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*Videoconferencing and Sustainable Development for Remote and Rural First Nations in Canada **

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Videoconferencing and Sustainable Development for Remote and Rural First Nations in Canada

Susan O'Donnell,[1] Brian Beaton[2] and Fenwick McKelvey[3]

[1] National Research Council Canada; [2] K-Net, Keewaytinook Okimakanak; [3]Ryerson University

Abstract: Videoconferencing can be used to connect remote and rural First Nation communities to work together on sustainable development priorities. This paper presents two case studies of videoconferencing events. In both cases, a real-time high-bandwidth connection provided rich visual and audio data to be exchanged among communities separated by vast distances. The host communities for these videoconference events are small First Nations with traditional lifestyles connected to the land. Despite their remoteness and traditional cultures, these communities have the capacity to use advanced high-bandwidth technologies in innovative ways to contribute to sustainable development of their communities.

Keywords: Broadband, video, indigenous, communities, rural

Introduction

More than 600 First Nation (Indigenous) communities are located across Canada's vast land mass. Many are in rural areas far from urban centres and remote places accessible only by air. The Canadian Constitution recognizes First Nations peoples as one of the founding nations of Canada. The Constitution also recognizes the First Nations' right to self-determination, to negotiate the terms of their relationships with Canada, to establish the governance structures they consider appropriate for their needs, and to determine how they wish to develop their communities.

Sustainable development is a concern and goal for all rural and remote communities in Canada. Although consensus exists for the need for sustainable development, its definition varies. At the federal policy level, sustainable development for First Nations encompasses social and community concerns *as much as* economic and environmental concerns. The broad concerns captured in the term only come into focus within the context of a particular band or region. In short, sustainable development – its meaning and implications – depends on First Nations own self-determination to decide on what concerns matter to them.

Many researchers, policy makers and community leaders have argued that information and communication technologies and broadband networks assist remote and rural communities in determining and implementing sustainable goals. First Nations in Canada have been developing, connecting into and using broadband networks to support their self-determination and sustainable development activities.

In our earlier work (O'Donnell et al., 2007) we discussed how two First Nations organizations - K-Net and Atlantic Canada's First Nation Help Desk - are supporting the use of videoconferencing by the remote and rural First Nations on their networks. Videoconferencing is a powerful information and communication technology that requires high bandwidth networks for simultaneous exchange of audio-visual information between two distant locations or among many distant sites. We have argued that videoconferencing is vital to remote and rural First Nations (O'Donnell et al., 2007, O'Donnell, Perley & Simms, 2008). In these communities, videoconferencing is deployed primarily within institutional contexts and for essential services such as health care and education.

In this paper we sketch a picture of how videoconferencing can contribute to sustainable development activities in First Nations if they have the opportunity to use the technology

outside of institutional settings in creative ways and to meet a wider range of community needs. We present two case studies of community-based videoconferencing in remote First Nations in Northern Ontario.

Sustainable development and videoconferencing in First Nations

Sustainable Development and First Nations

At the level of the United Nations, the principles of sustainable development were outlined more than 35 years ago at the UN's Stockholm conference in 1972. The themes of that conference were the interdependence of human beings and the natural environment, and the links between economic and social development and environmental protection. Fifteen years later, the Brundtland Commission (1987) defined sustainable development as: *"development that meets the needs of the present without compromising the ability of future generations to meet their own need."*

The interdependence of the social, economic and environmental aspects of sustainable development were recognized by the World Bank in 1992, when Michael Cernea argued that sustainable development must be socially constructed – social arrangements must be made purposefully for sustainable development to occur. Cernea also argued that technology "*cannot realize its full development potential unless it is embedded within adequate patterns of social organization – the social capital that sustains, uses and maintains the technology… creating and strengthening adequate organizational structures, and involving the users of the technology, is no less important than the technology itself*" (Cernea, 1992).

First Nations in Canada have recognized the interdependence of social and environmental factors in sustainable development. The Council of Yukon First Nations has defined sustainable development as*: "beneficial socio-economic change that does not undermine the ecological and social systems upon which communities and societies are dependent."* For the Gitxsan Wet'suwet'en: *"Sustainable development recognizes that development is essential to satisfy human needs and improve the quality of human life. It is based on the efficient and environmentally responsible use of all society's scarce resources - our natural, human and economic resources. Activities must be considered in light of their impacts on the "seven generations" to come."* (INAC, 2007)

Although each of the more than 600 First Nations in Canada is unique, there are common sustainable development priorities for all. The Assembly of First Nations (AFN), the main political organization representing First Nations in Canada, supports a number of activity areas which are central to the sustainable development of First Nations. These include: securing lands and resources; building capacity for governance; addressing the legacy of the residential schools; alleviating poverty; increasing health and wellness; providing education and training; ensuring adequate housing and water supply; maintaining culture and languages; and building relationships with partners who can work with First Nations to reach their goals.

Rural and remote First Nations have significant potential for sustainable development. There are two primary reasons for this (AFN, 2006). One is the rapid population growth in First Nation communities. The First Nations population is growing at a rate three times faster than the Canadian rate (StatsCan, 2007). Similar to many other developed countries, Canada's dependency rate is increasing; the population is aging and in the future more citizens will be dependent on rather than contributing to the tax base. In contrast, across the First Nations, more than 50% of the population is under 23 years of age. These young people will contribute to the ranks of the working population now and in the future.

The second major reason for the significant potential for sustainable development in First Nations is more economic stability and new fiscal arrangements. According to the AFN (2006), the resolution of long-standing land claims, new fiscal arrangements encompassing

resource revenue sharing agreements, and improved impact benefit agreements will provide a climate for long term investment and a sustainable base for First Nations economies. First Nations are realizing the opportunities for economically successful private partnerships. All these opportunities to build the economies of First Nations will increase the capacity for regional and national economic growth and employment (AFN, 2006).

Building Sustainable Broadband Infrastructure by and for Rural and Remote First Nations

O'Donnell and Delgado (1995) described how the Indigenous nations of the Americas have a strong tradition of building communication and media networks to support their self-determination goals. In the 1990s, this communications strategy expanded to the Internet. Ramirez (2001, 2007) has highlighted the importance of community ownership and building partnerships to develop broadband connectivity in remote and rural communities, in particular First Nations rural and remote communities.

Fiser (2004) has traced the history of broadband connectivity to remote and rural First Nations in Canada. In the 1990s most of these communities had inadequate broadband infrastructure. There was significant disparity among the communities, with some having adequate broadband and others having no broadband. By 1996, an alliance of the major telecommunications companies had entered into a $16M partnership with the federal government's SchoolNet program to build a network of satellite connectivity to many remote First Nations schools using the DirectPC solution. This initiative ensured that a broadband connection would be made to almost all the rural and remote First Nations communities in Canada.

SchoolNet contracted both local entrepreneurs and community-based First Nations organizations to provide telephone and in-person support to First Nations communities connecting by satellite. Two First Nations organizations that were engaged in this work starting in the mid-90s to serve the remote and rural communities in their region were Keewaytinook Okimakanak and the Atlantic First Nations Congress and their regional IT Helpdesk. By 2002, this arrangement had evolved into contracts with six non-profit Regional Management Organizations (RMOs) to account and provide support for First Nations school connectivity in their respective regions, using not only satellite but also a variety of landline connections. The six RMOs are: Atlantic Canada's First Nations Help Desk, providing services in Atlantic Canada; the First Nations Education Council (CEPN-FNEC) in Quebec; Keewaytinook Okimakanak (K-Net) in Ontario; Keewatin Tribal Council (KTC in Manitoba; Keewatin Career Development Corporation (KCDC) in Saskatchewan and Alberta; and the First Nations Education Steering Committee (FNESC) in British Columbia.

According to Fiser (2004), the RMOs: "have learned that connectivity cannot be a goal in itself. It has to be achieved in concert with more basic socio-economic strategies (health, education, justice, and so forth). The six FNS Regional Management Organizations came to the SchoolNet family knowing all too well about the socio-economic struggles remote and rural First Nations communities face."

Today, the work of the six RMOs has expanded beyond supporting schools; they are working with the communities in their regions to develop partnerships and connectivity solutions with a range of players from large telecommunications companies to local connectivity solution providers. The RMOs have developed models for community-based connectivity that maximize the benefits of broadband connectivity for First Nations communities and support community development activities.

In their recent proposal for a sustainable First Nations national broadband network, the RMOs 2008) identified the following priorities: support the RMOs individually and collectively to develop and deliver broadband connections, ICT and appropriate First Nation applications in partnership with First Nations, their schools, their health centres and other

First Nation organizations; support research in innovative strategies on ICT and connectivity in First Nations and other Aboriginal communities; and stimulate the emergence of partnerships between First Nations and other Aboriginals, governments, and the private sector to research and to support projects that focus on expanding and strengthening ICT capacity in First Nations and other Aboriginal communities.

Supporting the RMOs and their work to ensure broadband connectivity in First Nations is an ongoing struggle. The main program that funds them is not on a sustainable footing. For the past two years the federal funding to RMOs through the First Nations SchoolNet program has decreased significantly and there are no guarantees that the SchoolNet program will continue to be funded after 2009.

Videoconferencing in Remote and Rural First Nation Communities

To date, many of the policy and program initiatives to develop broadband infrastructure and capacity in First Nations have not made the distinction between "high speed Internet" and broadband capable of sustaining real-time audio and video communication. Although high speed Internet allows faster email or Web browsing capabilities, it does not guarantee the capacity required for reliable broadband videoconferencing (Perley and O'Donnell, 2006).

Videoconferencing is recognized as necessary to provide essential services and communications in remote and rural First Nations communities. The RMOs in the Atlantic, Quebec and Saskatchewan and Alberta regions have expanded their services to include their own videoconferencing bridging hardware and support. In 2005, the Assembly of First Nations leadership promised to seek the resources required for all First Nations to develop the broadband infrastructure necessary for videoconferencing.

Videoconferencing is used for distance learning, telehealth, and many other activities. Our earlier study of K-Net and the Atlantic Help Desk (authors, 2007) found that K-Net supports about 1,000 videoconferences a year in addition to telehealth sessions (in total more than 2,000 sessions in the 2007-2008 fiscal year), and the Atlantic Help Desk supports about 150 videoconferences a year. The communities are using videoconferencing to conserve financial and human resources and allow participation in events that may not otherwise be possible due to time and travel constraints. Videoconferencing provides more access to region-wide activities, and it promotes interaction between sites and groups that may not have connected previously.

Videoconferencing fosters many community development initiatives. Videoconferences are used primarily for interactive learning related to personal, professional or community development, for meetings and for community get-togethers. The main topics of the videoconferences are health and wellness, education and learning, culture and language, information and communication technology, and economic and community development. Most of the videoconferences are in the same province but many are connecting sites in two or more provinces, or even internationally. Most of the videoconferences connect more than 10 participants, and women are actively using videoconferencing.

Our previous research on the VideoCom project identified numerous technical, social and organizational challenges for videoconferencing in rural and remote First Nations (O'Donnell, Perley and Simms, 2008). The findings highlighted two common themes. First, the need for capacity building in the communities to use videoconferencing effectively to meet community needs. This includes building community awareness, community skills training, and community-based technology support. The second theme is the need for urban organizations and institutions, and especially funding organizations, to understand and validate the need for videoconferencing in these communities. Policies and funding programs are required to support the more widespread diffusion of broadband networks capable of supporting videoconferencing, and to support funding resources for community capacity building to use this technology effectively.

Methodology

Since 2006, the VideoCom research project has been exploring the use of videoconferencing and online video in the First Nation communities supported by its partners K-Net (www.knet.ca) and Atlantic Canada's First Nation Help Desk (www.firstnationhelp.com). As described in our earlier work (O'Donnell et al. 2007), the project uses a participatory research approach (Argyris, Putnam, & Smith, 1985; Chrishol & Elden, 1993; Schuler & Namioka, 1993) in which the project partners collectively decide the goals and direction of the research. In late 2007, the partners decided that VideoCom should support the development of two community-based videoconference events in northwestern Ontario. The events were conceived as a way for the communities to use the videoconferencing technology for a purpose they had chosen, and to showcase the use of the technology to meet community needs. Keeping with an understanding that the particularities of sustainable development vary, the community selected the topic of the event, its participants, its discussion, and its outcomes.

The first community to host one of these videoconferences was Keewaywin First Nation. Keewaywin was selected after a discussion among the project team and staff members of K-Net about the possibility of hosting an event celebrating women leaders in communities. That discussion was prompted after a commercial "Women in Leadership" event was held in northwestern Ontario in 2007. This earlier event could have used videoconferencing, but did not, to allow women in First Nation communities to participate. Several staff members at K-Net believed that First Nations women should also have the opportunity to celebrate women leaders in their communities, and they offered to organize the event. Tina Kakepetum-Schultz, a staff member of KO Telemedicine, offered to chair the videoconference which was held in her own community, Keewaywin, in January 2008.

The second community selected was Muskrat Dam First Nation. Muskrat Dam was chosen for several reasons, a primary one being that Angie Fiddler, an experienced community organizer who was also familiar with videoconferencing, lived in the community. Angie was hired by VideoCom to organize a community-based videoconference on a topic that would be of interest to her community. The use and preservation of Native language – Oji Cree – is a core concern to many Muskrat Dam community residents. The new community school has an Oji Cree immersion program and the language is also taught to the other students at all grade levels. After discussion with several community residents, Angie decided that the community videoconference event should focus on the use and preservation of Native language and showcase the work of the Kwayaciiwin Education Resource Centre. Angie's father Ray Morris works with Kwayaciiwin in Sioux Lookout. The videoconference event was held in Muskrat Dam in January 2008.

Two researchers from VideoCom visited each community in January 2008 to participate in the videoconference events. They included the lead researcher from the project and two graduate students, one of whom travelled to Keewaywin and the other to Muskrat Dam. For the researchers, the community visits involved travelling to Sioux Lookout, Ontario from their home bases in Fredericton, New Brunswick and Toronto, Ontario, and then travelling on by small plane to the communities. The third member of the team travelling to the communities was Cal Kenny, a multimedia artist and video maker on the K-Net staff in Sioux Lookout. Cal travelled with the researchers, shot video footage in the communities, and produced short videos afterwards that are available on the VideoCom site and linked in this paper.

The research visits followed the guidelines developed by KORI (2006) for doing community-based research. Each videoconference event included a focus group with participants that lasted about 30 minutes, during which they were invited to contribute their thoughts and ideas about videoconferencing for community events. The focus group transcripts were analyzed along with the archived videoconference events and the short videos. Background data about the two communities available from Statistics Canada and published works was reviewed. The result is the two case studies in this paper about

community-based videoconferencing. Any observations come directly from the researchers' first-hand experiences, interviews, or focus groups.

Case study 1: Keewaywin First Nation and the Women in Leadership Forum

Keewaywin First Nation Profile

http://www.keewaywin.firstnation.ca/

Photo: Cal Kenny, 2008

Keewaywin ("going home" in Oji-Cree) is a remote community located in northwestern Ontario. Keewaywin First Nation is a member of the Keewaytinook Okimakanak Tribal Council as well as the Nishnawbe-Aski Nation and is part of Treaty #5. The community was established in the 1980s in the traditional territories of former residents of the nearby Sandy Lake First Nation. Keewaywin is on the shore of Sandy Lake, a major lake in Little North wilderness region between Hudson Bay and Lake Superior. According to Berger and Terry (2006) Sandy Lake has wide open waters that are brown due to the clay of its watershed and the surrounding hills. Keewaywin and the two other First Nation communities on Sandy Lake rely on the lake and surrounding territory for transportation, fishing, hunting and trapping.

Residents of Keewaywin intending to travel to Sioux Lookout, the largest town in the region, have two options. Year round, they can take one of two scheduled flights daily on the regional airline, six days a week, or arrange a costly charter. From about January to March, they can also drive on winter roads to Sioux Lookout or to neighbouring First Nation communities. The cost of the air ticket one-way from Keewaywin to Sioux Lookout is about $300; alternatively, the drive on winter roads takes about 11 hours, often in hazardous conditions.

According to the 2006 Canadian census, Keewaywin has a population of 320, a 20% increase since the 2001 census. Everyone living permanently in the community has registered Indian status. The Band has 672 registered members with 350 people either living in a different First Nation or living off-reserve. The language and culture in the community is Oji-Cree. Just over half the population speaks a Native language as a mother tongue but only 15% speak it regularly at home. English is the dominant language in the community. The median age of the Keewaywin residents is 19 years old, compared to 30 years old for the province of Ontario as a whole. There are 125 children under 15 years old living in the community.

A modern school is a prominent feature in the community, with an adjacent ice hockey rink that is busy all winter. Aside from the airport buildings, the community also has a band office, a nursing station, a building that houses both the Internet high school and the e-Centre, a Northern Store, a police station, a church and a community centre.

At the time of the 2006 census, there were 75 residential dwellings in Keewaywin, mostly single detached houses. All the houses were built after 1986; by 2006, 65% of the houses required major repairs and 10% required minor repairs. The water running to homes in Keewaywin is not safe to drink. A new water treatment plant was in the final stages of

construction in early 2008. Until it becomes operational, water is available at several points in the community, including an open tap protruding from a wall inside the community centre.

Telecommunications in Keewaywin and the Women and Leadership Forum

Prior to December 2000, telephone service in Keewaywin consisted of a single public radio phone located at the Band office with a Sandy Lake extension. The school and the local clinic eventually installed their own radio phones as well. After fundraising more than $1.5 million in 1999 to pay 100% of the Bell Canada infrastructure costs, Keewaywin received community-wide telephone service.

Community members tell the story of having the internet before they had telephones. In 1997, Industry Canada's First Nations SchoolNet program installed a satellite internet connection (DirectPC) at the school to receive the information from the internet along with a MSAT unit to transmit the community's data. In 1998, Industry Canada's FedNor supported the Kuhkenah Network (K-Net) to double the community's outbound capacity by adding a second MSAT unit thus increasing their transmit speed from 4.8K to 9.6K. At the same time, wireless connections were established to the Band office and the Health Centre. Soon, cat5 cable was being run through the bush from each of these three hubs to the houses throughout the community.

Keewaywin was connected to broadband in December 2000 as part of Keewaytinook Okimakanak's (K-Net) efforts to raise the necessary funding to pay Bell Canada to upgrade their microwave network north of Red Lake. This work enabled Keewaywin to be part of K-Net's Smart Communities program that started in April 2001. K-Net installed the first videoconference unit in the Keewaywin school library in January 2001. By 2002, Keewaywin had videoconference units in the school, the health centre and the new community e-Centre. The community health centre also has a telemedicine suite.

Videoconferencing in Keewaywin is used for telehealth, distance education, meetings related to governance and service delivery, and various other purposes to benefit the community. Keewaywin was a pilot community for research into videoconferencing for speech and hearing assessments of children in remote communities. In 2007, women from Keewaywin and other remote communities achieved their Personal Support Worker certification after completing a four-year provincially-certified training program delivered partly by videoconference.

The videoconference unit in the community e-Centre can be booked by anyone in the community. All videoconferences in Keewaywin and other remote First Nations must be scheduled in advance with K-Net, which provides the videoconference bridge and manages the bandwidth to ensure quality of service (adequate video and audio connection) during the event.

As discussed earlier, the idea for the Women in Leadership Forum and for Keewaywin to host the event was developed through discussions between the VideoCom project researchers in Fredericton and staff at K-Net in Sioux Lookout. Several of the K-Net staff members were keen to have an event for women leaders in the remote communities and offered to organize the event. Tina Kakepetum-Schultz, a community engagement coordinator at KO Telehealth, agreed to chair the event. Tina is from Keewaywin First Nation. Keewaywin has good capacity to host videoconference events, and so the community was chosen to host the Forum.

The Women in Leadership Forum was held on January 28, 2008. Hosted in Keewaywin First Nation, it used multi-site videoconferencing to bring together 25 women in six communities to share stories and ideas about developing women leaders. K-Net provided the videoconference bridge – the technology needed to link the six participating sites – and the staff resources to coordinate the technical aspects of the event. The entire gathering was webcast and archived and is available for viewing online.

The Forum, which lasted one full day, had five featured speakers, all First Nation women leaders. Keynote speaker RoseAnne Archibald, deputy grand chief for Nishnawbe Aski Nation (NAN), participated from Timmins. She suggested NAN could use videoconferencing for its women's events to include more women from remote communities in discussions and activities. Other speakers were Kimberley Mason, Keewaywin First Nation Youth Leadership; Helen Cromarty, Special Advisor for First Nation Health Care; Rosie Mosquito, Executive Director of Oshki-Pimache-O-Win Education, Thunder Bay; and Elder Pastor Rhoda Beardy from Balmertown. Jocelynn Petawanick, a violinist from Pelican Falls First Nations High School participated from the meeting site in Sioux Lookout. After each speaker, all the participants in the event had the opportunity to ask questions and discuss issues raised in each presentation.

During the focus group at the end of the videoconference, many of the participants contributed their ideas for how videoconferencing could continue to support the development of women leaders in the communities. One idea put forward is to have more informal events for women to get together. As one of the participants said:

> *"Something that all women like to do is just have a round table discussion where we just talk about whatever we want to talk about, whatever comes up, you know, jokes or stories, like a visit with a whole bunch of other sites. I think it would be interesting to see how we all think alike (laughter) in terms of issues that we're facing in our everyday challenges. I've never really had a chance to be in that kind of forum, where everyone is just visiting and to me, using a videoconference always has to do with work or concentrating on getting things done, that sort of thing, but just to have a time where women can visit each other, I think would be nice."*

After the videoconference, several of the women in Keewaywin and Sioux Lookout contributed their thoughts to a short video about the event. The video, *Women in Leadership: Videoconferencing for Community Development*, can be viewed on the web at the following URL: http://meeting.knet.ca/moodle/mod/resource/view.php?id=3467.

Participating, contributing and learning from each other during this one day workshop provided all the participants with a better understanding of their capacity to continue building and supporting their communities, their families and each other. The workshop participants appreciated the opportunity to share their stories with each other and being able to take the lessons learned back into their homes and communities.

Case study 2: Muskrat Dam First Nation and the Native Language Resources Videoconference

Muskrat Dam First Nation Profile

http://www.muskratdam.ca/

Photo: Cal Kenny, 2008

Muskrat Dam First Nation is another remote community in northwestern Ontario south of Hudson Bay. The Muskrat Dam First Nation is a member of the Independent First Nations Alliance as well as Nishnawbe-Aski Nation and is part of Treaty #9. The community is

located on the shore of Muskrat Dam Lake, on the vast Severn River system. Muskrat Dam is connected by water routes and a winter road to neighbouring First Nation communities. There are daily flights to Sioux Lookout.

Muskrat Dam has grown rapidly since 2001. The community recorded a population of 252 in the 2006 census, a 300% increase on the population of 61 in 2001 (when few First Nations participated in the census). Most of those moving into the community since 2001 came from neighbouring First Nation communities. Everyone living permanently in the community has registered Indian status. The median age of the Muskrat Dam residents is 24 years old, compared to 30 years old for the province of Ontario as a whole. Thirty-six percent of Muskrat Dam residents living in the community are under 15 years old. They are 385 registered Muskrat Dam band members on the community's band list with 175 members living off-reserve.

Like Keewaywin, the language and culture in Muskrat Dam is Oji-Cree. According to the census, more than half the community members have a native language mother tongue and continue to speak the language. About 20% of community residents speak the native language most often at home. English is the dominant language in the community. Oji-Cree educational instruction is a priority in the community; there is an Oji-Cree immersion program in the community school. The beautiful new school building has a gymnasium that also serves as a community centre.

In addition to the regular buildings and community services found in all remote First Nations in the region, Muskrat Dam also has a Wahsa distance education centre, a busy community radio station that broadcasts primarily in Oji-Cree, a large community-run store, and a small snack shop - Louie Store - open in the evenings. The door to the radio station is not locked and can be accessed by anyone in the community who has information to share.

One of the striking aspects of Muskrat Dam First Nation is the physical beauty of the community. It is surrounded by water. All the community buildings and homes are separated by tall birch trees, and the entire community is ringed by a dense green forest. Keeping the green treed spaces is a community priority; there is a community by-law encouraging residents not to cut down trees in the residential areas. All the homes are within sight of, or a short distance from, the lake.

At the time of the 2006 census, there were 105 residential dwellings in Muskrat Dam, all of which are single detached houses. Most of the houses were built after 1986; by 2006, 40% of the houses required major repairs and 20% required minor repairs.

Videoconferencing in Muskrat Dam and the Native Language Resources Videoconference

Satellite telecommunications reached Muskrat Dam in 2005. The infrastructure development project led by Windigo Tribal Council was funded by Canada's BRAND program. As part of the same project, the local cable system was installed in the community. Under this project, videoconferencing units were purchased for the school, Wahsa, the band office and the health centre. The community health centre also has a telemedicine suite.

Muskrat Dam's Wahsa Distance Education centre is located in a beautiful log building near the main road and satellite dish. Wahsa provides distance education at secondary school level for students in remote communities. Post-secondary students can also access distance education by videoconference for a variety of professional qualifications.

Muskrat Dam is one of 46 remote Aboriginal communities in northern Ontario, northern Quebec and northern Manitoba that are part of the Northern Indigenous Community Satellite Network (NICSN). NICSN is led by a consortium of three Aboriginal organizations that deliver broadband services to large northern areas in these three provinces. In 2007, NICSN was awarded $27.5 million, primarily by the federal government, for a major expansion and

upgrade. NICSN will use the funds to purchase new satellite transponders and the required earth station to deliver enhanced broadband services to these 46 communities.

In Muskrat Dam, the community's satellite dish is a visible presence. Located by the main road near the community general store, the brilliant white large circular dish is passed daily by community residents. Next to the satellite dish is the community radio station with volunteer broadcasters speaking primarily Oji-Cree. Next to the radio broadcast studio is a small room housing the ancillary equipment for the satellite.

The satellite connection was used to host the Native languages resources videoconference event was held on January 31, 2008. As mentioned earlier, the event, organized and chaired by Angie Morris in Muskrat Dam, focused on the use and preservation of the Native Oji Cree language and the resources available by the Kwayaciiwin Education Resource Centre in Sioux Lookout. The title of the session was: *Anihshininiimowin: Our Language Of The Past, Now And Tomorrow*. K-Net provided the videoconference bridge and the staff resources to coordinate the technical aspects of the event.

The event used multi-site videoconferencing to bring together about 20 participants in Muskrat Dam, including a dozen children, and 15 participants in eight other communities in the region. The main focus of the event was showcasing the Oji-Cree educational resources available through the Kwayaciiwin Centre. The entire event was webcast and archived and is available for viewing online.

The event lasted most of an afternoon. Speakers from Kwayaciiwin used the visual aspects of the videoconference to good potential, demonstrating how different lessons using the materials can be given in classrooms. Afterwards, all the participants in the event had the opportunity to ask questions and discuss issues raised.

At the focus group at the end of the videoconference, there were ideas discussed about how videoconferencing could contribute to supporting the teaching and retention of Oji-Cree in the region. One of the participants described the benefits of videoconferencing:

> *"One of the major advantages I do see in using videoconferencing to share information is it saves a lot on money, travel costs. A return flight from here to Sioux Lookout to attend a meeting is about $500, and then on top of that, you have to consider meals and everything. Today, had we flown out all the participants here today, to fly to Sioux to attend a meeting, that would have been up to about $5,000, I would think. Whereas sharing through videoconferencing ― We're still at home, we can still do our daily thing, run home, go back to our kids. We don't have to leave our kids behind, and our families are still intact."*

After the videoconference, one of the participants in Muskrat Dam and several of the women in Keewaywin and Sioux Lookout contributed their thoughts to a short video about the event. The video, *Sharing Native Language Resources by Videoconferencing in Remote Communities*, can be viewed on the web at the following URL: http://meeting.knet.ca/moodle/mod/resource/view.php?id=3467

Conclusions: Videoconferencing and sustainable development in remote and rural First Nations

Many challenges face remote and rural First Nations. These challenges are well-known by the Canadian public who consume the ongoing stories in the mainstream media about the poverty, drug addiction, abuse and despair in many of the communities. These concerns are social, economic, and environmental. At the same time, there is little understanding of the significant information and communication technology capacity in remote and rural First Nations and the potential of this technology to contribute to the many ongoing community efforts toward positive and sustainable development. ICT provide a means for communities to

reach and enact collective goals. Given that sustainable development depends on self-determination, then ICT play a vital role in First Nations' sustainable development.

The two case studies in this paper describe how videoconferencing was used to connect remote First Nation communities to work together on self-determined sustainable development priorities. In both cases, a real-time high-bandwidth connection allowed rich visual and audio data to be exchanged among communities separated by vast distances. The host communities for these videoconference events were small First Nations with traditional lifestyles connected to the land. Despite their remoteness and traditional cultures, these communities have the capacity to use advanced high-bandwidth technologies in innovative ways for the benefit of their communities.

In the first case, the communities used videoconferencing to connect women in communities separated by vast distances to discuss ways to strengthen women as leaders. During the event, the participants spoke of the importance of developing women leaders who take on so many of the tasks necessary for sustainable community development at the community level. During the focus group and in the video made of the event, participants spoke of their belief that videoconferencing can be used to bring women from different communities together to share stories and build their leadership strengths.

In the second case, the communities used videoconferencing to showcase educational resources and tools used to develop Oji-Cree language skills in children, and to discuss as a group how the networks can continue to strengthen development of Native language in remote First Nation communities. During the focus group and the in the video, participants shared their specific ideas for ways to do this.

For the past decade, First Nations, governments, non-government organizations, private sector organizations and committed individuals have been working together to build advanced broadband infrastructure and applications for powerful communication tools in remote First Nations. At the same time, the growing population and increasing financial capacity of these communities create real potential for sustainable development.

Our two case studies illustrate that videoconferencing is a powerful means of communication that can contribute to different aspects of sustainable development, alongside its ongoing uses for telehealth and distance education. The technology enabled community leaders in remote and rural communities to come together over matters of common concern. In the window of study, the two communities decided upon topics that mattered to them and organized a meeting to begin to address their concerns. Videoconferencing and broadband technologies played an important role in actualising community goals and, by supporting self-determination, contributing to a First Nation's particular sense of sustainability.

Gatherings that connect First Nations communities by multi-site videoconferencing have the flexibility of being short, one-time events, as demonstrated in the half-day Muskrat Dam event, or longer full day events as in the case of Keewaywin conference. Appropriate resource people and host sites can be supported in any partner community wishing to join in the session. Individuals are able to watch the webcast sessions online and share their stories through the moderated online chat or e-mail tools available. Sessions are able to be supported and promoted online before the actual event and after the event so the discussions and sharing can continue to provide a rich learning environment for both participants and others wishing to access the archived information at a later date.

These case studies suggest that the struggle for building and maintaining sustainable local and regional networks and their support systems has broadened and taken on a new meaning. The "silo approach" to delivering a connection to one location in a community is no longer adequate. To sustain their networks, First Nations must take ownership of the infrastructure where required and network management tools by building creative partnerships with both the public and private sectors so their network connections are able to horizontally dissect all sectors at the local and regional levels. This way everybody is able to access and utilize the

communication tools they require to support their local operations, programs, services as well as home use.

Demonstrating and supporting appropriate and effective local applications of these broadband connections becomes an essential component of the work of the RMOs. As First Nations experience and utilize the potential of these communication tools, the demand for their use and the quality of the online sessions will evolve to become as valuable experience as the traditional in-person gathering. Being in a position to host innovative online gatherings provides these small remote communities with the resources required to share their experiences and stories around the world.

Effective participation in videoconferencing sessions requires a new set of communication tools that must be developed to support useful and positive experiences for all the participants. Videoconferencing skills involve many of the same techniques involved in any public speaking environment but they also demand a great deal of experience and planning to be able to engage all the participants in the event. All the participants are also challenged to be engaged throughout the session and become responsible active within the online environment. Bridging capabilities and strategies add another dimension to the experience. Local videoconferencing host sites and their roles add an important dimension to the planning and facilitation for all online sessions.

As discussed in our previous research into barriers for video communications (O'Donnell, Perley and Simms, 2008) often the attitude of superiority taken by urban-based corporate and government institutions demands that people come to them for their knowledge and resources. The evolution (or maybe it is a revolution) to a more sustainable and environmentally-friendly existence demands a more cooperative and respectful relationship between urban, remote and rural communities. Further, the changing realities created by high transportation costs, environmental pollution created within urban environments, and limited natural resources to support the demand for urban sprawl are all factors contributing to the demand to find alternative communication strategies for sharing and presenting information with people from anywhere and everywhere.

Remote and rural communities are always forced to work with limited resources. This situation is to some extent related to the lack of respect and understanding that many urban institutions, corporations and governments have for these foreign environments. Videoconferencing and the supporting broadband infrastructure can provide a bridge to creating meaningful policies, programs and services that will sustain all people and communities, no matter where they are located.

References

AFN. (2006). Royal Commission on Aboriginal People at 10 Years: A Report Card. Ottawa: Assembly of First Nations.

AFN. (2007). First Nations Role in Canada's Economy: A Discussion Paper for the Council of the Federation. Ottawa: Assembly of First Nations.

Argyris, C., Putnam, R., & Smith, D. M. (1985). *Action Science*. San Francisco: Jossey-Bass.

Berger, J., & Terry, T. (2007). Canoe Atlas of the Little North. Boston: Boston Mills / Firefly.

Brundtland Commission. (1987). Our Common Future: Report of the Brundtland Commission. Oxford: Oxford University Press.

Cernea, M. (1993). The Sociologist's Approach to Sustainable Development. Finance and Development(December), 11-13.

Chisholm, R., & Elden, M. (1993). Features of Emerging Action Research. Human Relations, 46(2), 275-299.

Fiser, A. (2004). A History of Policy Change - Backgrounder on the First Nations SchoolNet RMO Transition. Working Paper Draft 2.0 for Keewaytinook Okimakanak Research Institute. Toronto: University of Toronto, Faculty of Information Studies.

INAC. (2007). Sustainable Development Strategy for 2007-2010. Ottawa: Indian and Northenr Affairs Canada.

Keewaytinook Okimakanak. (2006). Community Consultation Guidelines. Thunder Bay: Keewaytinook Okimakanak Research Institute.

O'Donnell, S., & Delgado, G. (1995). Using the Internet to Strengthen the Indigenous Nations of the Americas. Media Development, 3, 36-38.

O'Donnell, S., Perley, S., & Simms, D. (2008, June 26-28, 2008). Challenges for Video Communications in Remote and Rural Communities. Proceedings of the IEEE International Symposium on Technology and Society (ISTAS 08), Fredericton, Canada.

O'Donnell, S., Perley, S., Walmark, B., Burton, K., Beaton, B., & Sark, A. (2007). Community-based broadband organizations and video communications for remote and rural First Nations in Canada. Proceedings of the Community Informatics Research Network (CIRN) 2007, Prato, Italy.

Patinaude, J. (2007, December 5). Ten First Nation Women Graduate PSW Program. Northern Sun News.

Perley, S., & O'Donnell, S. (2006). Broadband Video Communication Research in First Nation Communities. Paper presented at the Canadian Communication Association Annual Conference.

Ramirez, R. (2001). A model for rural and remote information and communication technologies. Telecommunications Policy, 25(5), 315-330.

Ramirez, R. (2007). Appreciating the Contribution of Broadband ICT With Rural and Remote Communities: Stepping Stones Toward an Alternative Paradigm. The Information Society, 23(2), 85-94.

RMOs. (2008). A New First Nations ICT Federal Policy and A First Nations National Broadband Network. Part One and Two. Presented by the Regional Management Organizations, FNS SchoolNet. March 2008. Ottawa: Regional Management Organizations, First Nation SchoolNet.

Schuler, D., & Namioka, A. (1993). Participatory Design: Principles and Practices. Hillsdale, N.J.: L. Erlbaum Associates.

Statistics Canada. (2007). Aboriginal Population Profile, 2006 Census. Ottawa: Statistics Canada.