

InfoNorth

Native Contributions to Arctic Science at Barrow, Alaska

By Karen Brewster

INTRODUCTION

IN August 1997, the Naval Arctic Research Laboratory (NARL) in Barrow, Alaska celebrated its 50th anniversary. The Lab, originally called the Arctic Research Laboratory (ARL) but renamed in 1967, is renowned for its accomplishments and contributions to the scientific understanding of the Arctic. Amidst the glory, however, there is little mention of the Iñupiat (North Alaskan Eskimo) role in this scientific program. Local residents' knowledge of the arctic environment contributed to the success of both individual scientists and the facility overall. Without Native assistance, much of the work at NARL could not have been accomplished. These men and women deserve to be recognized.

Few people are aware of the Iñupiat who worked on scientific projects at NARL. I believe the scientific community has been negligent in not making this better known. Therefore, I will discuss in general Iñupiat assistance to arctic science from the 1940s to the present, and describe a few specific cases. More Iñupiat worked at NARL than will be mentioned here, and they deserve equal recognition. Many more scientists are also involved, some who named their Native consultants and others who did not. The term "science" refers here to the natural sciences: biology, physiology, physics, geology, atmospheric studies, and oceanography.

Native participation in science at Barrow was made possible by key events, including the United States Navy's oil exploration program, interest in scientific research, and establishment of the Arctic Research Laboratory.

NATIONAL PETROLEUM RESERVE AND OIL EXPLORATION

In 1944, the United States Navy launched a full-scale oil exploration program (PET4) in Naval Petroleum Reserve No. 4 (NPR4). The 90,000 km² reserve in northern Alaska, established in 1923, had gone relatively unnoticed since the initial exploratory and mapping work. Now, the previously remote Iñupiaq community of Barrow would become the Navy's PET4 base of operations for the next nine years. The town would be inundated with Naval personnel, barges, and heavy equipment as the Navy constructed a village of Quonset huts and laid a gravel runway 6 km north of town.



The Naval Arctic Research Laboratory, Barrow, Alaska, circa 1950s. James Ahyakak Collection, North Slope Borough, Iñupiat History, Language and Culture Commission, Barrow, Alaska.

Barrow is located at the northernmost point in Alaska along the Arctic Ocean. The Iñupiat lifestyle in the 1940s, like that of their ancestors, was dominated by whaling, hunting, fishing, and trapping. It was still a harsh life with few amenities. Wood-frame homes had replaced sod houses, but they were poorly built and drafty. Most of the homes had electricity, but not running water, gas heat, or telephones. The dog team was still the main mode of transportation. Modern goods and supplies were available at local trading posts, but in limited quantities and for high prices. Prior to the Navy's arrival, there were few jobs in Barrow. People worked at the hospital, the school, the Native store, the weather bureau, or the church, but wages were low. The higher wages of the Navy jobs attracted both Barrow residents and Iñupiat from outlying areas. Many families moved to Barrow for jobs and remained there permanently.

At first, it was not easy for the Natives to get jobs. The Navy had reservations about hiring them because of the prevalence of tuberculosis and the perception that they were undependable workers. Only after establishing a health care program, providing TB testing, and helping to improve living conditions in the village did the Navy change its mind and provide more opportunities for Native employment. Iñupiat men helped unload the supply ships. They were laborers, equipment operators, mechanics, and carpenters, as well as guides and assistants on survey, seismic, and mapping crews. Iñupiat women sewed and repaired clothing (Roberts, 1952). Native knowledge of the country and its extreme conditions

gradually came to be recognized as beneficial to the PET4 operation.

Sadie Neakok, an 80-year-old Iñupiaq woman born and raised in Barrow, was a teacher, welfare worker, and Barrow's first magistrate. This respected community leader provided a local perspective on Iñupiat employment at the Navy's base camp:

The whole thing when that base opened up was we had no trained personnel in our community. It was the outside help that came in with all the knowledge. And then, when they hired a person, I was called in to interpret to my own people that they would not be paid like their bosses, even though they did the same kind of work, because they weren't trained for the job. And if you think that was easy! ...And I had to give the reason: "you haven't had so many years of schooling or do not have the expertise, the knowledge, that this person who is making you work has. But he will explain to you what you must learn." (Neakok, 1996: Tape 2, Side A)

Thus, there was tension right from the start between the Iñupiat and the non-Native newcomers. This was exacerbated by isolation: Iñupiat went to the camp to work, but rarely socialized with the Navy people. Navy personnel were required to stay on the military base, unless granted special permission to visit the community—permission which was not easily come by. This policy slowed bringing the groups together.

In 1953, having determined that the oil exploration program was not profitable, the Navy shut down the camp at Barrow. However, interest in scientific research in the Arctic remained: the Navy wanted to know more about the environment in which they were working, where they had a strong military interest. In 1947, Moses Shelesnyak, Director of the Navy's Office of Naval Research (ONR), proposed an arctic research program with a laboratory to support it. The Navy saw an opportunity: Barrow was the obvious choice for such a lab, since the PET4 base camp and oil exploration infrastructure were already there. From this beginning, a full-scale scientific research operation developed at the Arctic Research Laboratory.

THE ARCTIC RESEARCH LABORATORY

The Lab's first researchers arrived in the summer of 1947 to Quonset hut offices, labs, and male-only, dormitory-style living quarters set aside in a corner of the Navy facility. As the Lab expanded, quarters for women and married couples were added, but spouses were admitted only if they were employed on a project or by the Lab.

In the early years, the ARL focused on biological and physiological research, which suited the Navy's agenda of acquiring baseline data about the terrestrial environment and its inhabitants. Later, ground-breaking research was also achieved in the physical, ocean, and ice sciences. Especially important were the International Geophysical Year in

1957–58 and floating ice stations in the 1960s and 1970s. With each passing year, the number of research projects supported by the ARL increased, from 6 scientists in 1947 to over 200 by 1966. This increase spawned additions to the facility: the Animal Research Facility in 1948 and a large laboratory and office complex in 1969.

Although the United States Navy funded ARL, it maintained a hands-off approach to its operation. Universities were contracted to manage the Lab, and directors in Barrow oversaw day-to-day activities. Up until 1956, when Dr. Max Brewer became the first year-round resident director, directors lasted only a year or two, and none of them made Barrow their home. The Navy's main involvement was through the ONR in Washington, D.C., which coordinated administrative matters and approved all research projects to ensure that naval research priorities were being investigated. The Arctic Institute of North America and an Arctic Research Laboratory Advisory Board assisted with proposal review and made recommendations to the ONR.

THE NATIVE ROLE

The Navy's employment of Iñupiat during the PET4 program set the precedent for ARL's Native hiring. The Iñupiat had job experience, were accustomed to working in a military setting, and knew the procedures of operating the Navy camp. It was a natural transition to shift these workers to activities that supported the Lab's scientific work. In many cases, the tasks and jobs were the same. Iñupiat worked at ARL as workmen, carpenters, machine operators, mechanics, guides, boatmen, dog drivers, trappers, housekeepers, cooks, and office support. It quickly became apparent that the Iñupiat had specialized talents and knowledge that could contribute even more to the Lab's success, so their involvement with scientific projects was increased. Approximately 300 Iñupiat worked at NARL during its 33 years of operation (M. Brewer, pers. comm. 1997).

John Schindler, NARL's Assistant Director from 1960 to 1971, summarized the Native role as follows:

Since the first summer of the Laboratory's operation, we have enjoyed a unique relationship with the natives of Barrow. For most of the lifetime of the Laboratory, about 60 percent of our employees have been hired locally. The difficulties that someone from the 'South 48' can have trying to accomplish the simplest of chores in an arctic winter can only be appreciated fully by those who have learned the hard way. The people of Barrow have brought experience and knowledge to the Laboratory, and the value of these to the research effort can never be fully measured. Many overland trips, ice projects, boat projects and ice stations owe their success to the presence and gentle suggestions of local people. (Schindler, 1972: 219)

Dr. Laurence Irving, a physiologist from Swarthmore College in Pennsylvania and the Lab's first director, was one

of the first to recognize the value of Native knowledge for scientific field work:

The sharp observation of our Eskimo assistants has been invaluable. Combined with their keen observation, their accurate memory and ability to report observations literally is making available to us gradually the careful results of their serious study of this region. The store of information which they possess, and which they can impart undistorted by fancy, will be fruitful to us during the winter. (Reed and Ronhovde, 1971:44)

This attitude guided Irving's employment practices, as his friend and colleague, lichenologist George Llano, explained: "From the beginning, Larry always involved the Eskimos in work. He taught them, by a logical technique, techniques to do things. So they weren't ditch diggers, or automobile drivers, or whatever: they were actual colleagues. And that was Larry's whole attitude" (Llano, 1991: Tape H-91-21).

Dr. Max Brewer, whose 15 years at NARL made him the longest-serving director, also recognized what Native knowledge and talent had to offer science: "It is not necessary to have formally passed through the halls of a university to become a natural scientist. The keen and patient observer of nature, who can long remember what he has seen and who can relate it to other naturally occurring processes and events, also qualifies as a natural scientist or, perhaps even better, as a naturalist" (Brewer, 1976). The Iñupiat knew their home region and how to survive in it better than anyone else, and many were expert scientific observers. Brewer, realizing how much the Lab and the scientists needed this knowledge to succeed in the Arctic, hired more Natives and expanded their job duties to include field work. This was for the safety of the scientists and the benefit of their research.

Many scientists owe their lives to their Iñupiat guides; but they also owe their successful projects and careers to the Iñupiat who shared their knowledge about the Arctic. The more than 1500 scientists and technicians who passed through NARL from 1947 to 1980 (M. Brewer, pers. comm. 1997) were not held to a standard for acknowledging local assistance. Some scientists gave thanks or credit in their final reports, although this often was a poor reflection of the amount of work and assistance the Natives had actually provided. Others made no mention of their Native assistants at all. Only a handful went as far as recognizing the knowledge and contributions of their Native collaborators and publicly praising them for their accomplishments.

DR. LAURENCE IRVING AND SIMON PANEAK

Dr. Laurence Irving first met Simon Paneak in 1947, when he went to the Brooks Range to study birds. Simon Paneak, in his fifties, still traveled around the central Brooks Range with his family as his ancestors had done. The Nunamiut, or Inland Eskimo, depended upon the caribou as a main food source, so they moved with the



Simon Paneak, circa 1950. Photographer unknown. Elijah Kakinya Collection, North Slope Borough, Iñupiat History, Language and Culture Commission, Barrow, Alaska.

animals. When the village of Anaktuvuk Pass was formalized in the late 1950s with a post office and a school, many families moved into the village permanently, but the Paneak family continued to travel until the 1960s when Simon Paneak's health began to fail. They maintained a winter home in the village, but spent the summer months camping, hunting, and traveling.

Simon Paneak was a keen observer: his survival depended on it. His father had taught him how important it was to understand the details of the natural world and how to be a successful hunter. He learned to speak and write English when he was a young man living by a coastal trading post. Laurence Irving and Simon Paneak quickly became partners and worked together for 20 years. Paneak kept a daily field notebook for Irving of bird sightings, weather conditions, and local happenings. He also collected eggs and bird specimens. Every year, Irving lived and traveled with the Paneak family for a few weeks or a few months to observe and study birds. The two men became good friends. Irving respected and admired Simon Paneak and regularly recognized his contributions:

Simon was my very good and dear friend. I owe him much for all that he told and showed me about northern life. I also think

of many happy and interesting times spent with him, your family and friends. Many people whom I see recall their pleasure and interest in his company, for he was friend, host, guide and teacher of many scientists. (Irving, 1976)

Laurence Irving's attitude was a significant factor in the development of the professional relationship between himself and Paneak. As George Llano explained: "Larry was a person who always gave credit to everyone involved and who worked with him....He was particularly interested in Eskimos. He looked upon them as companions, and in the field he considered them to be experts...to be better than he was" (Llano, 1991: Tape H-91-21). At one point, this led Irving to even try to get a better job title for Paneak.

Simon Paneak benefited from the collaboration as well. He was paid for his work during a period when there were few opportunities for wage employment at Anaktuvuk Pass. He needed money to purchase ammunition, groceries, and supplies for his family. Irving brought him to the Alaska Science conferences. Paneak even co-authored papers with Irving (e.g., Irving and Paneak, 1954), a feat ahead of its time. All this exposure brought Paneak status as an excellent naturalist.

Simon Paneak's detailed record-keeping and correspondence with Dr. Irving show that he enjoyed the work, sharing what he knew, and being able to help science. He appreciated both their friendship and their scientific collaboration. The following story, told by George Llano, demonstrates Simon Paneak's pride in working with scientists:

Simon worked with geologist Philip Smith a lot. But, there's this scientist who came to Anaktuvuk Pass and he's standing there looking across the valley. He said something to the effect, "That's Lisburne limestone across the valley there." And Simon very kindly looked at it and said, "Yes, but only so far and then you have this, and this, and this geological thing." And the fellow thought, "This guy's putting me on or something." So in order to enforce this great knowledge he took one of his reprints out of his pocket and told Simon, "Here's something I've written." And Simon thanked him very kindly and went into his tent and got one of his reprints. He thought, "share and share alike." He didn't do it deliberately. It was just natural for him. It was a courtesy. (Llano, 1991: Tape H-91-21)

Because of his relationship with Paneak, Irving became a strong advocate for Native knowledge:

The search for Eskimo information about natural history has brought scientists extremely valuable information. In addition, the discussion of their animals and country has led me to pleasant acquaintances and friendships that I deeply appreciate. It is my feeling that by methodically seeking to increase the transfer of the unique Eskimo information to our science, our culture would be enriched. It seems to me that if we study the ways by which Eskimo knowledge can be introduced to us we can find there a northern resource of information that will be of great practical and cultural value for us. (Irving, 1960:10-11)

MAX BREWER AND PETE SOVALIK, KENNETH TOOVAK, AND HARRY BROWER, SR.

As Director of NARL from 1956 to 1971, Dr. Max Brewer was noted for the opportunities he provided for Natives. Convinced that the Iñupiat were talented, skilled, and knowledgeable and had much to contribute to NARL's mission, he hired many Iñupiat as mechanics, carpenters, laborers, animal caretakers, and field assistants. He also placed many more of them in direct contact with science by always sending Iñupiat along on field research projects. Max Brewer worked with many Iñupiat during his tenure, but he has specifically noted his admiration for and friendships with three in particular: Pete Sovalik, Kenneth Toovak, Sr., and Harry Brower, Sr. (Brewer, 1976, 1996).

Pete Sovalik, whom Brewer calls "the greatest naturalist ever to be in northern Alaska" (Brewer, 1996: Tape 1, Side A), worked as the animal caretaker at the NARL's Animal Research Facility for 20 years. He obtained many animals for the facility and assisted the scientists who studied them. Despite Pete Sovalik's limited formal education, scientists came to rely on his knowledge. According to Max Brewer, "He knows the animals and their habits so well that he has captured live lynx with only a piece of fish net. On other occasions he has captured rabid foxes alive for observation, without the use of either trap or gun" (Brewer, 1976).

Pete Sovalik also benefited from this collaboration. He explained how he felt about working at NARL during an interview conducted in 1965, when he was in his sixties: "I like it. The Lab—nice people—a lot of good trips out of it. I like that: go out in the field like this now, see the country once in a while, see the different species sometimes, meet lots of good people.... I help people, I guess" (Sovalik, 1965: Tape H88-26-02).

Kenneth Toovak, Sr. worked at NARL for over twenty years. He operated heavy equipment, served as project support foreman, and assisted many research projects on the sea ice. Max Brewer said the following about Toovak's contributions to NARL projects:

Kenneth knew how to accomplish anything that had to be done. I've forgotten now whether he'd had five or seven grades of formal education. He'd never taken mechanics in college—and by that I mean applied mechanics. But whereas in college they don't teach you how to use leverage or to innovatively apply it in the field, Kenneth was and is the master in the application of mechanics. (Brewer, 1996: Tape 1, Side A)

Like Pete Sovalik, Kenneth Toovak also enjoyed working at NARL, although he was hesitant about it at first. In 1990, he shared some of his NARL experiences at the North Slope Borough Conference on Science Education:

I was scared of White people—didn't want anything to do with them—especially because there were so many of them all at once. I stayed to myself...Pretty soon, those folks



Pete Sovalik and Dr. Charlotte Holmquist at Inuvik, Northwest Territories, 1969. Photo by G.B. Shepard. Courtesy of the North Slope Borough, Iñupiat History, Language and Culture Commission, Barrow, Alaska.



Kenneth Toovak, Sr. at the 1995 Elders/Youth Conference in Barrow, Alaska. Photo by Karen Brewster. Courtesy of the North Slope Borough, Iñupiat History, Language and Culture Commission, Barrow, Alaska.

started coming around to talk to me, asking questions. I started to get to know these people I had been scared of. We started to share the different things we know. This sharing became a very important part of my life. It wasn't easy. One example was having to figure out how to cook their *tanik* [white person] breakfasts of eggs and hotcakes. But we kept on sharing knowledge....Scientists wanted my help. I don't know what they heard about me, but they told Max Brewer they felt good when I helped them on the ice. So I made myself available to them, and we went on sharing. (Toovak, 1992:19)

Kenneth Toovak is proud of his involvement with science and always speaks fondly of those years. Now in his seventies and retired, he still fields questions about sea ice and ice dynamics.

Born in Barrow in 1924, Harry Brower, Sr. was the youngest son of the famous whaler and trader Charles D. Brower, author of *Fifty Years Below Zero* (1942). Harry learned to hunt from his Iñupiat mother and uncles. Over the course of his life, he became a successful hunter, trapper, and whaling captain. He was respected and known within his own community for his generosity, his willingness to help others, his extensive knowledge of arctic animals, and his survival and traveling skills.

Max Brewer first hired Harry Brower, Sr. as a carpenter in 1957. As Brewer learned how much Harry Brower knew about arctic animals and their environment, he saw how these special talents could benefit the Lab. So Harry Brower soon found himself spending more and more time out in the field on research expeditions, instead of doing carpentry. He also did all the taxidermy for the Lab; he had learned this skill as a boy, collecting and preparing specimens for his father's contributions to museums in Washington and New York (Brewer, 1996).

Harry Brower also benefited from his 25 years of association with NARL and its scientists. It was a steady job with

reasonable income, which helped him support his large family. He got to travel all around the North Slope accompanying research projects and building field camps. He interacted with people from all over the world, and he gained status as an expert within the scientific community. Harry Brower always spoke proudly about his NARL days and was pleased with the good retirement benefits he received (Brower, 1991). John Schindler, his good friend, said: "I think Harry really liked the Lab, mainly because he got to meet so many people and to see so many different things" (Schindler, 1996: Tape 1, Side A).

DR. THOMAS ALBERT AND HARRY BROWER, SR.

Dr. Thomas Albert also collaborated with Harry Brower, Sr. and became his friend. When Albert first went to Barrow in the mid-1970s to investigate arctic marmots, Brower helped him collect marmots and keep them alive for observation. Harry Brower's outstanding ability to notice and remember the smallest details of the natural world made him not only a good hunter, but an excellent scientific collaborator. In addition, according to Albert, researchers were drawn to Harry Brower because of his talent for storytelling and sharing what he knew in an understandable way:

The way I regard Harry is essentially as a very, very smart man who is very modest also. [He] had a tremendous amount of knowledge about the animals and the environment in his area, and he was able to explain it to somebody in a very clear way. He was very patient about answering questions: he wanted you to learn, and he was always available to help. If he were in the Western society more,...he'd be a great scientist or the dean of a college of science or something like that. He's a really gifted sort of guy. I've had in my life so many teachers, but I can count the number of good teachers I've ever had on one hand. It would take many hands to count



Harry Brower, Sr. at Nalukataq in Barrow, Alaska, 1986. Photo by Trish Brower McFarlin. Courtesy of the author.

the number of less-than-good teachers. But, he's one of the best teachers that I've had. (Albert, 1995: Tape 1, Side A)

With the marmot study, Tom Albert and Harry Brower began what was to be more than 15 years of friendship and close collaboration, most notably on the biology and behavior of bowhead whales. As a successful whaling captain, Harry Brower knew a great deal about whales and whale behavior. Sharing this knowledge benefited science and also helped protect the Iñupiat right to continue their subsistence whaling when, in the late 1970s, the International Whaling Commission (IWC) threatened to stop it. The Iñupiat hired scientists to prove that there were more bowhead whales than the IWC had thought and that Iñupiat whaling was not affecting the population. Albert, one of these first bowhead scientists, explained Harry's role in the research:

When I began studying the bowhead whale in 1978, Harry "took me under his wing" and spent many hours teaching me about the bowhead whale. His observations regarding how the whales move through the ice and his patient explaining of their behavior during the spring migration off Barrow were

crucial in our censusing of the bowhead whale. Our census study design was in large part based upon information Harry gave to us. We spent years and much money confirming, in a scientific manner, his basic field observations. (Albert, 1992: 25)

Tom Albert still lives and works in Barrow, where he is Chief Scientist for the North Slope Borough Department of Wildlife Management. He always speaks highly of Harry Brower and has publicly acknowledged his contributions whenever possible, in scientific articles, in papers delivered at conferences, and at his funeral in 1992. In an interview, he said of Harry Brower:

He has done a whole lot more for the Eskimo people than most of them realize....The good quota for subsistence harvests of bowhead whales that people have nowadays is due as much to him as [to] anyone, but few people realize it....[He is] an unsung hero...in the resolving of this great controversy between the International Whaling Commission, the federal government, the Alaska Eskimo Whaling Commission, and so on....Harry's the guy who was in behind the scenes, who had the biggest impact of any single person. And in every speech that I've ever given on the subject, I give him credit. And I think it's important that people try to give him the recognition that's due. (Albert, 1995: Tape 1, Side A)

In 1988, Harry Brower and Kenneth Toovak were recognized for their contributions to Arctic science. The Sigma XI Scientific Research Society awarded each of them a certificate of recognition for nonprofessional scientists who have made significant efforts in promoting scientific research. They are the only two Iñupiat ever to receive such an award.

THE NARL LEGACY

In 1980, the Navy shut down the Naval Arctic Research Laboratory. It was too expensive to operate, and they no longer wanted to support scientific research in the Arctic. In 1984, after much deliberation and negotiation, the old NARL buildings were turned over to Barrow's village corporation, the Ukpeagvik Inupiat Corporation (UIC). Despite this change in use and ownership, Barrow residents still call the area "NARL": the acronym has outlived the institution.

Although the site is no longer primarily a research facility, science continues at "UIC-NARL." UIC encourages visiting scientists to use the facility and provides logistical support when necessary. The old NARL buildings house the Department of Wildlife Management of the North Slope Borough, the Iñupiat-controlled regional government in northern Alaska. Staff members conduct publicly mandated projects, such as the bowhead whale census, fish studies, subsistence harvest studies, and marine mammal toxicology research. College-level natural science courses offered by Iisagvik College, the North Slope's community college, are also held at UIC-NARL.

Some benefits that NARL offered the people of Barrow are obvious: NARL provided steady employment at good wages; Iñupiat employees were able to travel, meet new and interesting people, do types of work they hadn't done before, and participate actively in scientific research projects. In addition, Barrow's standard of living improved and the lives of its residents were altered forever by the influx of money, supplies, building materials, and outside goods, the air service, and the contacts with outsiders associated with the Navy and NARL.

Among the less obvious legacies of NARL are the positive relationships developed between the Iñupiat and scientists. Not only were individual lives changed by collaboration with NARL, but the Iñupiat community as a whole was influenced by what happened there. Many of the Iñupiat political leaders of today worked at NARL. The result has been an interest in and appreciation for science:

Almost without exception, this involvement with NARL and its scientists helped create a positive outlook toward research and [the] use of science in helping Native people. NARL helped establish the idea that science was 'good.' This awareness of science has also left the widespread feeling that the people themselves will benefit from research on wildlife and the environment. (Albert, 1990:348)

The North Slope Borough has become a leader in the effort to involve local people in the design and conduct of scientific studies, recognizing that this collaboration allows them to influence and learn from projects and to show that local people have meaningful knowledge to contribute (Albert, 1988).

NARL also had a special influence on scientists. They were exposed simultaneously to a new climate and a different culture, both of which required shifts in their perspectives and methods. The scientists also learned from each other: NARL was unusual because it allowed scientists from diverse disciplines to interact and exchange ideas. At their home institutions, scientists often were isolated from one another by disciplinary specialization and busy teaching schedules (Schindler, 1972). "One person stated that his time at the ARL had been his single outstanding educational experience. He valued particularly his contacts with other investigators and said he had received a dinner-table education at the ARL which could be described as a university in a Quonset hut" (Reed and Ronhovde, 1971: 651).

The employment of Iñupiat at NARL and their assistance to its scientific projects show that the idea of incorporating traditional knowledge into scientific work is not new. The collaborations illustrated above exemplify the successful joining of Native knowledge and scientific approaches in trying to understand the natural world. These relationships grew from mutual respect and made important contributions to the scientific and Iñupiat communities. They show the breadth and wisdom of Native environmental knowledge and demonstrate how essential Native involvement is to scientific inquiry.

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