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DIGITAL DIVERSITY: BROADBAND AND INDIGENOUS POPULATIONS IN ALASKA

BY HEATHER E. HUDSON*

The challenge of bringing the benefits of broadband to very small, extremely remote villages is exemplified by the experience of serving indigenous rural populations in Alaska. This requires not just access, but adoption, entrepreneurship, and innovation. Dr. Hudson describes the history of provisioning access to these areas, and suggests a strategy of integrating investments from NTIA and RUS programs as a model for promoting broadband “digital diversity” to similar populations.

INTRODUCTION: THE ALASKA CONTEXT

“We went from house to house taking care of the sick... We had no phones... but used the school’s [HF] radio to report [on] our patients. There was no nonsense about confidentiality.”

– Paula Ayunerak, Alaska Native health aide in the 1960s¹

Alaska is the largest state in the US (571,951 square miles or more than twice the size of Texas) but has the nation’s lowest population density, with only 1.2 persons per square mile. Total population now exceeds 710,000, of which 14.8% are Alaska Natives. (Nationwide, indigenous Americans are only 1% of the total U.S. population).² Alaska Natives comprise several cultural and linguistic groups including Inupiat, Yupik, Athabaskan, Aleut, Tlingit, and Haida, organized into some 226 tribes. Approximately two-thirds of the indigenous population lives in more than 200 rural villages, most of which are remote settlements with fewer than 200 people each. The concept of “rural” has a different connotation in Alaska than in many other regions; some 75% of Alaskan communities have no road access. Transportation is by boat along the coast or rivers in the summer, and by bush plane year round, weather permitting.

Since the late 1970s all communities with at least 25 permanent residents have had telephone service, but broadband connectivity remains limited. The major mechanism for extending Internet access to

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¹ Quoted in Heather E. Hudson, *From Rural Village to Global Village* (New York: Routledge, 2006), 59.

² 2010 census data for Alaska can be found at State of Alaska, Department of Labor and Workforce Development, “Research Analysis,” accessed Oct. 14, 2011, <http://live.laborstats.alaska.gov/cen/>. An additional 51,875 Alaskan residents have identified themselves as racially composed of two or more races; a significant percentage of these are likely to be partly Alaska Native.

rural Alaska has been federal universal service funds; specifically the E-rate program that subsidizes Internet access for schools and libraries, and the Rural Health program that subsidizes connectivity for rural health clinics and hospitals. Under U.S. American Recovery and Reinvestment Act of 2009, Alaska has also recently received funding for infrastructure to extend broadband in the southwest part of the state, for improved connectivity for rural libraries and for training and support for rural public computer centers.

These initiatives primarily support improvements in Internet and broadband availability for rural Alaska. However, this article proposes a more rigorous framework including not only *availability*, but more broadly *access* and *adoption*, and examines how these concepts apply to Alaska Natives. The article also examines other elements of digital diversity, including *innovation* in applications and content, *entrepreneurship*, and *participation* in telecommunications policymaking. These concepts are applied to the Alaska context.

While Alaska may represent an extreme case because of its isolated location and remote villages, a similar framework for digital diversity could be applied in regions with significant indigenous populations such as tribal lands and the intermountain West. Furthermore, the framework may be relevant for considering how the concept of digital diversity could be applied in any multiethnic or multicultural region.

DIGITAL DIVERSITY: A FRAMEWORK

Access and Adoption

Availability of telecommunications from the providers' perspective can be defined in terms of houses passed for wireline technologies (such as optical fiber, coaxial cable, or copper) and coverage for wireless technologies. Availability from the users' perspective requires a different lens. FCC data are reported by household: percentage of households with telephones, percentage with broadband subscriptions, etc. However, availability at local sites such as libraries, community centers, and schools is also an important indicator for Alaska, especially concerning broadband. And as mobile phones – and increasingly smartphones and portable devices – proliferate, individual or personal access should also be considered.

However, access involves more than availability. Therefore, an analytical framework for rural Alaska should include *availability*, *access*, and *adoption*. Factors that could influence Native adoption at the household or personal level include price, availability of a computer or other device, availability of electricity, skills, and the perceived relevance of content or services. Adoption through shared usage at community locations could be influenced by skill levels, availability of training and/or mentoring, schedule of availability, perceived relevance, and value.

Several recent studies have examined broadband adoption and the reasons cited for non-adoption among US residents, with some data disaggregated by various demographic and ethnic criteria (age,

education level, urban/rural, gender, ethnicity, etc.). The Federal Communications Commission (FCC) carried out a study in 2009 to examine broadband adoption and use; the top reason given by non-users for not using the Internet was affordability.³ The 2010 report *Exploring the Digital Nation* by the National Telecommunications and Information Administration (NTIA) states that “persons with low incomes, seniors, minorities, the less-educated, non-family households, and the nonemployed tend to lag behind other groups in home broadband use.” The report provides detailed analysis of broadband adoption gaps: for 26% of non-broadband users, the main reason for non-adoption was that home broadband Internet was too expensive. Among those who did not use the Internet at all, price and perceived relevance were cited as key considerations.⁴

While helpful in increasing our understanding of barriers to adoption among various groups including minorities, these studies do not have samples of Alaska Natives large enough to provide any valid findings. For example, the study states that 42.6% of American Indians/Alaska Natives used broadband at home, but there is no separate breakdown for Alaska Natives.⁵ The FCC report also states that the sample of Alaska Natives is too small to report results.⁶ Within that category, it is also important to disaggregate Alaska Natives by urban and rural, as broadband availability is extremely limited in rural Alaskan communities, which are primarily inhabited by Alaska Natives. Thus, while NTIA data indicate that 70% to 76% of Alaskans use broadband, this estimate is likely to be highly skewed by the urban population.⁷

Services Provided for Native Communities

Another element of digital diversity in Alaska involves Alaska Natives as beneficiaries of telecommunications-delivered or -supported services, particularly health care and education. Alaska ranks 48th out of the 50 states in “doctors to residents” ratio, and 65% of physicians are located in Anchorage (the state’s largest city). Health care in remote communities is provided by Native health aides, typically women from the community with only a high school education and six weeks of training. They rely on telecommunications for consultation with doctors at regional hospitals and for transmission of patient data. The telemedicine network, founded as AFHCAN (Alaska Federal Health Care Access Network), is now the most extensive such network in the world, with more than

³ John Horrigan, “Broadband Adoption and Use in America,” The FCC Omnibus Broadband Initiative (OBI) Working Paper Series, 2009.

⁴ National Telecommunications and Information Administration, *Digital Nation: 21st Century America’s Progress Toward Universal Broadband Internet Access* (Washington, DC: February 2010) [hereinafter *NTIA*]; Economics and Statistics Administration and the National Telecommunications and Information Administration, *Exploring the Digital Nation: Home Broadband Internet Adoption in the United States* (Washington, DC: November 2010) [hereinafter *ESA/NTIA*].

⁵ NTIA.

⁶ Horrigan, 14. “For Asian-Americans, American Indians, and Alaskan natives, the sample yielded fewer than 100 respondents in each group. The first two groups in particular have a sizable population that may not speak English or that have low telephone penetration rates. Because of that and the small sample of respondents, it is inadvisable to report results.”

⁷ ESA/NTIA.

250 sites including 158 village health centers.⁸ The telemedicine facilities are also used for training and continuing education.

All communities in Alaska with at least ten students must have schools offering K-12 instruction. Teachers in small schools teach several grades, and teacher turnover is high. Internet access plus other audiovisual instructional materials are important supplements to classroom instruction; advanced placement and other courses such as foreign languages are available only online. Post-secondary courses for college credit, training for jobs available in rural Alaska, and continuing education are also offered online. Thus, these services should be considered as components of digital diversity, as they are a means of providing services for remote indigenous communities that would not otherwise be available, and education and training to enhance the skills of Native residents.

Innovation and Entrepreneurship

Digital diversity may involve more than use of available content or facilities; it may include various forms of innovation – for example, adapting content and applications to local conditions; developing new content and applications (involving local languages, cultures, development priorities, etc.); or entrepreneurship in starting new commercial or public service activities taking advantage of broadband.

For example, there is little educational content produced solely for Alaska. However, with access to the Internet, materials produced by any Alaskan school district can be shared with others, and online course materials can supplement resources in village classrooms. A model using earlier television technology was an innovative project in the 1980s called LearnAlaska; with a limited budget the project produced a few video programs specifically about Alaskan cultural, environmental, and historical topics. To add to these offerings, LearnAlaska secured educational rights to numerous audiovisual materials with content requested by teachers in village schools. These materials were made available to the teachers along with supplementary guides to relate them to the Alaskan context.

Participation in the Communications Sector: Policy and Services

An analysis of digital diversity in Alaska should also include the role of Alaska Natives in developing policies for communications services for native populations, and in owning and/or operating communications carriers and other service providers. Alaska Natives have opportunities to participate in telecommunications policymaking through recent initiatives by the FCC to establish a National Native Broadband Task Force and to request comments on improving communications in

⁸ Heather E. Hudson, "Rural Telemedicine: Lessons from Alaska for Developing Regions," *Journal of eHealth Technology and Application* 5, no. 3 (Sept. 2007): 460-467.

native lands.⁹ The State of Alaska has also established a state broadband task force to examine statewide needs for broadband, particularly in rural areas.

Concerning communications services, Alaska Natives are shareholders in telephone co-operatives in some rural communities, and partners in a Stimulus-funded infrastructure project. They have also developed websites and other online materials to promote indigenous products and cultural activities. These endeavors will be discussed below.

EARLY RURAL COMMUNICATIONS IN ALASKA

In the 1950s and 1960s, the only communication with most villages in Alaska was by two-way high frequency (HF) radio, which was very unreliable and often inaccessible for public use, as radios were typically located in a teacher's home or in a clinic. Experiments in the 1970s using NASA's ATS-1 satellite provided evidence that reliable voice communications could improve health care delivery in Alaska villages through daily contact between Native health aides and regional doctors.¹⁰ Later in the decade, commercial satellite service became available. All Alaskan communities with at least 25 permanent residents have telephone service as a result of a state regulatory mandate in the 1970s. The State also provided \$5 million to procure satellite earth stations for communities that had no phone service.¹¹

In the 1980s, as described above, the State supported a program called LearnAlaska that transmitted a channel of educational film and video programs to supplement instructional materials in village schools without science labs or specialized teachers. Radio stations were established in several native communities; they became part of a statewide public network that now includes 25 stations, sharing the costs and benefits of a coordinated statewide news, public affairs, and satellite distribution system. These initiatives resulted in what might be called "the era of analog diversity or analog inclusion."

In the 1990s, dial-up e-mail and then Internet access began to be offered in rural Alaska. With the introduction of the E-rate subsidy program resulting from the 1996 Telecommunications Act (see below), rural schools and libraries were able to lease bandwidth so that school students and other community residents could use their facilities to get online. This was the first major step toward digital inclusion for rural Alaska Native communities.

⁹ Federal Communications Commission, *Improving Communications Services for Native Nations*, CG Docket No. 11-41, Notice of Inquiry, 26 FCC Rcd 2672 (2011); Federal Communications Commission, *In the Matter of Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands*, WT Docket No. 11-40, Notice of Proposed Rulemaking, Mar. 3, 2011.

¹⁰ Heather E. Hudson and Edwin B. Parker, "Medical Communication in Alaska by Satellite," *New England Journal of Medicine*, Dec. 20, 1973.

¹¹ Heather E. Hudson, *Communication Satellites: Their Development and Impact* (New York: Free Press, 1990).

EXTENDING ACCESS: BROADBAND STIMULUS PROJECTS FOR ALASKA

In 2009, the U.S. American Recovery and Reinvestment Act appropriated \$7.2 billion “to begin the process of significantly expanding the reach and quality of broadband services.”¹² The Recovery Act allocated \$2.5 billion for rural infrastructure projects to the Rural Utilities Service (RUS), which administers these funds through the Broadband Infrastructure Program (BIP). Alaska received more than \$117 million for BIP rural infrastructure projects. The largest project, TERRA (Terrestrial for Every Region of Rural Alaska), will provide terrestrial connectivity through a hybrid optical fiber and microwave network to 65 native Yupik villages in Bristol Bay and the Yukon-Kuskokwim regions, an area approximately the size of North Dakota.¹³

Another project, SABRE (Southwest Alaska Broadband Rural Expansion), is intended to provide wireless 4th generation (4G) broadband service to southwest Alaska through a partnership between a telecommunications company and a subsidiary of Sea Lion Corporation, the Alaska Native Village Corporation for Hooper Bay.¹⁴ A third funded project offers free satellite equipment and installation plus discounted service to residents who do not have other options for accessing broadband.¹⁵

The Broadband Telecommunications Opportunities Program (BTOP), established by NTIA to administer its \$4.7 billion allocated under the Recovery Act, has funded two Alaska projects (in addition to state broadband mapping). OWL (Online with Libraries) will upgrade connectivity for 65 rural libraries, almost all of which are in indigenous communities. Facilities will include videoconferencing and webconferencing, so that the libraries can serve as public computing centers. It will also provide training and support in digital literacy to benefit community residents without broadband at home such as school students and adults taking online university and continuing education courses. Beneficiaries are intended to be remote library users where computer home ownership and Internet subscriptions are lowest, K-12 students for obtaining help with homework, adults undertaking university and vocational courses, and public service agencies serving the rural communities.¹⁶

Another project, Bridging the e-Skills Gap in Alaska, will provide computer skills and broadband awareness training to promote broadband adoption, particularly targeting Alaska Native villages. The project brings together 21 partner organizations throughout rural Alaska to increase technological literacy. It intends to generate up to 88,000 new broadband users, provide training to over 84,000 Alaskans, and create 88 new jobs in isolated and primarily indigenous communities. The program also plans to create a statewide Multi-Sector Digital Inclusion Council “as a forum for the discussion

¹² For data on the funds provisioned by the Recovery Act, see Recovery.gov, “Track the Money,” accessed Oct. 14, 2011, <http://www.recovery.gov/Pages/default.aspx>.

¹³ TERRA GCI, accessed Oct. 14, 2011, <http://terra.gci.com/>.

¹⁴ Rivada Sea Lion, “Southwest Broadband Rural Expansion Project,” accessed Oct. 14, 2011, www.iser.uaa.alaska.edu/Projects/akbroadbandproj/RivadaSeaLion.pdf.

¹⁵ United States Department of Agriculture, Rural Development, “Broadband Initiatives Program Resources,” accessed Oct. 14, 2011, http://www.rurdev.usda.gov/UTP_BIPResources.html.

¹⁶ National Telecommunications and Information Administration, “Broadband USA: Connecting America’s Communities,” accessed Oct. 14, 2011, <http://www2.ntia.doc.gov/alaska>.

and sharing of best practices and the elimination of redundancy through sharing of partner-developed content.”¹⁷

Additional broadband funding for rural Alaska has been provided by the Rural Utilities Service (RUS) through the state regulator, the Regulatory Commission of Alaska (RCA). RCA’s Rural Alaska Broadband Internet Access Grant Program is intended to facilitate long-term affordable broadband Internet services in rural Alaskan communities where these services do not currently exist. Eligible communities must have a population of less than 20,000 and a “not-employed rate” of more than 19.5 percent. Broadband speed is defined as 768 kbps (the old FCC definition) with the access goals referring to individual households. Funding is available to telecommunications carriers, who can receive up to 75% of construction costs if they commit to keeping rates comparable to those in Anchorage, Fairbanks, and Juneau for at least two years.¹⁸

All of these projects are intended to increase broadband access and adoption in rural Alaska, and particularly among Alaska Natives. As such, they address the first component of digital diversity identified above. The infrastructure projects and OWL should enhance services provided for Native communities, the second component of digital diversity – particularly education through better facilities in schools and through better access for distance education in libraries. The Bridging the E-Skills Gap project should also help Native Alaskans develop skills for innovation and entrepreneurship, the third component of digital diversity. All projects should provide some jobs in the ICT sector for Alaska Natives, the fourth component. It will be important to evaluate the impact of these projects, in terms of number and demographics of new users, types of usage, and resulting benefits for individuals and their communities to determine to what extent they actually do contribute to digital diversity among Alaska Natives.

UNIVERSAL SERVICE POLICIES: INCREASING ACCESS FOR INDIGENOUS POPULATIONS

Sustainability for providers and affordability for users are typically addressed through universal service policies. In Alaska, these may be considered two sides of the same coin. Without federal subsidies, Alaska’s vastness and low population density would make telecommunications prohibitively costly for rural communities and unattractive for private sector investment, thus severely limiting the potential for digital diversity.

Alaska has been a major beneficiary of the federal universal service fund (USF) programs, both in absolute funding and in funding per capita. In 2009, Alaskan subscribers contributed about \$19 million and received \$244 million, or more than \$12 for every dollar paid in. In 2010, USF commitments for Alaska were:

¹⁷ Ibid.

¹⁸ Regulatory Commission of Alaska, *Rural Alaska Broadband Internet Access Grant Program Round Five Grant Application Guide* (2010).” See also Regulatory Commission of Alaska, homepage, accessed Oct. 14, 2011, www.rca.alaska.gov.

- **Internet for Schools and Libraries (E-Rate):** Alaska received \$29 million in 2010; for the decade 1998-2009 Alaska received a total of \$155 million, the highest per capita of any state.
- **Rural Telemedicine:** Alaska received the largest amount of any state: \$35.5 million in 2010.
- **Low Income Subscribers:** Through the Lifeline and Linkup programs, Alaskan low income subscribers received subsidies totaling \$26.8 million in 2010.
- **Voice Services:** From the High Cost Fund, Alaskan telecommunications carriers serving rural areas received \$219 million in 2010.¹⁹

The E-Rate: Support for Community Access in Rural Alaska

The E-rate (short for “education rate”) program created by the Telecommunications Act of 1996 provides discounts on a wide variety of telecommunications, including Internet access and internal connections for schools and libraries. The applicable discount rate is based on an institution’s economic need and whether it is located in an urban or rural area. Rural Alaska qualifies for a 90% discount; that is, only 10% of connectivity costs must be provided by local or state sources.²⁰ Approved schools and libraries post their requirements online, where they are open for competitive bids.

In Alaska, the E-Rate subsidy had brought Internet access to most indigenous village schools. The schools also have become “anchor tenants,” major long-term customers that can help to justify infrastructure investments that can be used to serve other village customers. Despite the small size and isolation of many of the schools and libraries, carriers have competed in many rural areas of the state for the E-rate support. One of the competitive providers determined that the school subsidy was critical to its business case to bring broadband to the villages (primarily by satellite), and subsequently installed broadband wireless to cover the villages, with price for individual access not to exceed the price in Anchorage, the state’s largest city.²¹

All Alaskan communities with at least ten students must have schools offering K-12 instruction. Teachers typically cover several grades, and lab facilities are very limited. Students use the Internet for coursework; they may also take advanced placement classes and foreign language instruction online. Where separate community libraries exist, residents can use connected library computers to participate in training programs and continuing education classes.

¹⁹ These figures are derived from data posted at Universal Service Administrative Company (USAC), “Helping Keep America Connected,” accessed Oct. 14, 2011, <http://www.usac.org/default.aspx>.

²⁰ Heather E. Hudson, “The Future of the E-Rate: U.S. Universal Service Fund Support for Public Access and Social Services,” in *...and Communications for All: An Agenda for a New Administration*, ed. Amit M. Schejter (Lanham, MD: Lexington Books, 2009), 239-259.

²¹ Hudson, *From Rural Village to Global Village*.

Rural Telemedicine

Some 59% of Alaskans live in “medically underserved areas,” and many of these are indigenous residents.²² Physicians serving rural indigenous communities are located at regional hospitals. Health care in native villages is provided by health aides – community residents with high school or less formal education and six weeks of training in primary medical care. Telecommunications has been an integral component of health care delivery for Alaska Natives since the days of HF radio. As noted above, in the 1970’s, NASA’s ATS-1 experimental satellite showed that reliable voice communications between village health aides and regional doctors (as opposed to the often unreliable links via HF) could improve diagnosis and treatment of Alaska Natives in isolated villages, and could also be used for continuing education.²³

Today, AFHCAN (the Alaska Federal Health Care Access Network) connects about 250 sites including links between more than 150 village clinics and regional hospitals. AFHCAN handles about 22,000 cases per year, and has documented significant benefits in terms of reduced wait times for consultations, patient travel savings, and high provider and patient satisfaction.²⁴ The viability of AFHCAN is highly dependent on the FCC’s Rural Health Care fund, which subsidizes the difference between the price of connectivity in urban vs. rural areas. In Alaska, because of the isolation of villages and dependence on satellite circuits, the subsidy can amount to 90% or more of charges from telecommunications providers.²⁵

Universal Service Reform and Rural Alaska

The FCC has reviewed universal service support programs as a key strategy in implementing the National Broadband Plan, and intends to replace some existing support funds with a Connect America Fund.²⁶ The first steps were a series of FCC Notices of Inquiry (NOIs) and Notices of Proposed Rule-Making (NPRMs)²⁷ on universal service topics including high cost operator support mechanisms; low income customer support mechanisms (the Lifeline and Link-Up programs), subsidies for schools and libraries (the E-rate program), and rural health care connectivity. All of these are critical to the provisioning of affordable communications, including broadband, to indigenous residents of rural Alaska. In November 2011 the FCC released an order to reform

²² Stewart Ferguson and John Kokesh, *What Works: Outcomes Data from AFHCAN and ANTHC Telehealth: An 8 Year Retrospective* (Anchorage: Alaska Native Tribal Health Consortium, 2011).

²³ Hudson and Parker.

²⁴ AFHCAN Telehealth Solutions, homepage, accessed Oct. 14, 2011, <http://www.afhcan.org/>. See also Hudson, *From Rural Village to Global Village*.

²⁵ Personal interviews, Yukon Kuskokwim Health Center, Bethel, Alaska, Mar. 2011.

²⁶ Federal Communications Commission, *Connecting America: The National Broadband Plan* (2010); Federal Communications Commission, *In the Matter of Connect America Fund; A National Broadband Plan for Our Future; High-Cost Universal Service Support*, Notice of Inquiry and Proposed Rulemaking, Apr. 21, 2010.

²⁷ See for example Federal Communications Commission, *Connect America Fund and High Cost Support*, Notice of Inquiry and Proposed Rulemaking, Apr. 21, 2010; Federal Communications Commission, *Upgrading E-Rate for the 21st Century*, Sixth Report and Order, Sept. 23, 2010; Federal Communications Commission, *Review of Lifeline and Linkup Programs*, Federal State Joint Board Recommended Decision, Nov. 3, 2010; Federal Communications Commission, *In the Matter of Rural Health Care Support Mechanism*, WC Docket No. 02-60, July 15, 2010.

universal service funding in favor of the Connect America Fund, to help expand broadband services to 18 million unserved Americans.²⁸

The E-rate support for schools and libraries was retained in the FCC's Sixth Report and Order on that topic in September 2010.²⁹ It also appears that the FCC intends to retain the Rural Health Care subsidy program.³⁰ The High Cost Fund component of universal service is currently under review.³¹ The \$219 million in high cost subsidies for Alaskan carriers in 2010 have helped to keep prices for telecommunications services for rural indigenous residents "reasonably comparable" to urban rates, as mandated by the Telecommunications Act of 1996. Alaskan telecommunications carriers, ranging from statewide operators to small cooperatives and "mom and pop" companies, are strong proponents of retaining most elements of the existing High Cost Fund, which they perceive as threatened by the transition to the Connect America Fund. They argue that their customers, many of whom are native residents of small, isolated communities, would be severely disadvantaged if subsidies for rural services disappeared.

USF subsidies will remain a key element for availability and affordability of telecommunications in rural Alaska, which are critical for indigenous access to services ranging from voice to broadband. The Federal-State Joint Board on Universal Service states that it "supports deployment and maintenance of broadband services in areas that are now unserved or underserved, although it remains important to continue support for existing voice networks." It also recommends consideration of the extension of universal service support to broadband as part of the broader matter of universal service reform.³² The E-rate and Rural Health Care subsidies appear likely to continue, and the elements of the Connect America Fund that are to direct subsidies to broadband have apparently been assured via the FCC's order in November 2011.³³

INNOVATION AND ENTREPRENEURSHIP

Some Alaska entrepreneurial activities that benefit the indigenous economy have websites to attract visitors, such as ecotourism and the Iditarod dogsled race from Anchorage to Nome.³⁴ Others that

²⁸ Federal Communications Commission, *FCC Releases Connect America Fund Order, Reforms USF/ICC for Broadband*, Report and Order and Further Notice of Proposed Rulemaking, Nov. 18, 2011.

²⁹ Federal Communications Commission, *In the Matter of Schools and Libraries Universal Service Support Mechanism: A National Broadband Plan for Our Future*, Sixth Report and Order, Sept. 23, 2010.

³⁰ Federal Communications Commission, *In the Matter of Rural Health Care Support Mechanism*.

³¹ Federal Communications Commission, *In the Matter of Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing a Unified Intercarrier Compensation Regime, Federal-State Joint Board on Universal Service, Lifeline and Link-Up*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, Feb. 8, 2011.

³² Federal Communications Commission, *In the Matter of Federal-State Joint Board on Universal Service Lifeline and Link Up: Recommended Decision*, Nov. 4, 2010.

³³ Federal Communications Commission, *FCC Releases Connect America Fund Order, Reforms USF/ICC for Broadband*.

³⁴ See for example Alaska Wilderness Recreation and Tourism Association, homepage, accessed Oct. 14, 2011, <http://www.awrta.org/>; The Official Site of the Iditarod, homepage, accessed Oct. 14, 2011, <http://www.iditarod.com/>.

offer native handicrafts have used a web presence to extend their reach beyond tourists who visit their shops in Anchorage or Juneau. For example, Oomingmak Musk Ox Producers' Co-operative, whose members knit clothing from musk ox wool (which is much warmer than sheep's wool), states that it has generated significant sales from its website.³⁵

Native Alaskans are also using the Internet to preserve their culture and history. A native language map first produced at the University of Alaska Fairbanks in the 1970s has now been updated to include traditional and modern place names, with links to a GIS (geographic information system) database. The map data is available online so that others may add demographic, scientific, or historical information about locations on the map.³⁶ A group of native leaders and volunteers is using the web to preserve and share materials about the Alaska Native Claims Settlement Act (ANCSA); this endeavor was initiated in 2001, the 40th anniversary of the Act's signing.³⁷ The Alaska Native Cultural Center also provides historical and cultural materials on its website.³⁸ The Inuit Circumpolar Conference includes Inuit in Alaska, the Canadian Arctic, and Siberia, and uses a variety of media to share cultural materials and to organize its membership to address shared issues such as climate change, ocean resources, and natural resource exploitation.³⁹

Alaska Natives in the far North have also been entrepreneurial in providing telecommunications services. OTZ, the first native telephone cooperative in the United States, provides fixed and wireless voice and data services to the Inupiat regional hub of Kotzebue, ten Inupiat villages, and the native-owned Red Dog mine in northwest Alaska on the Bering Sea.⁴⁰ The Arctic Slope Telephone Cooperative serves Barrow and seven Inupiat villages on the North Slope and in the Brooks Range, plus the oil pipeline service center of Deadhorse/Prudhoe Bay.⁴¹ Both received funding to install and upgrade their networks from the Rural Utilities Service. An RUS-funded stimulus project to provide wireless 4G services in southwest Alaska involves a partnership between a telecommunications company and a subsidiary of Sea Lion Corporation, the Alaska Native Village Corporation for Hooper Bay.⁴²

INVOLVEMENT IN COMMUNICATIONS POLICYMAKING

The Federal Communications Commission recently established a Native Nations Broadband Task Force as part of its implementation process for the National Broadband Plan. Of the nineteen

³⁵ Personal interviews, Oomingmak Musk Ox Producers' Co-operative, Mar. 2011; see also Oomingmak Musk Ox Producers' Co-operative, homepage, accessed Oct. 14, 2011, <http://www.qiviut.com/>.

³⁶ University of Alaska Fairbanks, "Alaska Native Language Center," accessed Oct. 14, 2011, <http://www.uaf.edu/anlc/>.

³⁷ ANCSA at 40, homepage, accessed Oct. 14, 2011, <http://www.ancsaat40.org/>.

³⁸ Alaska Native Heritage Center, homepage, accessed Oct. 14, 2011, <http://www.alaskanative.net/>.

³⁹ Inuit Circumpolar Council, homepage, accessed Oct. 14, 2011, <http://www.inuit.org/>; Inuit Circumpolar Council Alaska, homepage, accessed Oct. 14, 2011, <http://www.iccalaska.org/servlet/content/home.html>.

⁴⁰ OTZ Telephone Cooperative, Inc., "Welcome to OTZ!" accessed Oct. 14, 2011, <http://www.otz.net/>.

⁴¹ Arctic Slope Telephone Association Cooperative, "About ASTAC," accessed Oct. 14, 2011, <http://www.astac.net/servlet/content/about.html>.

⁴² United States Department of Agriculture, Rural Development, "Broadband Initiatives Program Resources."

appointed members, two are Alaska Natives – one from Kawerak, the native association serving Bering Straits Inupiat communities based in Nome, and one from the Tanana Chiefs Conference based in Fairbanks.⁴³ The FCC also issued two notices in 2011 on broadband matters specifically relevant to native populations and native lands.⁴⁴ These notices provide an opportunity for Alaska Natives to comment on requirements for broadband and demographic and geographical conditions that need to be addressed in implementing the Connect America Fund and other FCC initiatives or rulemakings. However, to take advantage of these opportunities, native representatives will likely require training and mentoring about both specific issues and the procedures for participating in FCC proceedings.

Funding from NTIA for broadband planning and mapping could also include both participation and employment opportunities. A recently established state broadband task force with members appointed by the governor includes one Alaska Native, although more Native participation would be beneficial. The FCC native task force members could be asked to join to provide a bridge between federal and state activities, as well as to provide more knowledge of native concerns and communications issues. Alaska Native organizations with expertise in field research and community relations should be involved in the data collection and outreach required for the NTIA projects.

TOWARD A BETTER UNDERSTANDING OF DIGITAL DIVERSITY IN ALASKA

From Access to Adoption

Better data are needed on what services besides telephony are available in indigenous communities. A draft map showing broadband availability throughout Alaska exists, but data need to be verified because the current map appears to have numerous inaccuracies for rural areas. Data on quality of service and pricing are also required, as anecdotal evidence indicates that lack of affordable options and poor quality of service hinder the adoption and use of broadband in some villages. Also, data reported from a telephone survey appear to over-represent computer ownership and broadband usage in rural Alaska.⁴⁵ A follow-up survey with a larger sample and pretested questions specifically designed for rural Alaska is required.

Concerning adoption, national data for the United States show lower levels of broadband adoption among lower income, rural, and some minority populations. Among non-adopters, lack of relevance is cited as the main reason for not having broadband at home.⁴⁶ However, as noted above, the

⁴³ Federal Communications Commission, “Chairman Genachowski Names Members to the FCC-Native Nations Broadband Task Force,” press release, Mar. 3, 2011.

⁴⁴ Federal Communications Commission, *Improving Communications Services for Native Nations*; Federal Communications Commission, *In the Matter of Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands*.

⁴⁵ Connect Alaska, “Working to Bring the Benefits of Broadband to All Alaskans,” accessed Oct. 14, 2011, <http://www.connectak.org/>.

⁴⁶ Federal Communications Commission, Presentation at Open Commission Meeting, Sept. 29, 2009, accessed Oct. 14, 2011, <http://reboot.fcc.gov/open-meetings/2009/september>.

Alaska samples are not large enough to identify barriers for rural Alaskans or Alaska Natives. Research is needed in Alaska to increase understanding of reasons for non-adoption, to develop strategies to encourage adoption, and to identify or develop relevant applications for users with limited technology or language skills.

Impact of Stimulus Projects

More than \$140 million in federal stimulus funds have been awarded to projects intended to extend broadband and increase Internet usage in Alaska, primarily in rural indigenous communities. Stimulus projects are typically intended to create jobs quickly and to support projects that are “shovel ready.” Yet these may be no more than short-term construction and installation jobs. Long-term employment and economic impact requires more time, an understanding of the economic needs and goals of the region, and training to impart necessary ICT skills.

The infrastructure projects, which are primarily in Yupik regions of southwest Alaska, are intended to increase broadband availability. However, as noted above, adoption by Alaska Natives may depend on additional factors such as price, computer ownership, computer skills, and the perceived relevance of content. Given the lack of data on barriers to adoption in rural Alaska, a pre-installation study should be carried out to determine the extent of current Internet use and perceived demand, as well as any local concerns that might impact adoption. A strategy could then be developed to integrate the infrastructure investments from RUS with the skills training and applications development projects supported by NTIA. Furthermore, evaluation of these projects would be useful in determining increases in usage and barriers to usage, and identifying social and economic impacts. These results would be useful in determining how to increase digital diversity.

Innovation and Participation in Policy-Making

Alaska Natives have begun to use broadband and online tools for cultural preservation, access to health and education services, and economic development. However, additional training could help them develop more applications and content, and obtain the skills needed for information technology jobs in their communities. Also, as outlined above, there are also new opportunities for Alaska Natives to participate in broadband and other communications policy and planning activities for Alaska. Proposed universal service reforms could significantly affect the availability and affordability of communications services including broadband in rural Alaska. Again, training and mentoring will be needed to enable a new generation of native leaders to help shape Alaska’s communications future.

CONCLUSION: TOWARD GENERALIZING THE FRAMEWORK

The framework proposed in this article for analyzing digital diversity among indigenous populations in rural Alaska includes several parameters: access and adoption; innovation and entrepreneurship;

beneficiaries of ICT-delivered or -facilitated services; and participation in communications sector policies and services.

This framework is intended to show that digital diversity refers to more than just diverse populations having access to broadband. Digital diversity should include their use of broadband, developing and sharing content, utilization of broadband for economic activities, and employment in ICT-related jobs. In some circumstances, diverse populations may also be beneficiaries of institutional uses of broadband, such as for education, health care, and e-government. Also, in some contexts, diverse populations may have the opportunity to participate in planning for broadband expansion and strategies to overcome barriers to adoption. While the above analysis is limited to the Alaska context, this framework could be generalized to consider digital diversity in general, with modifications for specific regions or populations.

BIBLIOGRAPHY

- AFHCAN Telehealth Solutions. Homepage. Accessed Oct. 14, 2011, <http://www.afhcan.org/>.
- Alaska Native Heritage Center. Homepage. Accessed Oct. 14, 2011, <http://www.alaskanative.net/>.
- Alaska Wilderness Recreation and Tourism Association. Homepage. Accessed Oct. 14, 2011, <http://www.awrta.org/>.
- ANCSA at 40. Homepage. Accessed Oct. 14, 2011, <http://www.ancsaat40.org/>.
- Arctic Slope Telephone Association Cooperative. "About ASTAC." Accessed Oct. 14, 2011, <http://www.astac.net/servlet/content/about.html>.
- Connect Alaska. "Working to Bring the Benefits of Broadband to All Alaskans." Accessed Oct. 14, 2011, <http://www.connectak.org/>.
- Economics and Statistics Administration and the National Telecommunications and Information Administration. *Exploring the Digital Nation: Home Broadband Internet Adoption in the United States*. Washington, DC: November 2010.
- Federal Communications Commission. "Chairman Genachowski Names Members to the FCC-Native Nations Broadband Task Force." Press release, Mar. 3, 2011.
- . *Connect America Fund and High Cost Support*, Notice of Inquiry and Proposed Rulemaking, Apr. 21, 2010.
- . *Connecting America: The National Broadband Plan* (2010).
- . *FCC Releases Connect America Fund Order, Reforms USF/ICC for Broadband*, Report and Order and Further Notice of Proposed Rulemaking, Nov. 18, 2011.
- . *Improving Communications Services for Native Nations*, CG Docket No. 11-41, Notice of Inquiry, 26 FCC Rcd 2672 (2011).
- . *In the Matter of Connect America Fund, A National Broadband Plan for Our Future, Establishing Just and Reasonable Rates for Local Exchange Carriers, High-Cost Universal Service Support, Developing a Unified Intercarrier Compensation Regime, Federal-State Joint Board on Universal Service, Lifeline and Link-Up*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, Feb. 8, 2011.
- . *In the Matter of Connect America Fund; A National Broadband Plan for Our Future; High-Cost Universal Service Support*, Notice of Inquiry and Proposed Rulemaking, Apr. 21, 2010.
- . *In the Matter of Federal-State Joint Board on Universal Service Lifeline and Link Up: Recommended Decision*, Nov. 4, 2010.
- . *In the Matter of Improving Communications Services for Native Nations by Promoting Greater Utilization of Spectrum over Tribal Lands*, WT Docket No. 11-40, Notice of Proposed Rulemaking, Mar. 3, 2011.
- . *In the Matter of Rural Health Care Support Mechanism*, WC Docket No. 02-60, July 15, 2010.
- . *In the Matter of Schools and Libraries Universal Service Support Mechanism: A National Broadband Plan for Our Future*, Sixth Report and Order, Sept. 23, 2010.
- . Presentation at Open Commission Meeting, Sept. 29, 2009. Accessed Oct. 14, 2011, <http://reboot.fcc.gov/open-meetings/2009/september>.
- . *Review of Lifeline and Linkup Programs*, Federal State Joint Board Recommended Decision, Nov. 3, 2010.
- . *Upgrading E-Rate for the 21st Century*, Sixth Report and Order, Sept. 23, 2010.
- Ferguson, Stewart and John Kokesh. *What Works: Outcomes Data from AFHCAN and ANTHC Telehealth: An 8 Year Retrospective*. Anchorage: Alaska Native Tribal Health Consortium, 2011.
- Horrigan, John. "Broadband Adoption and Use in America." The FCC Omnibus Broadband Initiative (OBI) Working Paper Series, 2009.
- Hudson, Heather E. *Communication Satellites: Their Development and Impact*. New York: Free Press, 1990.

- . *From Rural Village to Global Village*. New York: Routledge, 2006.
- . “The Future of the E-Rate: U.S. Universal Service Fund Support for Public Access and Social Services.” In *...and Communications for All: An Agenda for a New Administration*, edited by Amit M. Schejter, 239-259. Lanham, MD: Lexington Books, 2009.
- . “Rural Telemedicine: Lessons from Alaska for Developing Regions.” *Journal of eHealth Technology and Application* 5, no. 3 (Sept. 2007): 460-467.
- Hudson, Heather E. and Edwin B. Parker. “Medical Communication in Alaska by Satellite.” *New England Journal of Medicine*, Dec. 20, 1973.
- Iditarod, The Official Site of. Homepage. Accessed Oct. 14, 2011, <http://www.iditarod.com/>.
- Inuit Circumpolar Council. Homepage. Accessed Oct. 14, 2011, <http://www.inuit.org/>.
- Inuit Circumpolar Council Alaska. Homepage. Accessed Oct. 14, 2011, <http://www.iccalaska.org/servlet/content/home.html>.
- National Telecommunications and Information Administration. “Broadband USA: Connecting America’s Communities.” Accessed Oct. 14, 2011, <http://www2.ntia.doc.gov/alaska>.
- . *Digital Nation: 21st Century America’s Progress Toward Universal Broadband Internet Access*. Washington, DC: February 2010.
- Oomingmak Musk Ox Producers’ Co-operative. Homepage. Accessed Oct. 14, 2011, <http://www.qiviut.com/>.
- OTZ Telephone Cooperative, Inc. “Welcome to OTZ!” Accessed Oct. 14, 2011, <http://www.otz.net/>.
- Recovery.gov. “Track the Money.” Accessed Oct. 14, 2011, <http://www.recovery.gov/Pages/default.aspx>.
- Regulatory Commission of Alaska. Homepage. Accessed Oct. 14, 2011, www.rca.alaska.gov.
- . *Rural Alaska Broadband Internet Access Grant Program Round Five Grant Application Guide*, 2010.
- Rivada Sea Lion. “Southwest Broadband Rural Expansion Project.” Accessed Oct. 14, 2011, www.iser.uaa.alaska.edu/Projects/akbroadbandproj/RivadaSeaLion.pdf.
- State of Alaska, Department of Labor and Workforce Development. “Research Analysis.” Accessed Oct. 14, 2011, <http://live.laborstats.alaska.gov/cen/>.
- TERRA GCI. Accessed Oct. 14, 2011, <http://terra.gci.com/>.
- United States Department of Agriculture, Rural Development. “Broadband Initiatives Program Resources.” Accessed Oct. 14, 2011, http://www.rurdev.usda.gov/UTP_BIPResources.html.
- Universal Service Administrative Company. “Helping Keep America Connected.” Accessed Oct. 14, 2011, <http://www.usac.org/default.aspx>.
- University of Alaska Fairbanks. “Alaska Native Language Center.” Accessed Oct. 14, 2011, <http://www.uaf.edu/anlc/>.