Achieving the Vision of Universal Broadband: Lessons from North America for Developing Regions

Prof. Heather E. Hudson
Institute of Social and Economic Research
University of Alaska Anchorage

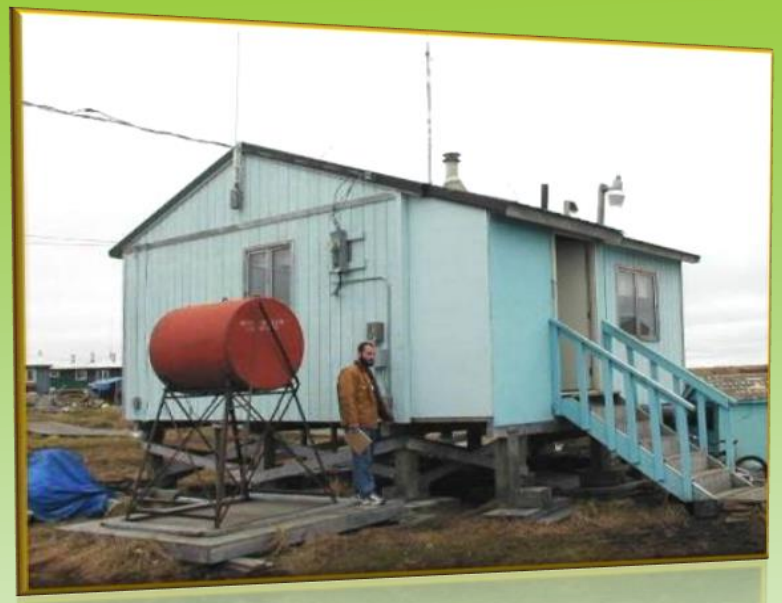
ISER: More than 50 years of public policy research in Alaska

UAA UNIVERSITY of ALASKA ANCHORAGE

The Northern Context: Similar to other Remote/Indigenous Regions

- Small communities
- Isolation
  - Long distances
  - Few roads
- Indigenous residents
- Young populations
- Large households
- Low/seasonal incomes
- Limited employment

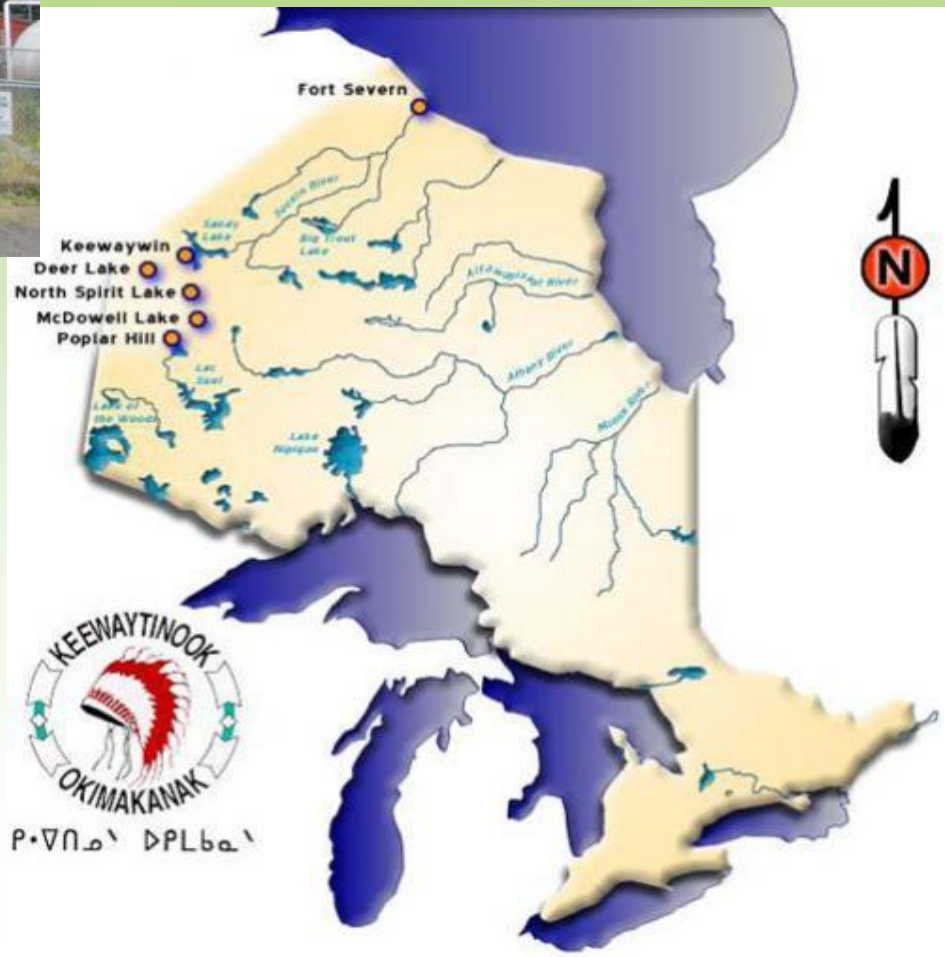
Telemedicine in Alaska: Rural clinics linked to regional hospitals



and major referral hospital: Alaska Native Medical Center, Anchorage

Alaska: Village schools must offer Kindergarten to Grade 12

Online resources for teachers and students
Online courses in STEM, languages, music



Northern Canada:

KNET sponsors an online high school for adults in remote communities

Rural Businesses and Organizations, Ecotourism

- **Aviation, fisheries, retail**
- **Small businesses, nonprofits**
- **Financial Services**
- **Marketing Indigenous products**
- **Ecotourism**

Traditional Activities, Cultural Preservation

Sharing information for hunting

- **Setting trap lines in Northern Ontario**
- **Finding whales off Utqiagvik**
- **Hunting eider ducks: Saniqiluac**

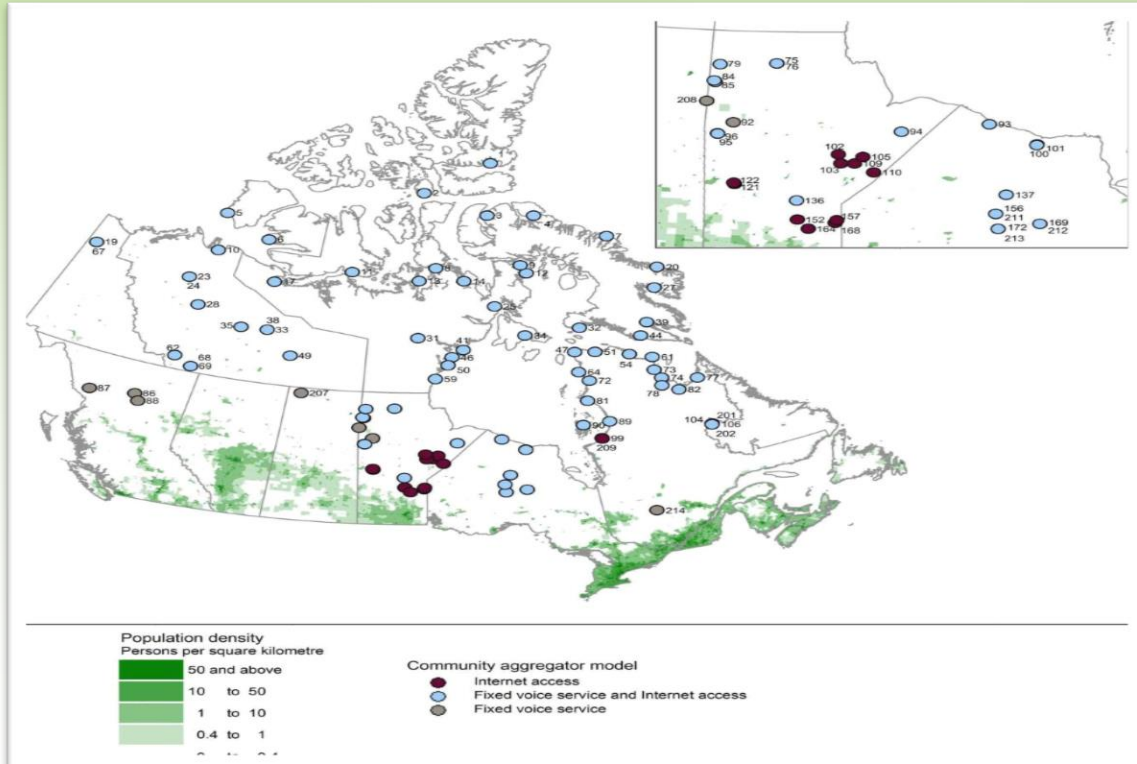
Beyond Infrastructure: What makes Broadband Accessible?

- *Availability*
  - Coverage (wireless)
  - Houses passed (fiber, coax, copper)
- *Affordability*
  - Price for commonly used services
  - Price as percentage of disposable income
- *Bandwidth*
  - Broadband for internet access and multimedia services
  - May include spectrum for fixed and mobile wireless
- *Quality of Service*
  - Reliability – outages and downtime
  - Latency (delay)
  - Jitter

Arctic and SubArctic Canada

Indigenous Populations

Communities and Connectivity



Availability: Broadband for All in Northern Canada

- Regulator decides broadband is a “basic service” to be available to all Canadians including remote communities
- Target speeds of 50 Mbps down, 10 Mbps up
- Rural Broadband fund: C$750 million

Indigenous testimony:

- Explained need for broadband
- Proposed criteria for access, affordability, quality of service
- Emphasized participation in provision of services
- Proposed a fund for northern infrastructure and services

Implementing the Broadband Fund

The Devil is in the Details…

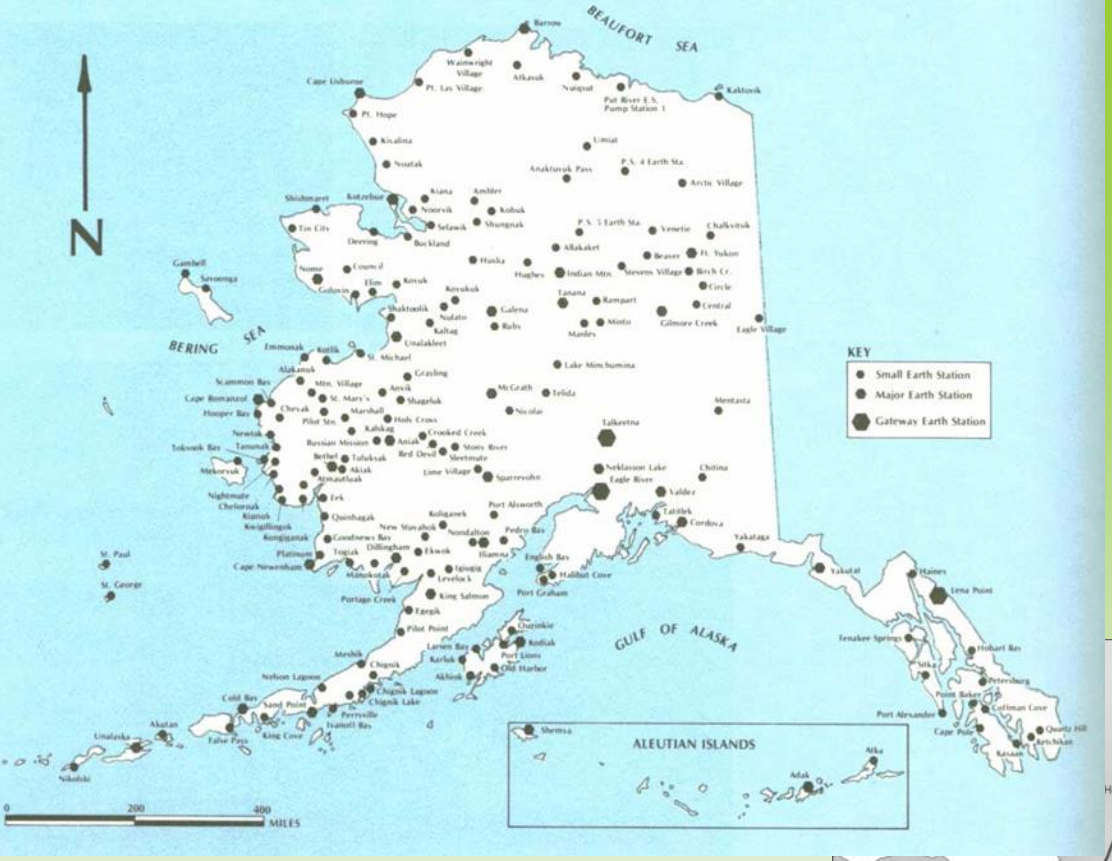
- **Need for *meaningful* consultation with northern communities**
  - **Not just "attempts to consult"**
  - **Not just market studies that could be done anywhere**
- **Eligibility criteria:**
  - **Who is eligible to apply for funds?**
  - **Are there considerations for small and/or Indigenous providers?**
- **Limitations of rural data**
  - **Data incomplete, not up-to-date**
- **Compliance and enforcement conditions**
  - **Deadlines, quality of service**

What about operating costs?

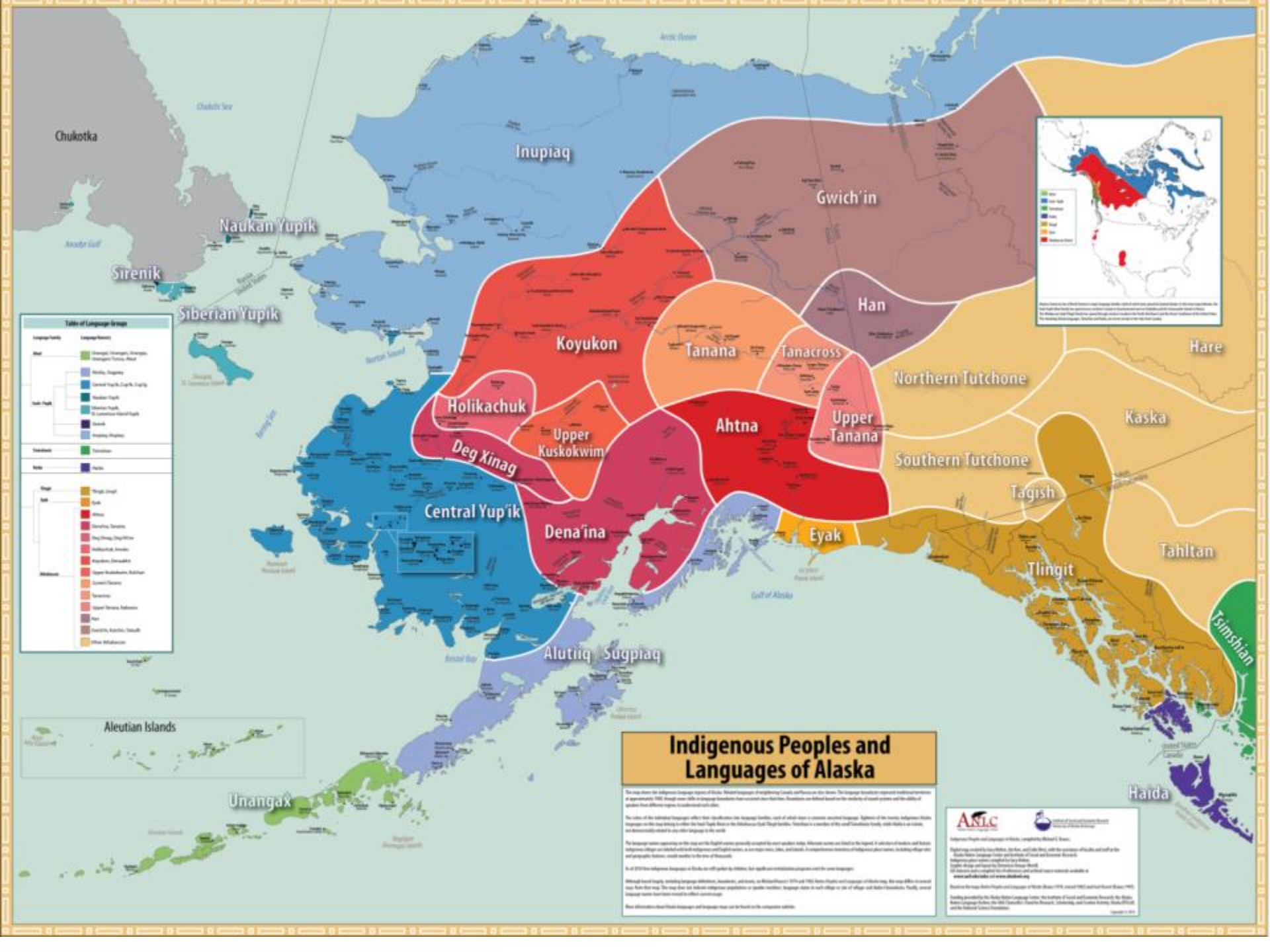
- **The fund provides Capex, not Opex**
- **There are no nationwide universal service funds for operations in Canada**

Alaska

Communities and networks



- Largest U.S. state: 1.5 m sq. km.
- Alaska Natives: 15% of population
- 6 major linguistic/cultural groups
- 226 tribes
- more than 200 villages, most without road access


Chukotka
Inupiaq
Gwich'in
Naukan Yupik
Sirenik
Siberian Yupik
Koyukon
Tanana
Tanacross
Han
Hare
Northern Tutchone
Holikachuk
Upper Kuskokwim
Ahtna
Upper Tanana
Kaska
Deg Xinag
Southern Tutchone
Tagish
Central Yup'ik
Dena'ina
Eyak
Tahltan
Tlingit
Tsimshian
Alutiiq
Sugpiaq
Aleutian Islands
Unangax
Haida
Table of Language Groups
Indigenous Peoples and Languages of Alaska

Universal Broadband?
The Affordability Paradox

- **Underserved users say they need more bandwidth**

  BUT

- **Newly served users say they cannot afford to use as much bandwidth as they need to participate in the digital economy**

  - **Businesses, organizations cannot afford to use these services as much as they would like:**
    - **Webinars, Skype, videoconferencing, cloud-based services**
  - **Residents say they can't afford enough bandwidth and data for social media, distance education**

Affordability: Federal Universal Service Operating Subsidies in Alaska

Connect America Fund: providers

- High cost support
- Providers must offer voice and broadband

Lifeline: subscribers

- Subsidies for low income residents

Schools and Libraries: The E-Rate Program

- Most Alaska rural schools qualify for 84% subsidy or higher (max 90%)
- Qualified schools and libraries request competitive bids for services
- Schools and libraries often become “anchor tenants” for communities

Rural Health Care Program

- Subsidizes difference between cost of rural connectivity (e.g. at rural hospital) and comparable cost in major city, e.g. Anchorage

Alaska has received >$3 billion in USF funding since 1998

Backbone Networks in the North

Satellite (GEO)

Microwave

Submarine Fiber

Connectivity Challenges

- Satellites and Mobile Wireless
  - Most satellite footprints don't cover Alaska
    - Difficult to upgrade services for remote communities
  - Regulators want to repurpose some satellite frequencies for 5G
    - FCC: auctions for 3.5G spectrum
    - Canada: ISED proposes reverse auction
- Optical fiber
  - Expensive and difficult to install in the North
    - Ice scouring on the coast, permafrost
  - Expensive to modify to serve additional locations
    - Greenland fiber has no branching units for Baffin/Iqaluit
  - Business model unclear
    - Mackenzie Valley: Government funding, Northwestel management
    - Alaska: Quintillion as wholesaler, but limited market

Need for Spectrum: 5G vs. Satellite Use of 3500 MHz in the North

- Higher frequencies (e.g. 3400 MHz and higher): attractive for 5G
  - Already used for some satellite services
- Many remote communities rely on satellite communications
  - telephony and Internet services
  - TV and radio reception

US: > 4,000 licensed or registered TVROs
"thousands" unregistered
Canada:
927 licenses issued to 281 licensees
for services in this band

- Microwave networks
  - also use these frequencies

- What services get priority?
- Who has to move?

U.S. and Canada: Proposed Policies

Both countries:

- Have large territories that remain dependent on C-band satellite connectivity for interactive voice and data, and for radio and TV reception
- Prioritized reallocation of 3500 MHz for 5G over existing uses for satellite services and terrestrial fixed services
- Propose to auction 3500 MHz spectrum for 5G

Problems with auctions: Alaska experience

Reverse auctions: difficult for small providers

No competition

Almost all won by large incumbents

No Native providers participated

Neither country:

- requires that licensees build out 5G services throughout rural/remote regions

Conclusions: Lessons for other Regions

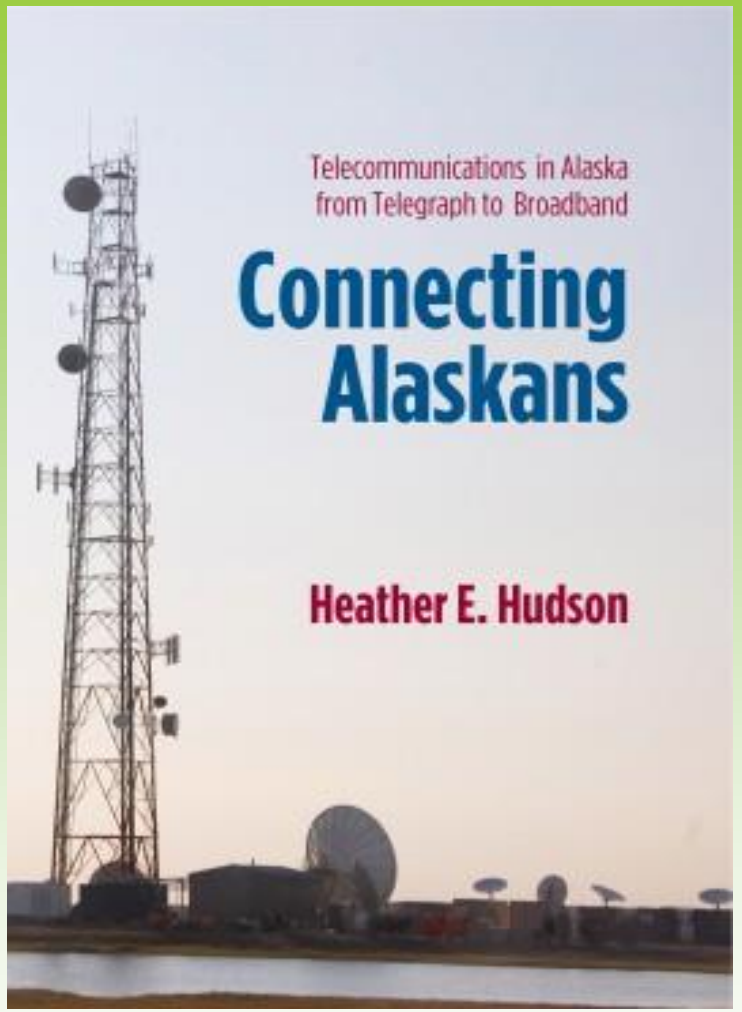
- **Participation in the policy /regulatory process**
  - ***Meaningful* community consultation and involvement**
- **The devil is in the details**
- **Affordability is key**
  - **Availability without affordability limits potential social and economic benefits**
- **The role of subsidies**
  - **Capex subsidies and other funding to extend/upgrade infrastructure**
  - **Opex subsidies to ensure affordability and QOS**
- **Continuity of services**
  - **Frequencies and facilities should not be changed or removed without a guarantee of continuity**
- **Enforcement**
  - **Licenses, deadlines, quality of service, pricing, etc.**

Thank You

For more information:

hehudson@alaska.edu

https://iseralaska.org/



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