

SESSION TWO: FOOD, ENERGY, AND WATER AS RESOURCES IN THE FEW NEXUS

WATER

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SUMMARY OF CURRENT KNOWLEDGE/RESEARCH

- We know basic water treatment techniques
- The system is changing

Links to Food

- Water quality is directly tied to health and food sources

Links to Energy

- Energy usage for water treatment (\$\$) - maybe opportunities to decreasing cost with efficiency improvement
- Replacing outdated equipment
- Cost of heating and distributing water

CHALLENGES

- Public perception of Alaska water and education

Short-Term

- Can we use known water treatment strategy, efficiency retrofitting in rural communities?
- How to engage communities in process, development and training? (long term)
- What are indirect costs to water quality issues in Alaska, both health and economic impact?
- Decreased state funding, maintenance at home and community level

Long-Term

- How to operate and sustain treatment systems given energy and infrastructure
- We don't know which parameters are most important for each community
- Water transportation

PRIORITIES FOR RESEARCH NEEDS

- rain/snow harvesting
- Transportation (LOO)
- Public perception/education (L)

Short-Term

- Opposition with environmentally threatened communities that needs to relocate, for community planning - but MUST engage and include customers and communities throughout entire process to establish a new paradigm for rural islanded communities
- Consult expert local knowledge of hydrological system
- How much water (what purposes, how much?) is used, what can communities afford? What is a culturally appropriate system?
- Using known water treatment strategies in rural communities
- Data on water usage in rural Alaska communities
- Community engagement
- Optimal community planning based on prior knowledge

Long-Term

- How will climate change (higher sea levels, higher temperatures) erosion rates, permafrost thaw, affect future of quantity and quality of water?
- Changes in water transportation (+long)
- O & M - sustainability of water systems (+long term too)
- multiuse/re-use of water
- PPT harvesting
- How will climate change affect disease vectors and water-borne pathogens? What parameters necessary?
- We don't understand impacts of big potential projects - Pebble Mine, Food and Agriculture
- Adaptable community systems
- Water quality impacts food quality
- Impact of industry

Cheryl

- Research studies that have found connections between quantity and health outcomes

- Indirect cost of lack of access to adequate amounts of water
 - Slower graduation rate
 - Lost work days
 - No actual research

Tom

- Climate change impact
 - ANTHC Rural Energy INitiative
 - NW community
 - Erisosion
 - Increased turbidity
 - Need different treatment of water

Jamie

- Do not know where water is
- Water vulnerability assessment index (Arctic)

Bill

- Know how to treat water given enough money

Known	Unknown
Water impacts health	Perception of people to water
Know energy usage in water utilities in ~70 communities (ARUC)	Parameters jeopardizing water quality in communities
Concerns of giardia moving further north	Using known water treatment strategies in rural communities
Inefficiency in water usage <ul style="list-style-type: none"> ● Hardware ● Human capital ● Work with local operators (ANTHC) ● Lower temperature of water, just needs to keep it from freezing 	Data on water usage <ul style="list-style-type: none"> ● Might be at the community level
Hydraulic systems are changing	What does an adaptable/resilient water system look like?

No routine manuals and procedures	Maintain decentralized systems
Decentralize water	Snow water harvesting?
Communities need to be engaged in water decisions	Do we need to treat water in the future?
Other Arctic communities face same challenges	Decision making for multi-use
We can develop systems to treat water given sufficient resources	Local knowledge
High energy costs for water treatment	Affordability
	Specific impact of climate change
	What is a culturally appropriate system?

ARUC

- Lower energy costs to 24%
- Low cost of oil, warm winters

Newtok

- New contractor for relocation effort
- Wastewater treatment (same issues apply)

Transportation

- Food, change for better or worse?
- Increase public awareness of water change
- Self determination
 - Working knowledge base to make decisions
- Multi-Use of water
 - Salmon
 - Business development

Additional Notes

- Know
 - Studies connect provision/quantity of water and health
 - Know how to build a water treatment system given enough money
 - But how sustainable is that system?

- Operability and appropriateness of solutions
- Water Use? Volume?
 - Cultural Issues
 - Depends on accessibility
 - Diversity in use/purposes/how much?
- Need to know
 - Indirect costs
 - Health with water...? What is economic impact?
 - How climate change affects water security
 - What is future vulnerability
 - Fresh water supply
 - Work doing at ANTHC
 - Also erosion component and infrastructure stability
 - NW Arctic - erosion up turbidity TS
 - Limited instrumentation - know changing but limited information
 - Arctic water reserve vvl. Index
 - Takes more energy to treat and distribute water in rural Alaska
 - 40% of cost is energy and heating of water
- ERAC
 - Decrease in cost due to energy/efficiency projects, warm winters, fuel oil -
 - So maybe there is an appropriate to lower cost of providing clean waters
- Climate change - migration of Giardia up North
- Energy priority/efficiency retrofits
 - LED lighting, pumps, hands-on training and changes (decrease T of water loops, etc.)
- No routine manuals/maintenance/processes at DEC
- State funding decreasing
- DEC
 - Alaska Water and Sewer Challenge
 - Use known tech on house scale to decrease cost
 - Maintenance at home leve challenge
- Challenges
 - Training of locals in maintenance
 - Baseline quantity of water to know how it is changing
 - Community engagement on treatment - inclusion of customers through entire process
 - Are changing levels of water treatment acceptable?

- Def. water - social, bio, chemical
- Delivery
 - To community households
- Source of water
- As a disaster - what does a flexible/adaptable system look like?