A PAN-NORTHERN APPROACH TO **SCIENCE**

April 2016

Nunavut

Government of Northwest Territories
Gouvernement des Territoires du Nord-Ouest

Yukon Government

A PAN-NORTHERN APPROACH TO SCIENCE

Message from the Government of Yukon



Science and technology can provide us with insights and solutions to develop the North as a region of vibrant, healthy communities with a strong and diverse economy that protects the environment for future generations.
Recently, the Yukon government released our own Science Strategy that outlines our vision to support the active pursuit, gathering and storage of scientific knowledge so it can be easily retrieved, transferred, shared and used to support evidence-based decision-making.

At the heart of our strategy is support for partnerships that help manage emerging issues and develop northern scientific capacity.

Cooperating in the development and exchange of scientific information can help to achieve advancements in knowledge and understanding that are not possible when parties work in isolation. Partnerships that bring together capabilities, interests, expertise and resources can accelerate the pace of knowledge and understanding and make the best use of limited resources.

We are committed to working together with the Northwest Territories and Nunavut to advance the *Pan-Northern Approach to Science*. Together, we will strive to foster partnerships within the territories and beyond our borders to achieve our mutual goals.

We support and promote the use of the best available science and traditional and local knowledge in decision-making.

Message from the Government of the Northwest Territories

As a culturally, socially and environmentally diverse area, Canada's northern territories attract high levels of scientific interest and activity. The North continues to be an important location for research by national and international government, academic and industry-based researchers.

The Government of the Northwest Territories recognizes that reliable, timely and accessible knowledge is essential to address the dynamic changes taking place in our northern territories. It is critical that this knowledge reflects the historical and current conditions of both our people and the environment.

We support and promote the use of the best available science and traditional and local knowledge in decision-making.

Continued collaboration with other governments, including Aboriginal governments and organizations, as well as communities, academic institutions, other organizations and industry will ensure scientific research benefits and meets the needs of Northern residents.

We are committed to working with Nunavut and Yukon to advance the *Pan-Northern Approach to Science*, which will help guide future research that is` relevant and valuable to our residents in the North.

Our approach is centered on strong community engagement and partnerships to ensure that scientific endeavors are appropriately guided by Inuit culture, expertise, and ingenuity.

Message from the Government of Nunavut

As the youngest territory in Canada, Nunavut has witnessed substantial growth in our capacity for scientific research and development. Over the past ten years, we've built new research facilities and established collaborative relationships across all disciplines to promote scientific advancement in Canada's North. As Nunavut approaches its 17th anniversary, our government recognizes the critical role that science and research plays in promoting a positive economic and social future in Nunavut. The Government of Nunavut supports an approach to science that emphasizes scientific training and capacity building for Nunavummiut. Our approach is centered on strong community engagement and partnerships to ensure that scientific endeavours are appropriately guided by Inuit culture, expertise, and ingenuity.

This focus yields positive results. Our residents, and particularly our youth, are more proactive and engaged than ever before in research. By building on the needs, interests, and traditional knowledge found in our communities, we have already seen innovative approaches to contemporary problems emerge. Scientists in Nunavut have created new wildlife population survey techniques, new approaches to health screening, and have made major advances in measuring the performance of our community wastewater systems.

Nunavut's vision for research aligns with the *Pan Northern Approach to Science*, and we are committed to working with our partners in the Northwest Territories and Yukon to refine that vision, build on our successes in research leadership, share best practices, and move forward together in advancing science that addresses the unique needs of Canada's North.

Science in Canada's North

"It is not sufficient to study the North from afar. Broadening our own understanding of the North, and drawing upon traditional knowledge as well as modern science, will improve our collective ability to operate in an environment that is fragile to begin with, and undergoing serious and rapid change."

Why is science important to the North?

The North is experiencing a dynamic period of changes and challenges. Resource development, climate change, economic change, new technologies, health risks and social change require territorial governments to adapt their programs and services. Territories need sound and reliable evidence-based information – derived from scientific investigations and research – to make informed policy decisions. Science is a central element in ensuring sustainable resource development, health and wellness, education, industrial diversification, cultural retention and economic development in the North.

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Northerners need to be actively involved

We recognize that it is not sufficient to study the North from afar. Northerners have long advocated for the right to be actively involved in research, not just as subjects or passive observers. We operate in a fragile environment that is undergoing serious and rapid change. Broadening our own understanding of the North, building northerners' capacity to plan and conduct research, and drawing upon traditional knowledge, as well as modern science, will improve our collective ability to operate in that environment. A new era of science and technology development is upon us, one that balances the need for pure, curiosity-driven science with the need for solutions-driven, needs-oriented and partnership-based research.

A Northern Approach to Science

The territories are committed to working together to build a better North for the benefit of northern citizens, as well as all Canadians. Science is an essential part of this work.

The territories' Premiers understand the importance of science and have seen an opportunity for us to work together to develop northern science. This document outlines a pan-territorial approach that:

- Identifies guiding principles for science
- Fosters cooperation and collaboration
- Recognizes the importance and contribution of traditional knowledge to advancing the northern knowledge base and its value to decision-making
- Supports the achievement of *A Northern Vision*

A Northern Vision: Building a Better North

A Northern Vision: A Stronger North and Better Canada, originally published in 2007, described how the territories wished to work together to achieve our common goals and engage in partnerships to shape the future of Canada's North.

"*It is not sufficient to study the North from afar. Broadening our own understanding of the North, and drawing upon traditional knowledge as well as modern science, will improve our collective ability to operate in an environment that is fragile to begin with, and undergoing serious and rapid change.*"

A Northern Vision: Building a Better North, released in 2014, renews that commitment.

"*As Premiers of the Northwest Territories, Yukon and Nunavut, we are committed to working together to develop the North as a region of vibrant, healthy communities with economies that offer sound investment and diverse employment opportunities, a flourishing private sector and protection of the environment for future generations … We will continue to work with all levels of government within each territory and beyond our borders to achieve our mutual goals.*"

A Shared Vision for Northern Science

The Premiers' shared vision for northern science in the three territories is to:

- Support a strong northern science community that is solution-driven, needs-oriented and partnership-based
- Broaden our own understanding of the North
- Encourage both traditional knowledge as well as modern science
- Develop northern research capacity
- Realize a prosperous, healthy and sustainable North that will benefit northerners and all Canadians, now and in the future

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A Northern Vision: Strengthening cooperation amongst the territories

A Northern Vision: A Stronger North and Better Canada was first published in 2007, the document has been used to guide evidence-based work on shared priorities of the territories including:

- Completion of a Northern Transportation Systems Assessment
- Commitment to a *Pan-Territorial Adaptation Strategy*: Moving Forward on Climate Change in Canada's North
- Completion of *Paths to a Renewable North*: A Pan-Territorial Energy Inventory
- Monitoring of our shared renewable resources, such as caribou and polar bears
- Researching the cumulative impacts of development projects on the environment, wildlife and people
- Researching the effects of climate change on permafrost
- Advocating for change to the federal Northern Housing Fund to ensure the health and sustainability of our communities
- Speaking with a common voice about infrastructure needs of the North
- Renewal of additional federal funding to offset the higher costs of delivering health care services in the three territories
- Collaboration on social issues
- Supporting advancements in northern technology and innovation

Principles of the Pan-Territorial Approach to Science

1. **Science and innovation are essential to a prosperous, sustainable and healthy North and we should:**
   - Support the active pursuit, gathering and storage of scientific knowledge so it can be easily retrieved, transferred, shared and used to support evidence-based decision making
   - Recognize the importance of promoting and adopting technological advances to facilitate sustainable development
   - Support science programs in keeping pace with industrial innovation and activity
   - Recognize the important role that innovation can play in creating new opportunities and solutions, which is essential to continued growth, prosperity and competitiveness
   - Promote health and social sciences, as they have an essential role to play in enhancing the quality of life of northerners
   - Recognize the important direct economic spillover benefits of research and technology development initiatives in the North

2. **Collaboration and capacity-building is essential and we should:**
   - Employ, where appropriate and feasible, collaborative research methods that promote local engagement and capacity development
   - Recognize the importance of ongoing development of science and technology capacity within northern organizations as an essential consideration in the development and delivery of northern science programs. Ongoing support for northern territorial colleges and research institutes in these endeavours is critical
   - Establish, maintain and grow a strong northern-based science community

3. **Traditional and local knowledge is essential to our understanding of the North and we should:**
   - Equally recognize the importance and contribution of traditional knowledge to advancing the northern knowledge base and its value to decision-making, as well as the necessity of preserving and respecting traditional knowledge as integral to sustaining northern cultures.
   - Reflect local, Aboriginal, and scientific knowledge and expertise to fully encapsulate the state of knowledge on a particular topic.
   - Encourage efforts to incorporate the traditional and local knowledge of northern Aboriginal peoples and local residents in research projects and decision-making.
   - Respect the rights of Aboriginal governments and peoples to set guidelines regarding ownership of, access to, and use of their traditional knowledge.

4. **Balance the need for pure, curiosity-driven science with the need for solutions-driven, needs-oriented, and partnership-based science that addresses northern needs and we should:**
   - Reflect northern priorities and input in the development and delivery of northern science programs.
   - Address northern needs for information to maximize social, economic and environmental benefits of science activities.

5. **Scientific cooperation and partnerships are essential and need to be enhanced and we should:**
   - Recognize that there are areas in science where we must cooperate in the development and exchange of scientific information.
   - Support improved scientific coordination amongst departments and agencies to prevent duplication, increase efficiency, and facilitate exchanges and transfers of data and information between government, industry, and academic organizations and scientists.
   - Recognize the importance of partnerships across jurisdictions, nations and disciplines in developing the knowledge base that is needed to support decision-making and manage emerging issues.

A Northern Vision: Principles

1. Self-reliant individuals live in healthy, vibrant communities with opportunities to build their capacity through education and skills training, enabling them to reach their full potential.
2. The cultural heritage of Aboriginal people is preserved, promoted and able to flourish, and the history and diversity of all citizens is celebrated.
3. The northern tradition of respect for the land and the environment is embraced.
4. Aboriginal land claims and self-government agreements have been successfully negotiated and continue to be implemented by the parties.
5. Northerners will be the primary beneficiaries of northern resource development.
6. The economic potential of the territories is fully realized through a robust private sector, and by the construction of strategic infrastructure – in partnership with Canada – that encourages investment, enables job creation and improves standards of living.
7. Northerners have the tools and authority to manage their own affairs.
8. Strong, responsive governments make decisions and take actions that are anchored in the principles of responsible, sustainable development.
9. Northern communities have access to the research and information they need to mitigate and adapt to the impacts of environmental changes.
10. The territories are full, participating members of the Canadian federation, contributing to the nation's prosperity.
11. The territories engage with the international community on issues of importance to the circumpolar North.

Roles of Territorial Governments in Northern Science

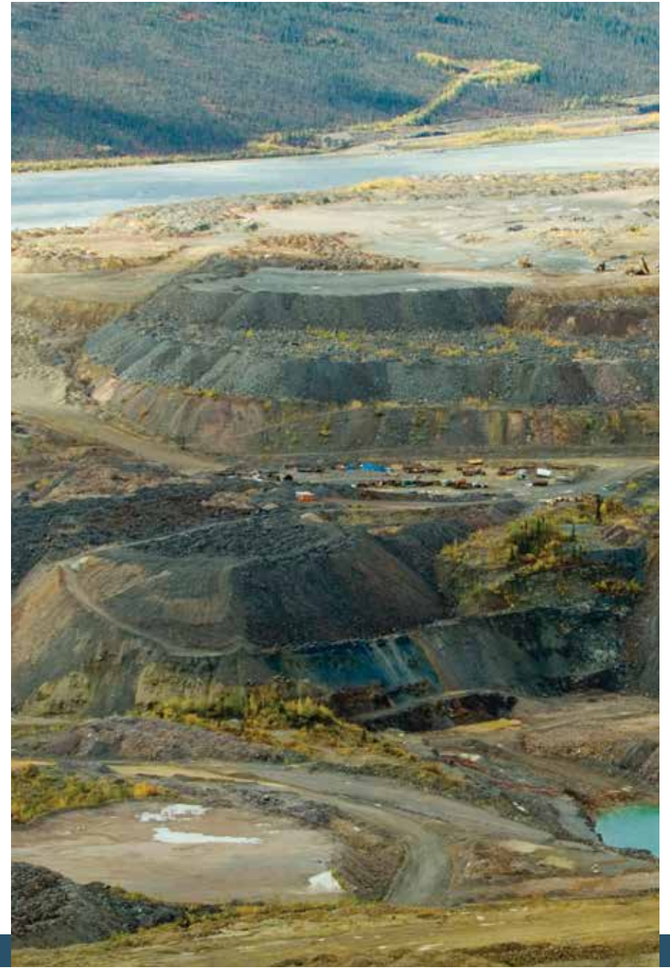
The Premiers confirm that there are six areas where governments have a role in northern science:

1. *Practitioner* – Most territorial governments employ science practitioners to address various questions related to their mandates. While this science is often conducted for management purposes, it can also include pure research, all of which can help inform decision-making, guide legislation and policy development and promote science.

2. *Consumer* – Territorial governments need reliable and evidence-based information to develop sound policies and legislation. Science must inform government policy and legislation development so decisions are made based on the best information about their potential environmental and social impacts. Territorial governments collect a wide range of information through reports, scientific literature and journals, surveys, raw data, real-time remotely-sensed information and research.

3. *Educator* – Territorial governments are responsible for the social and natural science education of their residents. This includes the general education of the public, formal education programming and encouraging interest in scientific query. Education is the key to building capacity so that northerners can function as science practitioners and advanced-level scientists.

4. *Facilitator* – Territorial governments facilitate research within their jurisdictions in a number of ways, including funding and/or managing research facilities and making datasets available for scientific use.



5. *Regulator* – Territorial governments administer legislation governing how research is conducted and communicated within their jurisdictions. Research licensing ensures that research activities are not harmful to the regions people, wildlife and lands; licensing also compels researchers who work in the North to provide information about their proposed activities and share their research findings.

6. *Partner* – Territorial governments partner in a number of regional, national and international science initiatives. As public governments, our organizations contribute considerable capacity to such projects including our scientists, data, research facilities, local expertise, and advisory services (e.g. through participation in committees that review and approve research proposals).

Role of Territorial Colleges and Research Institutes

From inspiring and training the next generation of scientists, to supporting and facilitating the work of scientists today, territorial colleges and research institutes have a unique and important role to play in the development and delivery of northern science.

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Yukon

Yukon College is the only territory-funded post-secondary institution in Yukon. Approximately three-quarters of its students attend its main Ayamdigut campus in Whitehorse. The capital is also home to a learning centre and a correctional centre campus. The rest of its students attend its 11 community campuses. Yukon College's mission is to be a leader in education, rooted in diverse cultures and northern environment where everyone is inspired to dream, learn and achieve.

Yukon College is preparing to become a university. The Yukon College board of governors and staff recently spent 18 months conducting research and meeting with leaders from more than 60 institutions and organizations around the world, and they learned a number of valuable lessons that are guiding the institution as it moves forward in planning and development. So far, Yukon College has determined the following areas of emphasis:

- *Niche programming* – The university must be unique and relevant, with a few niche programs. Instead of being all things to all people, the university will be known for a few areas of expertise. The current focus is on further developing expertise in First Nations governance, climate change research and policy, and resource development (skills and trades).
- *First Nations* – First Nations governance, programming, services and institutional life should incorporate First Nations values, knowledge and identity.
- *Career programs* – Job-ready programs, such as the trades and office administration, will continue to be an important part of the new university.
- *Community engagement* – Yukon communities are a fundamental part of the Yukon mosaic, and community campus learners must be able to access programs and engage in relevant research activities.

- *Pathways* – There will continue to be a place and pathway for every learner, creating pathways to personal success.

Yukon College is building the foundation for the university by developing its first degree – a Bachelor of Policy Studies in Indigenous Governance, as well as a graduate certificate in Climate Change Policy Studies.

The Yukon Research Centre is about solving northern problems with northern expertise. The centre answers northern research questions, supports and advances local innovation and provides research services to visiting researchers. It works in partnership with government, industry, entrepreneurs, First Nations and communities to improve the lives of northerners. The research centre's in-house experts, connections across the circumpolar North and student involvement enhance its ability to answer research questions and meet innovation needs.

Northwest Territories

Aurora College is the public college of the Northwest Territories, and the only degree-granting post-secondary institution in the NWT. It was established as a Board-governed corporation by the Aurora College Act to deliver adult and post-secondary education, including delivering university-level programs and granting the prescribed university degrees and applied bachelor degrees. Aurora College's mandate is to deliver a broad spectrum of programs to meet the needs of individuals, communities, and the labour market. With regional campus facilities in Inuvik, Yellowknife and Fort Smith, as well as community learning centers in an additional 23 communities, Aurora College is uniquely structured to serve the needs of the people of the NWT. Aurora College's mission is to focus on student success and to be committed to supporting the development of Northern society through excellence in education, training and research that is culturally sensitive and responsive to the people served.

Aurora College is in the preliminary stages of a new ten-year Strategic Planning process, which will include extensive consultations with partners, clients, shareholders, Aboriginal organizations, various levels of governments, industry and business, and the public. One of the issues that will be examined is the possibility of moving to university or university-college status. In addition, strategic partnerships with other NWT post-secondary providers are being broached. During the Strategic Planning process, the Board of Governors expects to retain the following core values:

Diverse programming suited to NWT needs – Through the Aurora College Act, the College is mandated to deliver a range of programming, from basic adult education to university level programs. Aurora College will continue to deliver programs that align with labour market needs of the Northwest Territories, the requests of communities, and the interests of students.

Northern-focused and culturally appropriate programming - Courses and programs will continue to be developed and delivered in a manner that is respectful and reflective of Northern peoples and cultures. Traditional knowledge, traditional languages and cultures, and the teachings of Elders will continue to be integrated into Aurora College programming and operations.

Niche programming – Specialized programs, such as Aboriginal Language and Culture Instructor, Environment and Natural Resources Technology, and Business and Office Administration courses tailored to prepare students to work in Northern and Aboriginal environments will continue to be important offerings.

Expanded adult education courses – Work will continue to develop and deliver new and expanded courses (e.g. Introduction to Office Skills, Start Your own Small Business, revised Access programs, etc.) to meet the unique needs of adult learners in NWT communities.

Aurora Research Institute (ARI) is the research division of Aurora College. ARI's mandate is to improve the quality of life for NWT residents by applying scientific, technological and indigenous knowledge to solve northern problems and advance social and economic goals. ARI provides its services through three research offices located in Fort Smith, Inuvik and Yellowknife. These services include: licensing and coordinating research; promoting communication between researchers and the people of the communities in which they work; promoting public awareness of the importance of science, technology and indigenous knowledge; fostering a scientific community within the NWT that recognizes and uses the traditional knowledge of northern Aboriginal peoples; making scientific and traditional knowledge available to people of the NWT; and supporting or conducting research which contributes to the social, cultural and economic prosperity of the people of the NWT.

Nunavut

Nunavut Arctic College has a strong commitment to provide high quality educational opportunities to all residents of Nunavut. The College has five campuses: Nunatta Campus, including Piqqusilirivvik (the cultural school) in Clyde River, the Nunavut Research Institute in Iqaluit, Kivalliq Campus and the Nunavut Trades Training Centre in Rankin Inlet and the Kitikmeot Campus, located in Cambridge Bay.

Community Learning Centres, located in all 25 communities of Nunavut, bring our programs home to people throughout the territory. These centres are a doorway to a wider world of learning opportunities. Each Community Learning Centre is staffed by an Adult Educator who can provide information and guidance to anyone seeking further education.

Adult Educators are able to conduct academic assessments and assist people in making vocational and educational choices. They can also help individuals to find information on career programs through Nunavut Arctic College or other community colleges and universities. College courses are designed to meet the ever-changing needs of the people of Nunavut.

Arctic College is a leader in Adult Basic Education. Arctic College Fine Arts programs are nationally recognized and produce skilled artisans, important to the economy of the region. Business and management courses and customized training courses are helping to train the professional workforce of Nunavut.

The **Nunavut Research Institute**, a division of the College, is mandated to identify community needs for research and technology and act as the science advisor to the Government of Nunavut.

The core objectives of the Institute are to:

- Coordinate the research licensing process under the Nunavut Scientists Act
- Support the meaningful involvement of Nunavut residents in scientific research, including advancing the incorporation of Inuit Qaujimajatuqangit in research design
- Promote the development and application of new technologies to improve the quality of life of Nunavummiut
- Help broker research projects and partnerships that meet the needs of Nunavut residents
- Provide a clearing house of information on scientific research conducted in Nunavut
- Organize, facilitate, and promote research training and outreach programs designed to enhance awareness and build local research capacity in Nunavut.

The Path Forward

Sound, reliable, evidence-based information is required to make the right decisions and:

- Scientific information helps us address major social, political and environmental changes.
- The importance of science to the ongoing operation of government programs and services must be recognized.
- The North must contribute to pan-northern and circumpolar science strategies and policy development.
- We have made commitments at the territorial, national and international levels to provide science-based information.
- Science-based information informs the design, implementation and evaluation of policy and legislation.

Northern science capacity must be developed and:

- Infrastructure and logistics constraints on science activities must be addressed.
- A systematic and long-term approach to developing science capacity within the territorial governments is required.
- We need to support the building of science capacity in the North more broadly.

Science communications and outreach must be enhanced and:

- The use of science as a tool for decision-making in the North should be promoted.
- Science practitioners and agencies supporting science must be informed about our institutional and informational needs.
- Community engagement will increase the public's trust and acceptance of science.

- Research results should be more widely accessible to northern decision-makers, especially at the community level.

- By promoting and enhancing science education in our schools, our northern students will be encouraged to pursue advanced post-secondary studies in science.

Science policies should be strong and supportive

- Governments can direct and support research by their departments, boards, agencies and outside institutions.

- Science priorities should be established and regularly reviewed.

- Science must be integrated into government strategic and business planning.

- Baseline data collection and storage, information management and data sharing should be standardized across departments.

- Appropriate research approaches and methodologies should be encouraged.

Strong and meaningful partnerships are essential

- Collaborating to meet the changing circumstances and evolving challenges of life in the North will benefit all northerners.

- Governments must continue to engage about science with each other and with their partners in Aboriginal groups, academia and other levels of government.

- We can inspire organizations and funding agencies from outside the North to consider our interests when developing their research plans and to work with us on these issues.

- We must remain committed to building, maintaining and growing these essential science partnerships.

Science funding in the territories

Science advisors to the Government of Yukon and Government of Nunavut, in a December 2013 letter to the editor of the Journal Arctic, commented on the importance of a northern voice in determining what knowledge is needed, and correspondingly, what research is funded.

"*What gets funded and who decides what research will take place strongly influences what scientific information is available. The vast majority of funding for science in northern Canada comes from agencies south of 60˚. The upside is that northerners benefit from a level of investment in acquiring knowledge that is beyond what northern agencies could afford. However, the downside is that northerners often have a limited opportunity to influence policy and investment decisions when it comes to science. Northerners need a greater opportunity to influence science-funding priorities.*"

Appendix: What is science?

The territories define science as including research, baseline studies, effects monitoring, traditional knowledge studies and community-based monitoring in a range of fields, including social sciences, physical and natural sciences, archaeology, engineering and health sciences. This broad definition incorporates many different methodologies and research approaches used to collect valuable information on the physical, biological and human environments of the North.

Science is a system

Territorial governments – alongside the federal government and agencies, Aboriginal governments and agencies, and academia – play a key role in the development and management of science. Science is a system that requires the following elements be achieved to maximize impacts and benefits of scientific endeavours to people, environments and economies of the North:

- Clear **articulation of needs and priorities** that are connected to established needs and goals so investments are made strategically
- Effective **outreach and communication** to ensure social, economic and environmental benefits of scientific activities can be maximized
- Ongoing **capacity building and training** to enhance our ability to access, apply and develop scientific knowledge
- Effective **data management** systems so scientific information can be easily retrieved transferred, shared and used.
- Necessary **research infrastructure** is in place to support scientific activities.

- Appropriate and **stable financial support** for scientific activities. The realities of resource limitations require all involved to focus on activities that are most urgently needed, and to establish meaningful partnerships that will help all involved to expand our reach.
- A policy **environment** that, among other things, ensures the protection of sensitive data, enables scientific activity, enhances scientific coordination, ensures effective oversight of scientific activity including tracking research outputs to ensure that knowledge generated by northern research is communicated to northern decision makers, and facilitates and promotes scientific excellence.

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