Social and Economic Innovation in the Arctic:

The Northwest Arctic Borough's Community Utility Assistance Program

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Hilton Anchorage
Water Resources & Public Utility Track

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Preface

The Arctic is a “Bellwether”
for Changes in the Environment & Human Health

–**Northwest Arctic Borough (NAB)** lies above the Arctic Circle; along with Alaska’s North Slope; these boroughs make the USA an Arctic nation

Governance issues are prominent and dynamic with global implications

The **8-Nation Arctic Council is led by Iceland (2019-21_**as Chair)

Other 7 members are the USA, Canada, Kingdom of Denmark (Greenland), Norway, Russia, Finland & Sweden.

Also known as Circumpolar North countries

Environmental Health Roles

Environmental Health Practitioners create the field and practice of Environmental Public Health (EPH)

Intersection of environment quality & human health through understanding of climate change impacts / opportunities by:

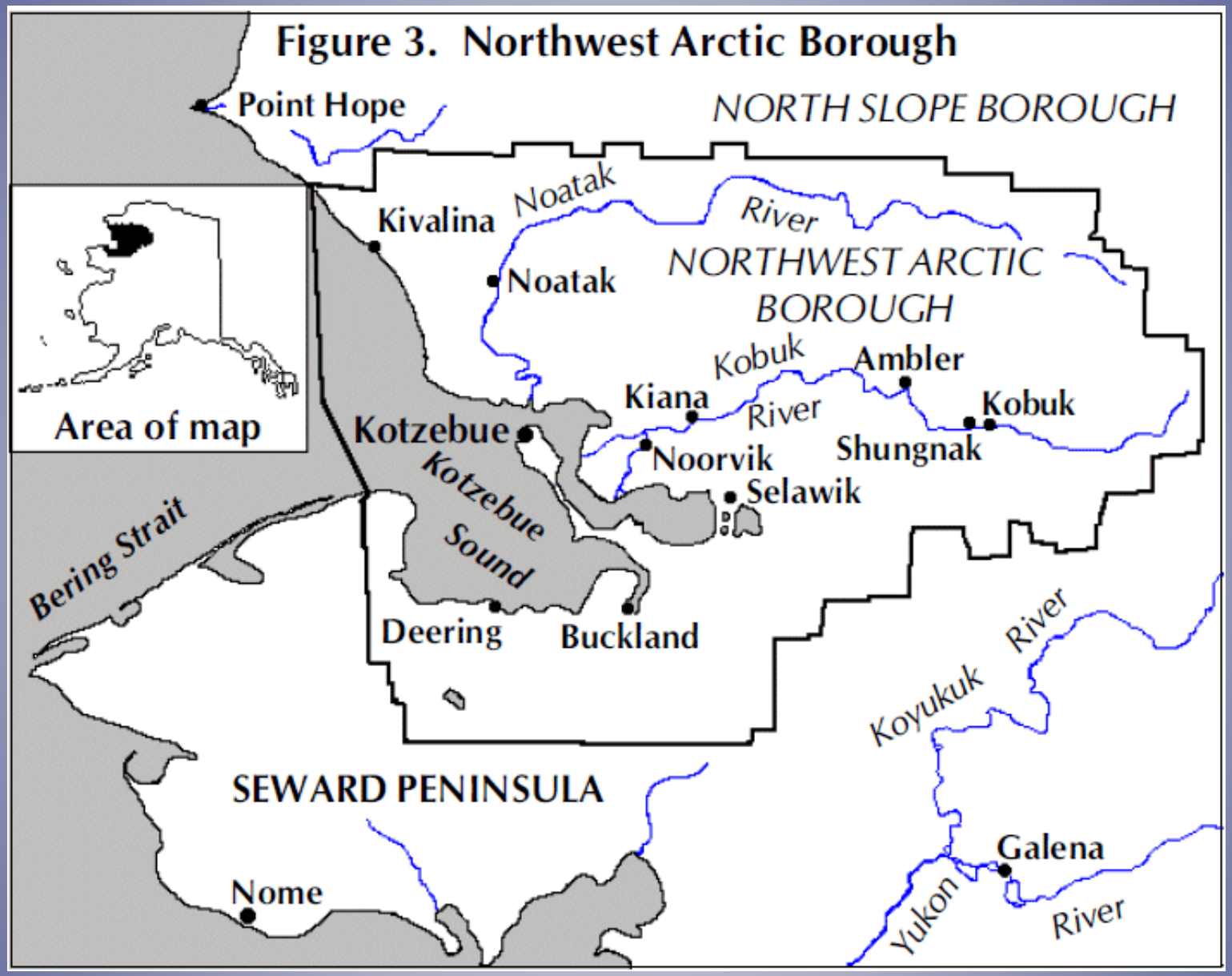
1. Understanding decision making
2. Supporting incorporation of sound scientific and technical judgment and evidence-based practice
3. Navigating politics and bureaucratic responses &
4. Improving governance through development of programs that foster resilience
5. Mitigating the impacts of resource development; and
6. Developing priorities to address the impacts of climate change on maintaining or improving the health of communities.

Arctic Geographic Context

- For the most part, the Northwest Arctic Borough lies above the NW Arctic Circle in latitude.
  - It is the parallel of latitude that runs 66 33′ 44″ (or 66.5622°) north of the Equator.
  - The region north of this circle is known as the Arctic, and the zone just to the south is called the Northern Temperate Zone.


Bering Sea
Provideniya
Magadan
Okhotsk
Nome
Anadyr
Anchorage
Valdez
Fairbanks
UNITED STATES
Chukchi Sea
Pevek
Cherskiy
Dawson
Perkatkun
Wrangel Island
East Siberian Sea
Barrow
Prudhoe Bay
Verkhoyansk
Inuvik
Beaufort Sea
CANADA
New Siberian Islands
Tiksi
Echo Bay
Yellowknife
Sachs Harbour
Kotel'nyy
Laptev Sea
Banks Island
Victoria Island
Cambridge Bay
Arctic Ocean
Queen Elizabeth Islands
Severnaya Zemlya
RUSSIA
Hudson Bay
Repulse Bay
Noril'sk
Ellesmere Island
Dikson
Alert
Franz Josef Land
RUSSIA
Kara Sea
Thule
Baffin Island
Baffin Bay
Novaya Zemlya
Nord
Barents Sea
Longyearbyen
GREENLAND
DENMARK
Svalbard
NORWAY
Labrador Sea
Sondre Stromfjord
Nuuk
Greenland Sea
Murmansk
Scoresbysund
Tromso
Arkhangel'sk
Ammassalik
Norwegian Sea
FINLAND
ICELAND
NORWAY
SWEDEN
Reykjavik
Helsinki
Atlantic Ocean

The Arctic boundary features Alaska; defined by the U.S. Congress under Public Law (P.L. 98-373, The Arctic Research Policy Act of 1984).



http://www.north-slope.org/departments/wildlife-management/co-management-organizations/ice-seal-committee/isc-research-projects/isc-harvest-documentation


Kotzebue
Selawik

Geography

Community	Location	Population
Ambler	Inland	258
Kobuk	Inland	151
Shungnak	Inland	262
Kiana	Inland	385
Buckland	Inland	420
Noatak	Inland	514
Kivalina	Coastal	400
Kotzebue	Coastal	3294
Deering	Coastal	133
Selawik	Coastal	841
Noorvik	Coastal	668

Kivalina (above) and Kiana (below)

Region Profile

- NAB was formed in 1986: 11 communities
- Size of Indiana
- Region is remote and isolated with no connecting roads between communities or with the rest of the state
- 85% of residents are Inupiat Eskimos
- Unemployment ~15.6%. The median household income: $45,976.
- 17.4% of the population has income below the poverty level

Region Profile, Northwest Arctic Borough

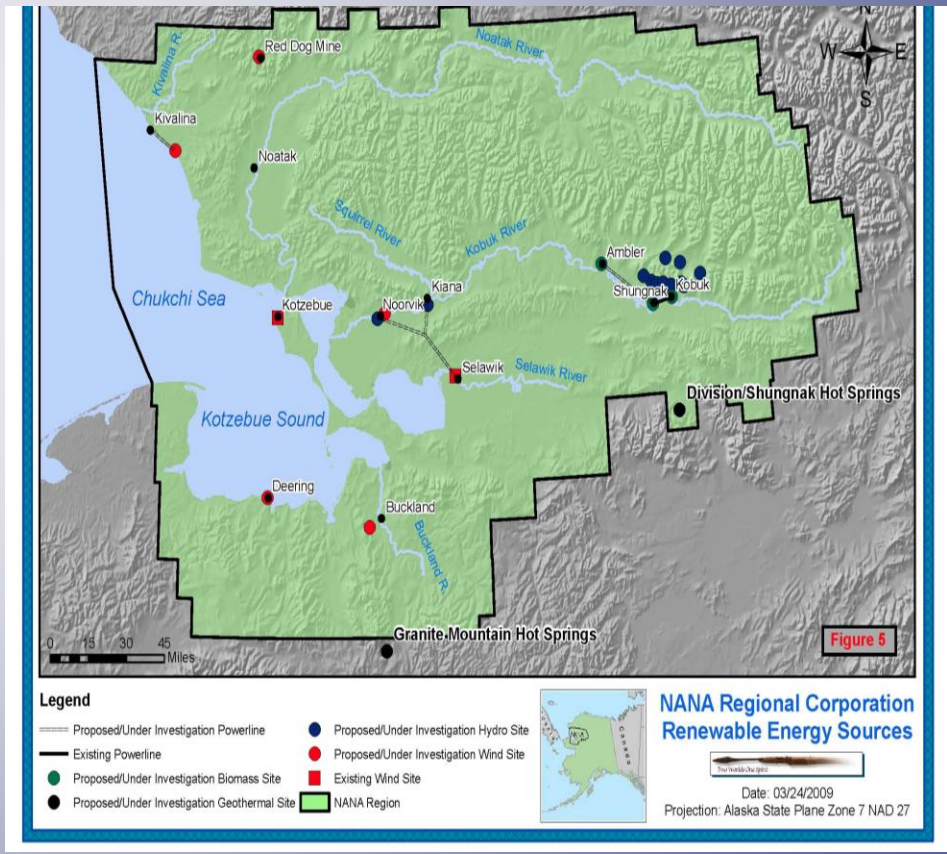
- Median age of population ~23 years old (2008)
- 40% of the Northwest Arctic Borough's employment is in government
  - By comparison, 25% for the State of Alaska as a whole
- 46.6% female; 53.4% male
- Climate: long, cold winters, cool summers
- Temperatures range: -52 to 85 degrees F.!
- Total precipitation averages are 9 inches per year with average annual snowfall 47 in.
- Home to the Red Dog Mine, the major economic development in the NAB
- Subsistence is a critical activity & many residents depend on it

http://www.nwabor.org/about.html

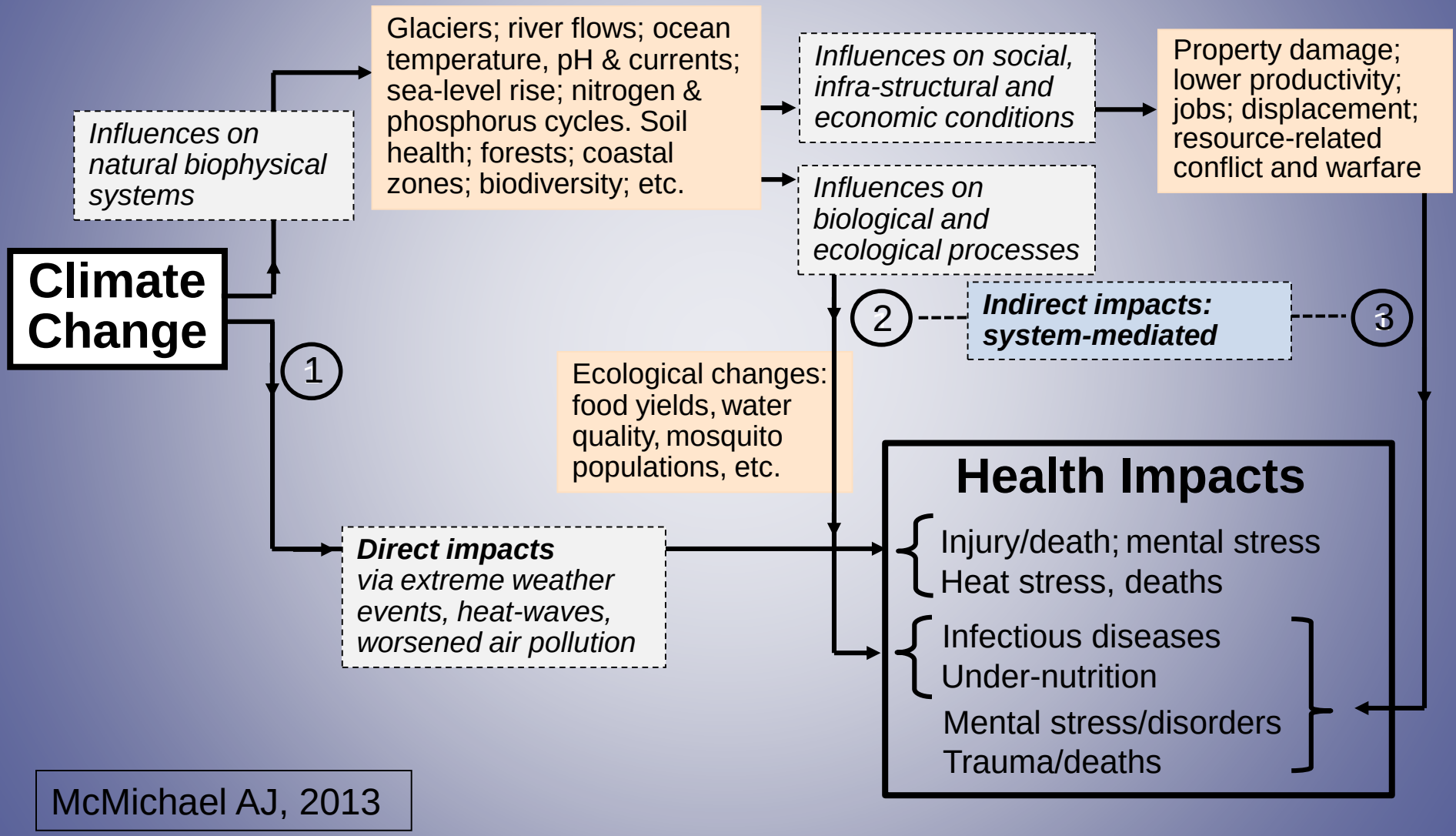
Renewable Energy

Total annual (non-transportation) energy consumption by communities in NW Alaska is estimated to be **5.3 million gallons** in diesel fuel or equivalent, not including the operations of the Red Dog Mine and port.

- Dependent on heating oil and gasoline.
- Stove oil: $5/gallon, median monthly expenditure >$530. The cost of wood varies from $120-$500. Electricity costs about $258 per month
- Wind, biomass, solar, hydroelectricity, geothermal energy sources. Energy policy should encourage sources that fit specific communities
- Red Dog mine is important source of PILT payments (payments in lieu of taxes to NAB)



Climate Change: Health Impact Pathways



McMichael AJ, 2013

Although climate change can cause illness and death directly…

There are multiple global risks

Innovation @ Work: Community Utility Assistance Program (CUAP)

Challenge: In past years, NAB residents struggled to pay high water/sewer bills

	Current bill per month	Delinquency rate, 2017
• Ambler	$210/month	47%
• Buckland	$175/month	12%
• Deering	$105/month	41% (sewer only)
• Kiana	$140/month	13%
• Kobuk	$200/month	58%
• Kotzebue	$134.61/month	35% (excludes garbage)
• Noatak	$138/month	50%
• Noorvik	$157.50/month	31%
• Shungnak	$180/month	54%
• Selawik	$200/month	94%

– Over $1 million is owed in delinquent payments!

Goals of the Borough Community Utility Assistance Program

1. Cut average residential water/sewer bills by ~2/3
2. Reduce the number and cost of emergencies
3. Provide regional training and support for Operators and Administrators
4. Increase construction grant funding for villages through improvement of best practice scores and preventive maintenance

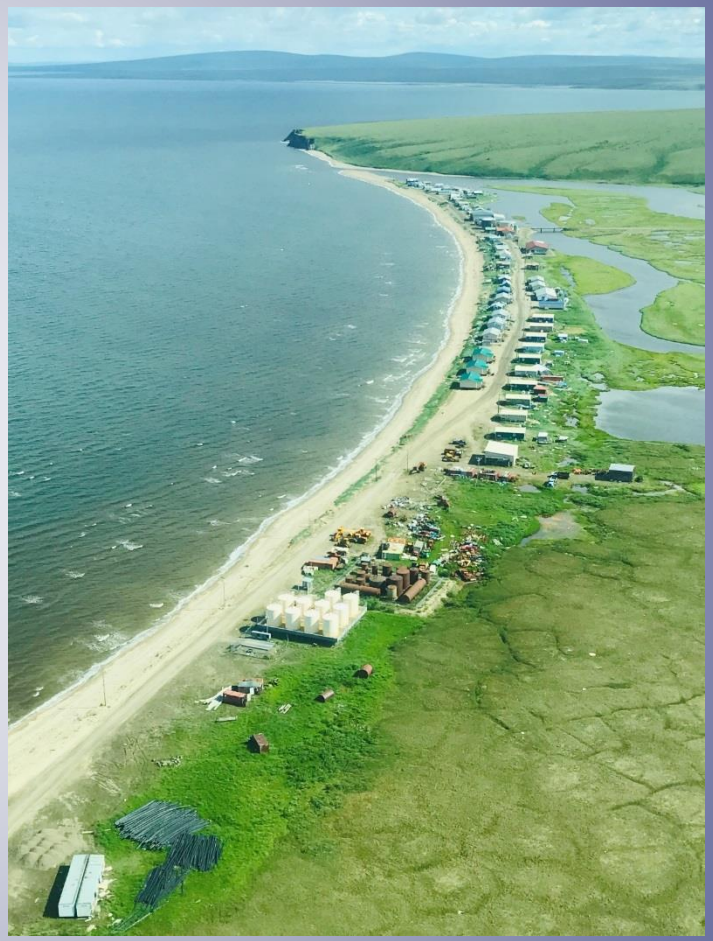
Are Healthy Sustainable Alaskan Communities Attainable? Change and Innovation in Alaska

Dr. Konkel's Applied Research Focus is in "Human Dimensions in the Arctic"

Community Utility Assistance Program (CUAP)

In 2018, ANTHC Partnered with the NAB to formulate the creation of the Community Utility Assistance Program (CUAP)

- This program takes a pro-active approach to addressing emergencies by rewarding communities for practicing good business behaviors.



Major Provisions for the NAB

1. All water/sewer operator labor costs & benefits.
2. Purchase of community water system heating fuel.
3. Payment for customer monthly billing service.
4. Training funds for Operators and Administrators.
5. Funding to hire a regional utility coordinator to provide assistance to operators and help run the program.

Operational Efficiency Measures

ANTHC

1. A billing service for every community.

2. Labor account services as a source used to pay operators.

3. The hiring of a NAB funded staff member to assist communities by:
    1. Carrying out work plans
    2. Processing payroll
    3. Assisting with PM plans
    4. Coordinating training
    5. Providing on-site technical assistance

Ownership & Implementation Agreements

Community

1. Continued ownership of the water/sewer system and hiring of local operators.
2. Reduction of water/sewer rates.
3. Ensuring collection of monthly payments from all customers and building a reserve to help pay for spare parts.

Ownership & Implementation Agreements

4. Completion of monthly preventative maintenance (PM) plans to reduce emergencies.
5. Completion of the Annual Work Plan with upgrades and maintenance.
6. Compliance with RUBA-- The Rural Utility Business Advisory program best practice scoring criteria.

Administered by the Alaska DCCED

(Dept. of Commerce, Community & Economic Development)

CUAP Program Results

- 8 Northwest Arctic Borough (NAB) communities have decided to participate
  - Noatak manages its own Water and Sanitation & Shungnak will also remain independent (on its own) in managing these utilities
- Rate reductions have already occurred in communities that have joined the CUAP program (retroactive to July 2018)

Residential Water And Sewer Rates

Community	Pre CUAP Rate	Percent Reduced	CUAP Rate	Individual Household Yearly Savings
•Ambler	$210 per month	66%	$71.40 per month	$1,663
•Buckland	$175 per month	66%	$59.50 per month	$1,386
•Deering (Sewer Only)	$105 per month	66%	$35.70 per month	$832
•Deering (Water Only)	$.25 per gallon	66%	$.085 per gallon	$16.50 per gallon
•Kiana	$140 per month	66%	$47.60 per month	$1,109
•Kivalina	$.05 per gallon	Rates were already subsidized by the City of Kivalina	$.05 per gallon	$29,120 Saved by City
•Kobuk	$200 per month	66%	$68.00 per month	$1,584
•* Noatak	$138 per month	Have Not Joined Program	$46.92 Per Month	$1,093
•Noorvik	$157.50 per month	66%	$53.55 per month	$1,247
•* Shungnak	$180 per month	66%	$61.20 per month	$1426
•Selawik	$250 per month	66%	$85.00 per month	$1980

Noatak and Shungnak are currently not CUAP members

Residential Collection Percentages

Community	Pre-CUAP Collection Percentage	Current Collection Percentage
•Ambler	96%	147%
•Buckland	Unknown	76%
•Deering	111%	94%
•Kiana	102%	176%
•Kivalina	Unknown	50%
•Kobuk	85%	254%
•Noorvik	95%	130%
•Shungnak	83%	137%
•Selawik	41%	109%

Low collection percentages are expected for the two newest NAB Communities; anticipate %s to go up as customers begin paying their bill regularly through the ARUC office in Anchorage.

COMMERCIAL RATES have decreased by 50%!

Lack of Preventive Maintenance leads to:

1. Winter time emergencies which are expensive and leave residents without water and sewer for months at a time
2. Low Best Practice scores, leading communities to lose out on grants needed to build or improve their water/sewer system.

In Sum, working together, how can the Borough help?

1. Reimburse village water/sewer operator labor costs & benefits
2. Purchase bulk fuel for village water systems
3. Pay for customer billing service
4. Provide training money for operators and administrators
5. Hire a regional utility coordinator to provide assistance to operators. The coordinator would work closely with the Maniilaq Remote Maintenance Worker program

Working together, how can villages help?

1. Continue to own the water/sewer system and hire local operators
2. Reduce water/sewer bills
3. Collect money from all customers each month
4. Build up an emergency reserve
5. Complete monthly preventative maintenance and budgets

Best Practice scores increase the chance of grants to build or improve water/sewer systems. They will also help insure children have the healthy benefits of water/sewer into the future.

"I love clean water because it could make me run faster and be healthier." **Anaya Dozette**

"Clean water could help me stay healthy so I won't get sick." **Jallissa Kelly**

"Clean water can make my bath better." **Rochelle Cleveland**

Back row- Clara Maude Cleveland, Beverly Dean (Teacher)

Middle row- Rochelle Cleveland, Patsy Gray, Justin Custer, Arlene Cleveland, Jallissa Kelly, Storm Woods, Zander Downey

Front row- Rihanna Greist , Jody Greist, Landen Douglas, Zaylee Williams, Anaya Dozette

Ambler 3/30/2018

Cost of proposed program

Proposed cost to Borough of $1.85 million a year

Operator labor	$980,000
Customer billing	$ 85,000
Bulk fuel	$295,000
Coordinator & training	$350,000
Kotzebue subsidy	$125,000

Future year costs should be less.

- Lower fuel cost, with bulk school purchase
- Labor and training costs decrease after repairs

Alaska's Policy Swings

Governor Sarah Palin Administration
DEC. 4 2004 – JULY 26 2008

- Climate Change Cabinet-level Subcommittee
  - Immediate Action Working Group
  - Many state agency Commissioners and Deputy Commissioners were represented
  - Replaced from July 2007 – Nov. 2014 by Gov. Sean Parnell

Policy Swings

Governor Bill Walker's Administration 2014-2018

- Climate Change Action Plan
  - Members appointed by the Governor through the Boards and Commissions function in his Office
  - Website created and actions coordinated by a Seattle consultant

Policy Swings

Current Gov. Michael Dunleavy (R-Wasilla) 2018 – ?

- Suspended all work of the previous Administration on the Climate Change Action Plan

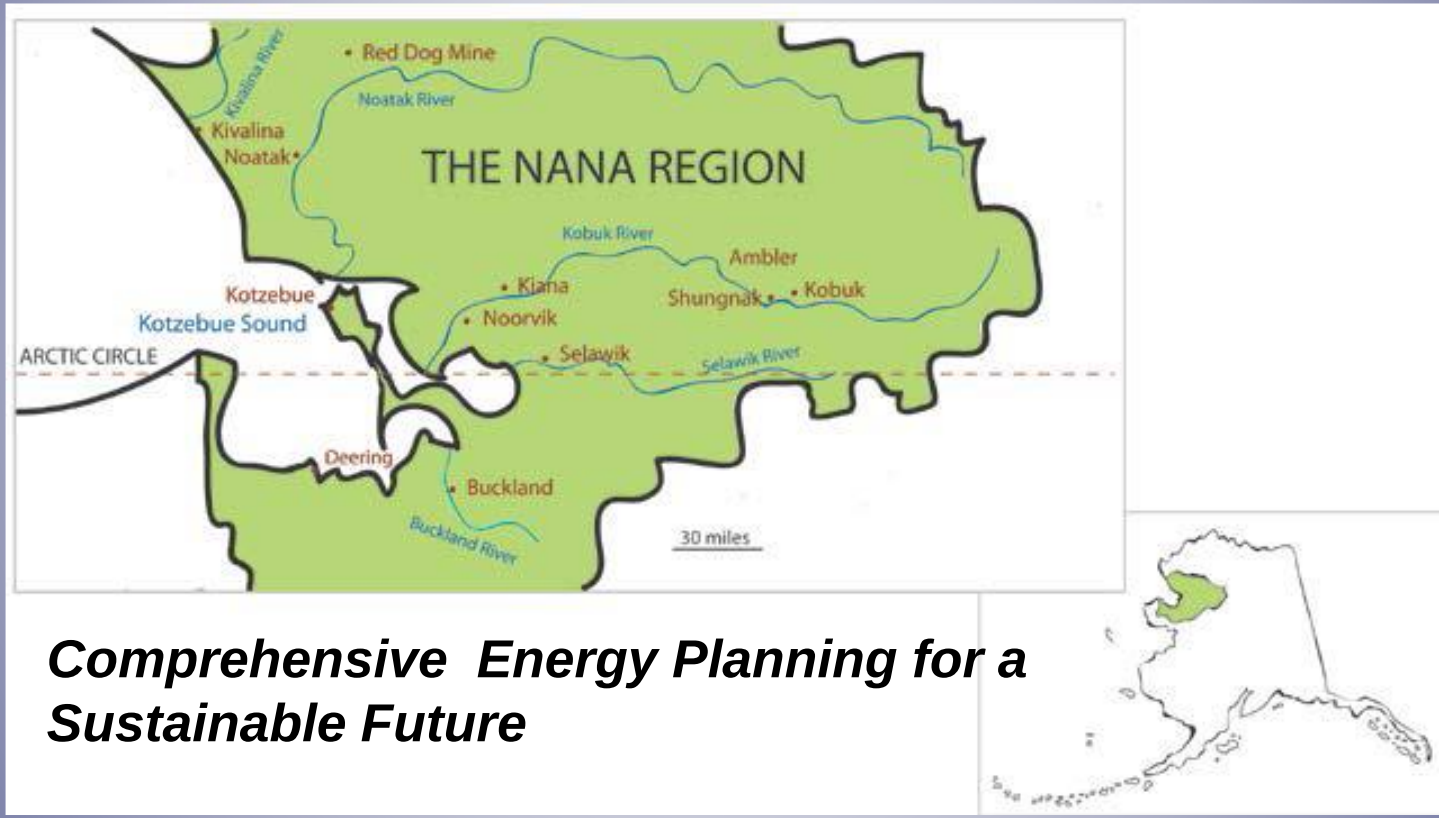
- In public safety (SB91 repeal) briefing, stated in response to a question on coastal and riverine erosion and villages having to relocate because of changing environmental conditions driven by climate,

"It's not my priority."

Conclusion

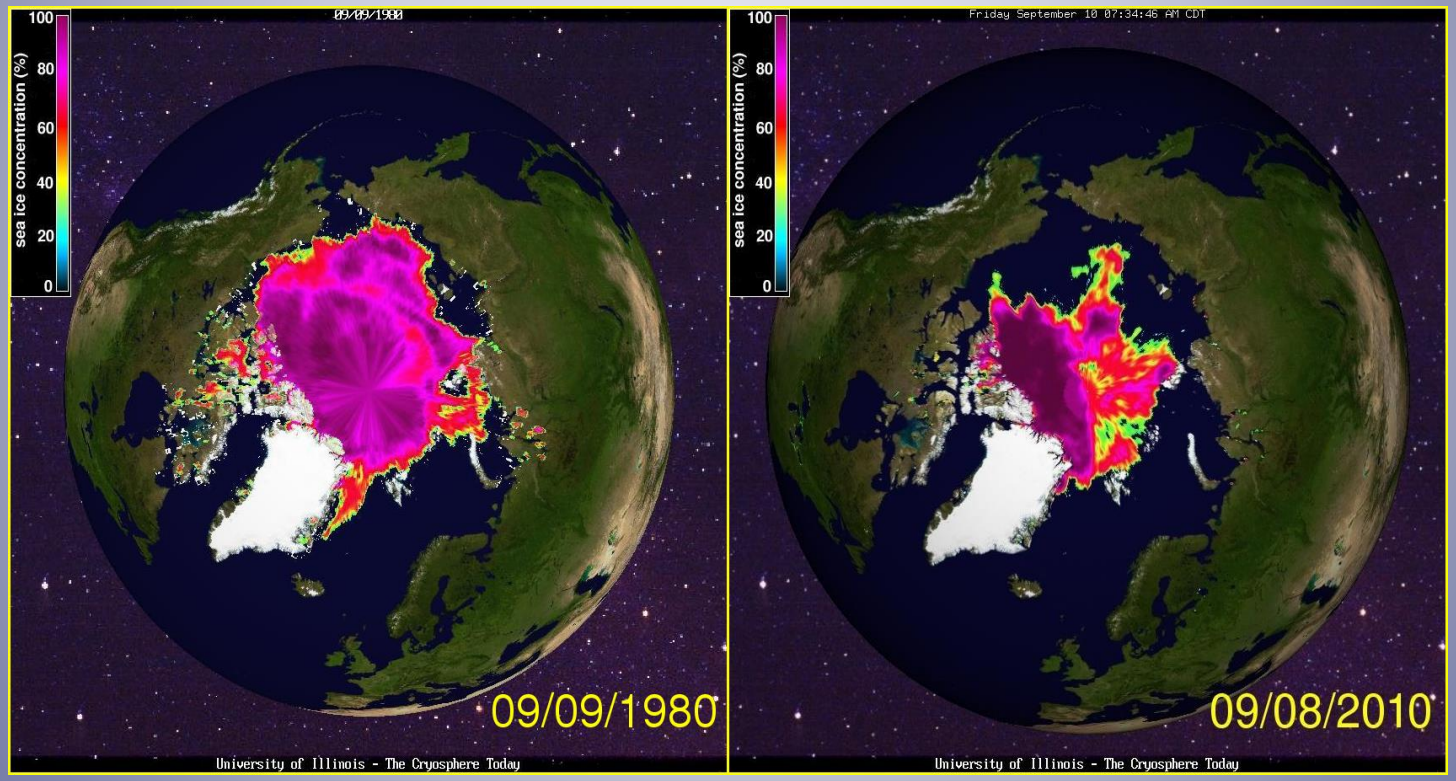
- Climate change impacts on coastal and riverine erosion and infrastructure are becoming more recognized; costs in Alaska alone range from $100 million to $350 million per year. Newtok is moving to Metarvik.
- The Community Utility Assistance Program is an innovative approach to drinking water and sanitation utilities in the Northwest Arctic Borough.
- Alaska has a new Governor (M. Dunleavy-R), and a newly constituted 31st Alaska State Legislature. Operating, capital, and permanent fund dividend issues are outstanding as of 'press time.' New funding realities associated with a structural budget deficit.

NANA Region &
The Northwest Arctic Borough



Comprehensive Energy Planning for a Sustainable Future

30 Years of Ice Depletion



"Comprehensive" means that everything and everyone has a relationship with what is being planned via full stakeholder engagement.

Alaska, the Great Last Frontier, is at the "coalface.'

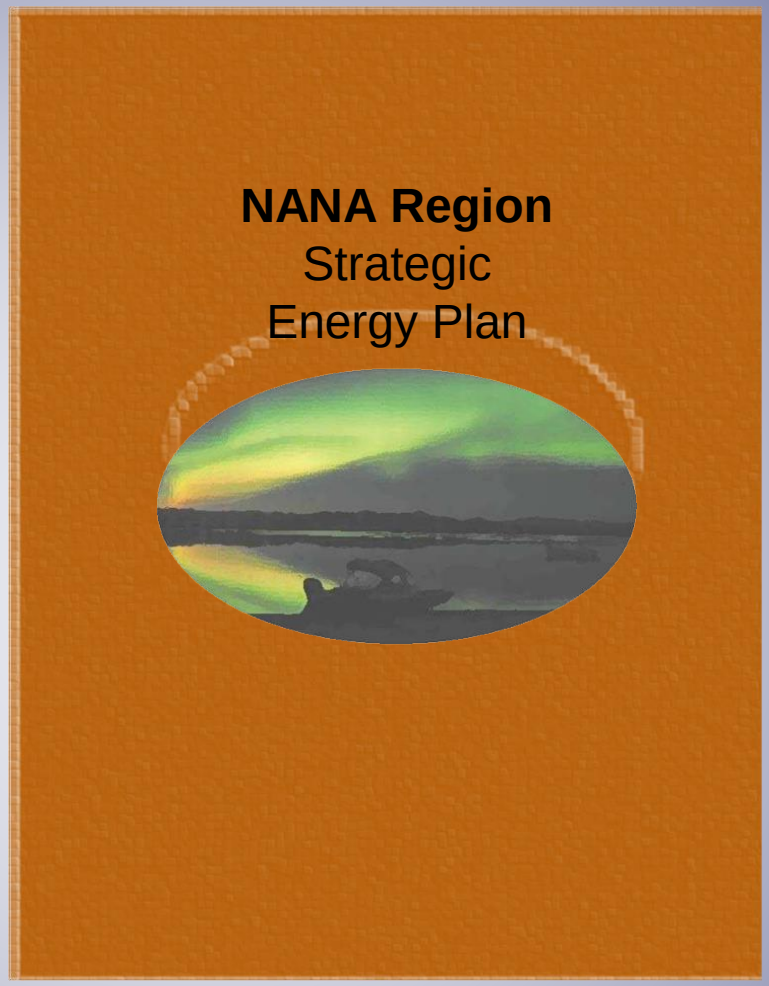
Selawik Alaska

Located on tundra with melting permafrost underneath

Water and sewer lines goes above ground

NANA REGION

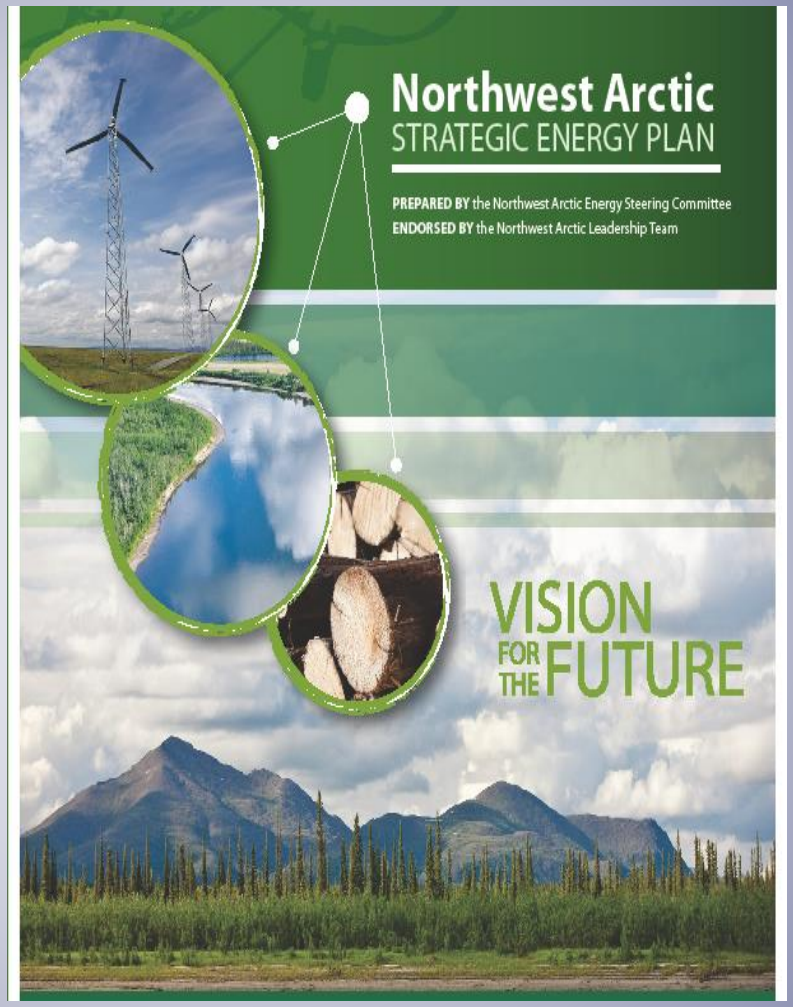
Kotzebue
Noorvik
Selawik
Kiana
Deering
Buckland
Noatak
Kivalina
Ambler
Shungnak
Kobuk



Prepared
for
NANA Regional Corporation
December 31, 2008

NANA REGION

Kotzebue
Noorvik
Selawik
Kiana
Deering
Buckland
Noatak
Kivalina
Ambler
Shungnak
Kobuk



Stakeholders in the NAB

- Governments (Tribal, City & Borough)
- Corporations and Industry
- Education (Schools & College)
- Utilities (Electrical, Water & Sanitation)
- Transportation (Air, Barge, Truck)
- Health Organizations such as Manillaq
- The people in communities

NAB Energy Awareness project

2009 Smart Energy meters-all households

TED 1001 Energy Monitor

ECO- Meter for Kotzebue

Wind diesel projects

Selawik 2007- AVEC

Using funding from the AEA renewable Energy fund, Wind/diesel systems are also being constructed in Buckland and Deering

Kotzebue (KEA) 1997

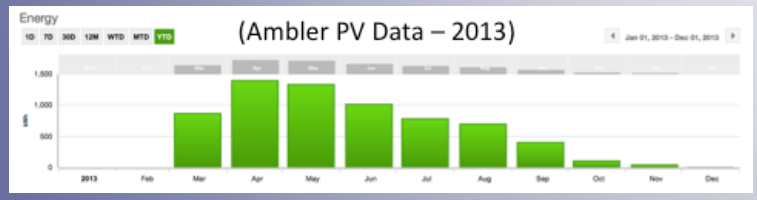
Buckland 2014

LED Conversions for Lighting

- Up to 60 % savings in electricity can be achieved by changing to LED lights. 2009
- Conversions are being made for Community buildings and Street lights. 2009-2014

2011 NAB Synergy of Pilot Projects

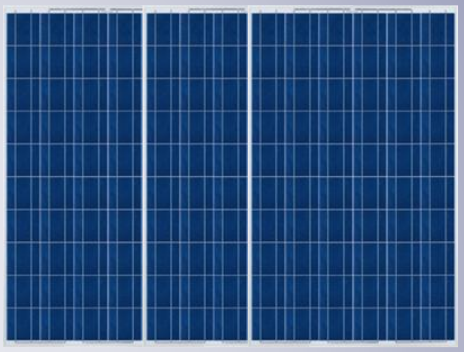
Photos: Northwest Arctic Borough



Powering water treatment facilities with renewable energy

- Borough population: 7,810
- Electricity for village water / sewer plants
- Launched in Ambler, replicating across borough
- 10,000 kWh/year from 10 kW array
- Peak production April-June
- Long sunlight hours in summer + 30% reflection from snow-covered ground in spring
- 12.8 year payback

hotspot energy



DC4812VRF Solar/DC Air Conditioner/heater

Pilot Projects In Kobuk and Ambler

12,000-18,000 BTU, 48V DC
Heat Pump VRF
Dynamic Capacity Compressor 100% DC - No Inverter with AC backup

1 Kw Solar installed saves another $ 410-860/year

We are all in the same boat

Thank you for your attention. Questions?

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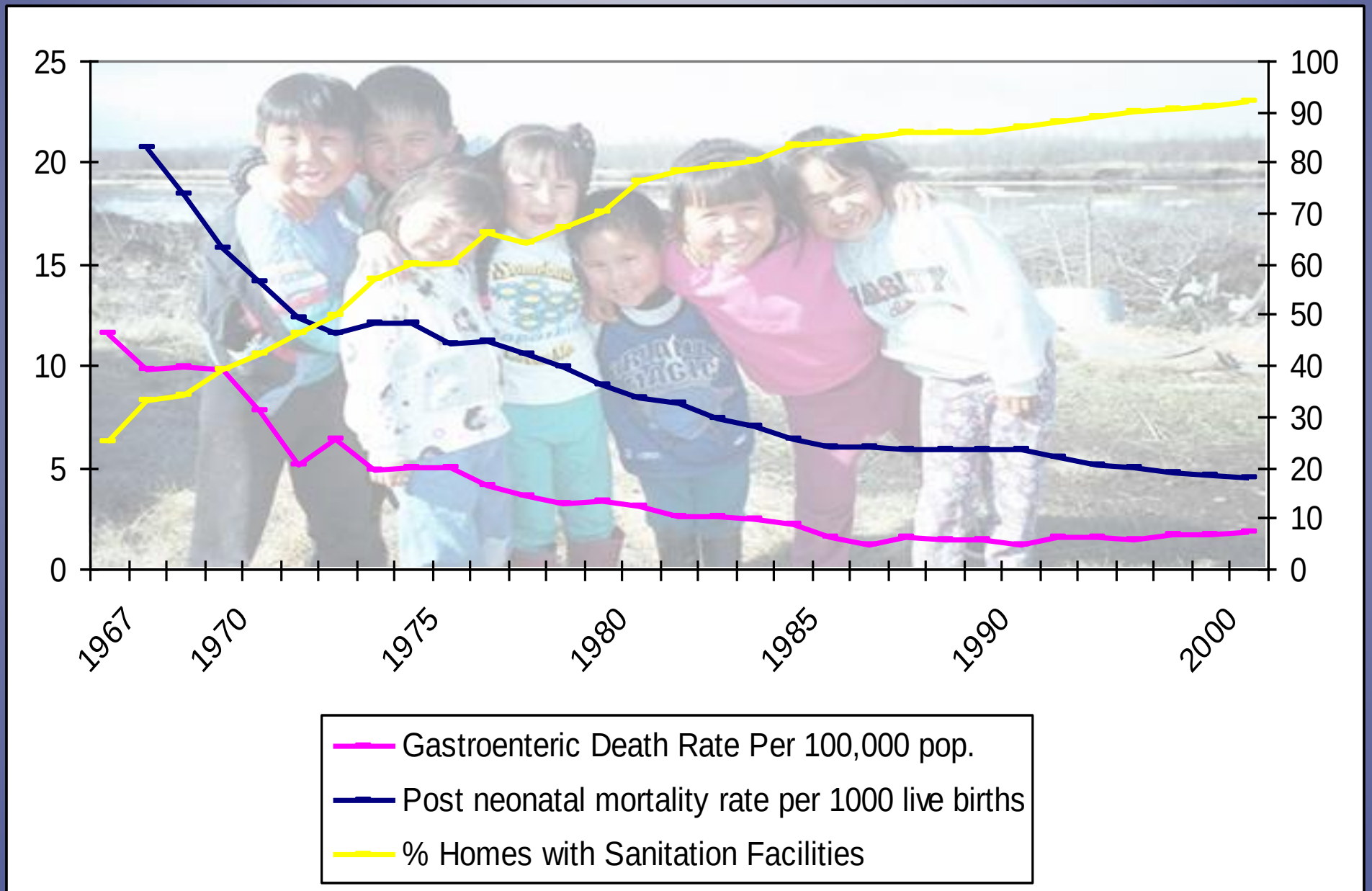
Energy Perspectives in the Northwest Arctic Borough

Snyder kids, Selawik, AK

(photo courtesy of Michael Brubaker, ANTHC, 2011)

Gastrointestinal and postneonatal* mortality rates compared with percent of American Indian and Alaska Native homes having sanitation facilities




Current Study Area
(Northwest Arctic Borough)
ANTHC Target Area
(Entire State of Alaska)
FAR NORTH
SOUTHCENTRAL
INTERIOR
INSIDE PASSAGE
ARCTIC OCEAN
BEAUFORT SEA
Barrow
Prudhoe Bay
Deadhorse
Kotzebue
Taylor
Pilgrim Springs
Nome
Council
Coldfoot
Circle
Fairbanks
Chena Hot Springs
Nenana
North Pole
Kantishna
Healy
Chicken
Delta Jct.
Tok
Bethel
Trapper Creek
Talkeetna
Wasilla
Gakona Jct.
Glennallen
Anchorage
Palmer
Chitina
Dillingham
Kenai
Kennicott
Naknek
Soldotna
Whittier
Valdez
McCarthy
Seldovia
Seward
Cordova
King Salmon
Homer
Carmacks
Ross River
Destruction Bay
Haines Jct.
Whitehorse
Carcross
Chignik
Port Lions
Kodiak
Haines
Skagway
Juneau
Hoonah
Tenakee
Angoon
Sitka
Kake
Petersburg
Wrangell
Hollis
Ketchikan
Metlakatla
Prince Rupert
CANADA YUKON
GULF OF ALASKA
Key
= Road
= Pipeline

ARUC has expanded since 2008 to maritime climates.

Kivalina, Northwest Arctic Borough

374 residents, 97% Inupiat, note physical location adjacent to the Chukchi Sea (Arctic Ocean) 83 miles above the Arctic Circle RELOCATION
Traditional lifestyle revolves around subsistence, year round. $200 million (Est.)

Scientific Consensus

Global warming is ‘unequivocal’

Global effects are detectable ‘with high confidence’.

Intergovernmental Panel on Climate Change

Conclusion

- Climate change is happening in Alaska & the Arctic.
- We need research, integration of capabilities and capacity, and implementation of sustainable infrastructure projects.
- Innovation and technology: huge asset.
- Arctic environmental conditions are changing, challenging.
- Epidemiologists and environmental health professionals are extremely well positioned to play a key role.
- Sustainability builds on our competencies, strengths, energy and vision. Collaboration is essential, relationships integral. Think Global, Act Locally!

Acknowledgements

John Nichols, Program Manager, Alaska Rural Utility Collaborative (ARUC Program, ANTHC)
Mike Black, Director, Rural Utility Management Services, Alaska Native Tribal Health Consortium (ANTHC)

Ingemar Mathiasson, Energy and Resources Coordinator, NAB

Eric Hanssen, former Project Manager, Rural Energy Initiative, Alaska Native Tribal Health Consortium (ANTHC)

Cruikshank Lecture & Track I Climate and Health Plenary
Dr. Tony McMichael
20th World Congress of Epidemiology (WCE 2014)
Anchorage, Alaska

Dr. Tony McMichael
Anchorage, AK
20th World Congress of Epidemiology
August 14-17, 2014
"A Tri-Polar View of Prospects for a Warming Planet" Plenary & the Robert Cruickshank Lecture

Captain John Spriggs, US PHS, "Father of the ANTHC Rural Utility Cooperative," in memorium issued by the 29th Alaska Legislature, Feb. 2016

We are all in the same boat

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