 years, making Illisarvik the longest-running field experiment in northern Canada.

In the early 1970s, oil and natural gas were discovered in the Mackenzie Delta. Many major oil companies established offices in Inuvik, and large multiyear research programs increasingly focused on regional resource exploration and extraction. One of the earliest programs was the Beaufort Sea Project (1973–77), a collaboration between the oil industry and government to investigate the risks and potential impacts of offshore oil extraction in the Arctic. The Northern Oil and Gas Action Plan (NOGAP; 1983–91) was the next large-scale project to focus on regional resource development; its purpose was to provide baseline data that could be used to assess the potential effects of oil and gas development on the natural environment, local citizens, and historical sites. By the late 1990s, unconventional fossil fuel sources were also being evaluated. Gas hydrates are an energy source formed when water and methane gas come together under extreme pressure in cold environments (for example, in permafrost or under the sea floor). When heated or depressurized they melt, releasing methane gas that can be used as fuel. In 1998, the Mallik project (a partnership between Natural Resources Canada and the Japan Oil, Gas and Metals Corporation) first investigated the economic and environmental feasibility of gas hydrate development in the Mackenzie Delta. Expanded programs of study followed in 2002 and 2006–08. The Inuvik Lab served as the logistical headquarters throughout all Mallik field campaigns, but in 2006–08 took on an expanded role. In addition to supporting the more than 300 international researchers participating in the field research program, the Lab and ARI also acted as the designated project operator responsible for all field operations and financial management. This was the first time that a northern science agency had taken responsibility for a program of this magnitude.

The Lab again had the opportunity to support a large-scale northern research program during the fourth International Polar Year (IPY) from 2007 to 2009. IPY research

focused on climate change in polar regions and the health and well-being of northern citizens. One of Canada's four Northern Coordination Offices was established at the ARI headquarters in the Inuvik Lab facility. Throughout IPY, the Lab provided equipment, logistical support, and technical assistance to research programs based throughout the western Arctic. Additionally, the Lab and the IPY Northern Coordination Office facilitated training opportunities for local residents of all ages and helped to involve local residents fully in all stages of IPY research. During IPY, the Lab noted increases in the amount of research conducted in the Inuvik region and in the number of research projects licensed across the Northwest Territories (Fig. 3a).

Following IPY, the culture of increased communication and support among northern research facilities has persisted and led to the formation of new networks. WARC has recently joined the Canadian Network of Northern Research Operators (CNNRO), as well as the International Network for Terrestrial Research and Monitoring in the Arctic (INTERACT) as an Observer Station. Both are networks of research logistics providers with mandates that include facilitating northern research and sharing best practices for safe and efficient operations.

Conducting Research

In addition to facilitating and supporting regional research, current staff members of the Lab also conduct research and gather monitoring data with particular local or northern significance. Renewable energy technologies have been studied in partnership with other northern agencies in order to determine whether they could be used to offset fossil fuel usage and increase energy security. Over the past decade, wind energy potential has been evaluated in many Northwest Territories communities in partnership with the territorial Department of Environment and Natural Resources. The wind feasibility studies involved local residents, who provided critical support for wind tower installations and data retrieval. When the new research centre was built, renewable energy technologies and monitoring systems were incorporated into the building design. WARC has a bank of solar panels and a solar wall, both mounted on south-facing exterior walls to capitalize on the long hours of daylight each summer. The energy captured by both systems offsets that drawn from the grid, and the system is being monitored in collaboration with the Arctic Energy Alliance in order to evaluate its performance and the long-term feasibility of integrating these technologies into northern infrastructure.

The construction of WARC also presented an opportunity to assess different building methods that may be better adapted to a changing climate. Melting permafrost and deepening active layers in Canada's North have the potential to seriously affect infrastructure in many communities. The construction to support the new building included some hollow pilings along with the traditional back-filled pilings. This experimental technique allows air circulation

and may therefore decrease the time required for disturbed ground to refreeze. Ground temperatures and refreeze rates are being continuously monitored at WARC to determine whether the hollow pilings offer any advantage over the construction method typically used in northern regions.

The collection of seed populations native to the Northwest Territories was initiated in 2005 to meet an identified demand for indigenous seeds that could be used to revegetate and restore disturbed land. Since that time, the Lab has partnered with several organizations to conduct germination trials, build seed volumes, and run field trials in order to assess growth and survival on disturbed sites. A revegetation trial is currently underway in partnership with the Town of Inuvik Golf Course to restore land damaged by heavy equipment. Seed collections will also be used to create an educational garden at WARC in the summer of 2015. The garden, designed and planted in partnership with local Aboriginal organizations, will profile the traditional uses of local species. The ultimate goal of this project is to make indigenous seed populations available to government and industry, allowing large-scale developments to mitigate their environmental impacts on the surrounding landscape.

The Lab also partners with external organizations on several ongoing regional projects that monitor water quality, ground temperature, snow depth, and air quality. The contributions made by Lab staff take many forms, including equipment maintenance and repair, data collection, calibration, and data analysis. The on-the-ground support provided by the Lab is critical to our research partners, as it allows for data collection and equipment maintenance outside of peak seasons, when other team members are not physically present in Inuvik.

OUR ROLE IN THE COMMUNITY

The aim of the station is to serve not only the scientist, but the community as well. In this remote Arctic location, the presence of such a laboratory will be a boon to all the townspeople.

J. Lotz (1963:20)

From its earliest days, the Lab has been an integral part of the Inuvik community, hosting community meetings and events alongside researchers and their work. The first community event of note took place right around the time the facility opened in 1964. When construction of the round, high-ceilinged building that would eventually house the cosmic ray detectors was complete, but before the equipment had been moved in, the community gathered inside for an unofficial opening ceremony for the Lab that included drum dancing. As Dick Hill later reminisced, "When we opened the door people swarmed in—the dancers performed and, in the under-ventilated room, everyone sweated." During the mid-1960s, when there were no TVs or theatres in Inuvik, the Lab screened movies in the second-floor conference room each weekend. National Film

Board features and other short films were shown to an audience that sometimes numbered more than 100 community members. The list of the somewhat unorthodox roles the research centre has filled over the years includes community daycare, public library, vet clinic, and meeting place for community events. The Lab was also the venue for some of the first Inuvik town hall sessions, where proposals for development of other town facilities, such as the library and arena, were presented and discussed. This early flexibility and responsiveness are likely key factors contributing to the success of the facility with both the research and the local communities.

In 1967, a community-based research group called the Mackenzie Institute formed at the Lab. This was a partnership of Inuvik residents who met to discuss topics of interest to community and regional stakeholders and to provide informed comments on regional development projects. Residents visited the Lab and shared their experiences and observations with researchers; this interaction was unique for its time, since prior Arctic science and research programs had generally excluded local indigenous populations from knowledge exchange and had neglected to consider their research interests (A. Stuhl, pers. comm. 2014). The Institute therefore promoted a more holistic approach to northern research than was the norm and shared the diverse cumulative knowledge with formal decision-making bodies, such as the early town councils and the federal departments overseeing science and development in the Northwest Territories. The disbanding of the group in the 1970s, after several years of intellectual engagement and knowledge sharing among local residents, Lab staff, and visiting researchers, was likely due to the increasing influence and momentum of the Citizens for Original People's Entitlement (COPE) (A. Stuhl, pers. comm. 2014).

In keeping with that spirit, the Lab continues to maintain strong ties with the Inuvik community. Local residents and students make use of the regional research library, which contains more than 20 000 catalogued items that are fully integrated into the territory's library system. The Lab hosts public research lectures by members of the local and visiting research communities, as well as an annual Speaker Series that brings distinguished lecturers to Inuvik. Staff members facilitate community outreach events by preparing poster displays, judging local science fairs, and running after-school activities such as the current robotics club. Research centre tours and science outreach activities are provided for children of all ages, either through the public

school system or through organizations such as the preschool, summer day camps, and Inuvik Youth Centre. The staff strive to make northern science accessible and interesting to people of all ages, in order to raise awareness of research taking place in the western Arctic and to present careers in science, technology, and engineering as viable options for youth.

CELEBRATING 50 YEARS OF RESEARCH IN INUVIK

Fifty years of continuous research support in Inuvik illustrates the relevance of the western Arctic region to the study of climate change and northern priorities.

P. Seccombe-Hett (2014:16)

To mark both the anniversary of the Lab's opening and the significant milestone of 50 years of research in the Inuvik region, the research centre staff hosted a busy schedule of events in the fall of 2014 and created a commemorative logo (Fig. 4).

In recognition of the Lab's history as a gathering place for the community, the staff held a weekly series of movie nights that included a screening of the classic film "Nanook of the North," as well as more recent films that portrayed significant local research projects. An open house was held in November, when all Inuvik residents were invited to visit the Lab, take a tour, and participate in interactive science demonstrations on robotics, hydrology, physics, and the traditional uses of indigenous plants.

A series of three commemorative talks took place in mid-November; all were exceptionally well attended and received. The invited presentations included a retrospective on 50 years of Arctic research by Dr. John England (University of Alberta), an examination of how to effectively incorporate traditional knowledge into research projects by Dr. Brenda Parlee (University of Alberta), and a review of 20 years of socio-cultural research in the Gwich'in Settlement



**INUVIK
RESEARCH
LABORATORY**

CELEBRATING 50 YEARS OF RESEARCH

FIG. 4. The Lab's official 50th anniversary logo.



FIG. 5. Jane Arychuk, President of Aurora College, partnered with an Inuvik child during the 50th anniversary Robotics Challenge.



FIG. 6. East Three Secondary students touring the Inuvik Satellite Station Facility as part of the 50th anniversary celebrations.

Area by Alestine Andre, Sarah Jerome, and Lillian Wright (Gwich'in Social and Cultural Institute).

Several youth-focused events were also held during the anniversary celebrations. Six Inuvik youth (ages 9 to 18) participated in an on-the-land camp in the Mackenzie Delta, where research centre staff helped the youth conduct fish surveys and community elder Lillian Elias demonstrated how to prepare dry fish. The camp was an opportunity for the youth to learn how scientific research and traditional knowledge can be used in concert to better understand the natural environment. Staff facilitated an afternoon-long robotics event, challenging participants to build robots that

could quickly and accurately navigate a racecourse (Fig. 5). Research centre staff also coordinated field trips for students from Inuvik's East Three Secondary School to visit the Inuvik Satellite Station Facility. Staff from the Canada Centre for Remote Sensing gave a tour of the newest satellite dish, and the students learned about the importance of remote sensing in northern research and monitoring (Fig. 6).

The celebrations culminated with a public feast on the night of 19 November (Fig. 7), when more than 250 community members enjoyed a celebratory dinner. The evening began with formal presentations from government representatives and delegates from local Aboriginal organizations and ended with an open invitation for all to come forward to offer their congratulations and memories of the research centre. Many former staff members and local residents spoke, sharing their stories of the building and its role in the community.

A FINAL REFLECTION

The occasion of the 50th anniversary of research in Inuvik has presented a rare and valuable opportunity to look back on the history of the Lab. It has also allowed us to ensure we remain on a path that honours the collaborative spirit that has been cultivated over decades by the research and local communities. In spite of the many changes the Lab has endured since its doors first opened in 1964, the goals of the facility and its staff have remained the same: to support research and discovery in the western Arctic, to help answer northern research questions, and to help communicate research results to northern residents.



FIG. 7. Staff from the Western Arctic Research Centre and the Aurora Research Institute on the evening of the community feast celebrating 50 years of research in Inuvik. The two commemorative pictures held by the staff were presented by the Honourable George L. Tuccaro, Commissioner of the Northwest Territories (picture on left), and the Aurora College Board of Governors, faculty, and staff (picture on right).

ACKNOWLEDGEMENTS

For more information on many of the topics discussed here, please see our website (www.nwtresearch.com). Thank you to all who celebrated our 50th anniversary with us! This publication benefited from discussions and correspondence with Dick Hill, Andrew Stuhl, Scott Dallimore, Chris Burn, and the current and former staff of the Aurora Research Institute. We would like to dedicate this article to the memory of Dr. J. Ross Mackay (1915–2014), a giant of research and discovery in the western Canadian Arctic and an inspiration to many. Sadly, Dr. Mackay passed away shortly before our official 50th anniversary celebrations.

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