NNA REU 2026
Mariculture in Valdez, AK

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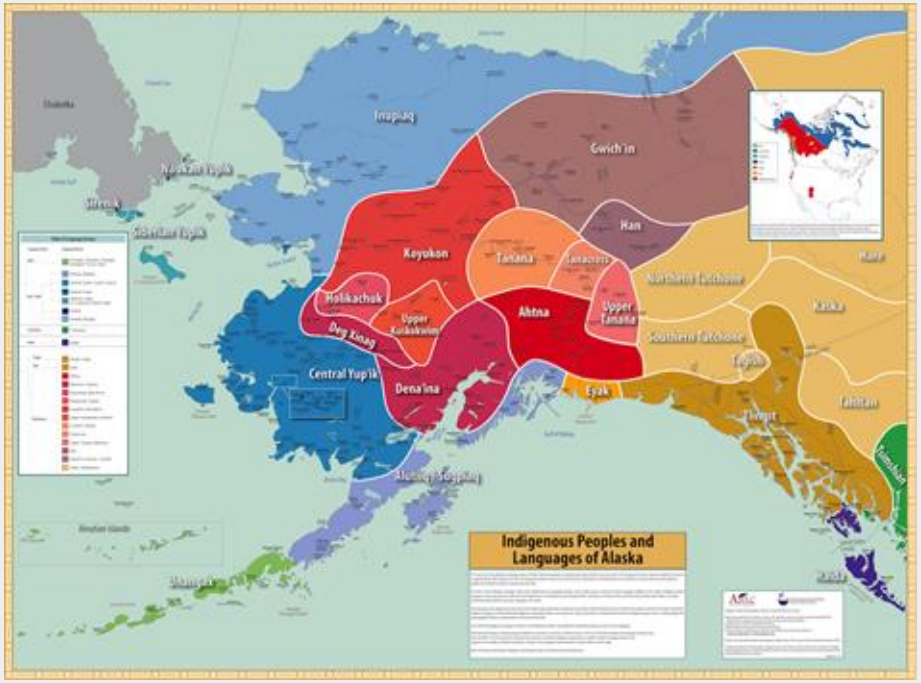
02/05/2026

JACK BAY

Land Acknowledgement



We acknowledge that we are presenting on the traditional lands of the Dena’ina people.

We acknowledge that we live on the traditional lands of the Dena’ina, Tlingit and Eyak.

We acknowledge that our research projects are on the traditional lands of the Alutiiq/Sugpiaq and Troth Yeddha', a traditional gathering place for the Lower Tanana Dene

Kelp & Oyster Farming in the Prince William Sound

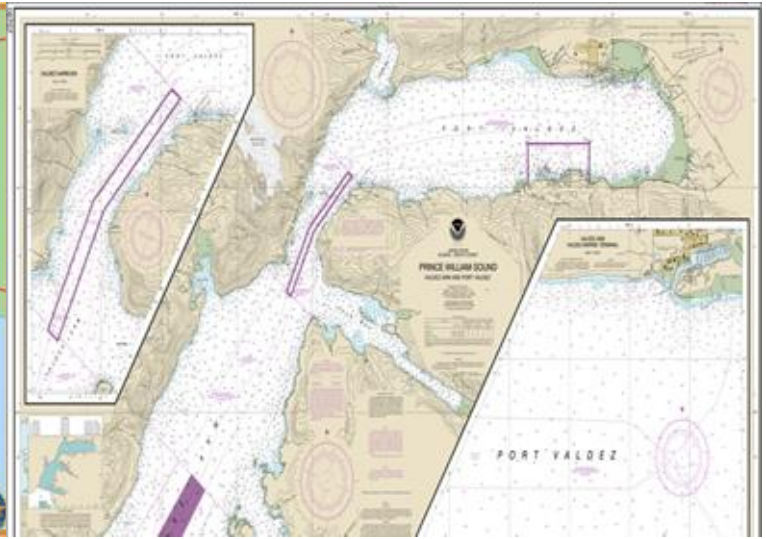
LOOKING ACROSS THE BAY HEADING OUT TO SAMPLE

01

Valdez, AK


Arctic Ocean
Chukchi Sea
Prudhoe Bay
Beaufort Sea
UNITED STATES
ALASKA
Fairbanks
TRANS-ALASKA
PIPELINE SYSTEM
CANADA
Anchorage
Valdez
Bering Sea
Gulf of Alaska
Juneau
Pacific Ocean


Chugach
Mountains
Valdez
Whittier
Prince William Sound
Cordova
Kenai Peninsula
Gulf of Alaska

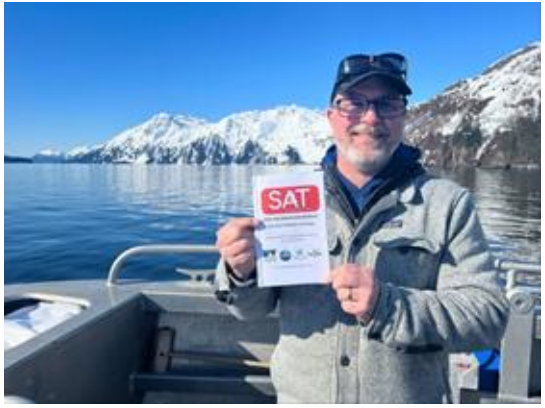

PORT VALDEZ

SAMPLING LOCATION

POTENTIAL FARM SITE IN JACK BAY

Test Sites:

- Port Valdez
- Sawmill Bay
- Jack Bay
- Galena Bay



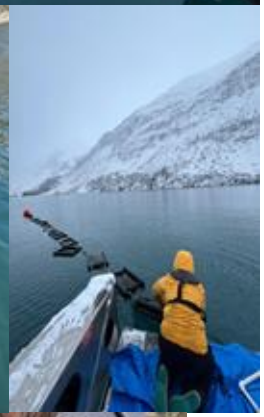
Tommy holding the Site Assignment Toolkit

Getting ready to sample, Tommy and Amanda


Hannah collecting water samples for UAF OARC

NNA CO

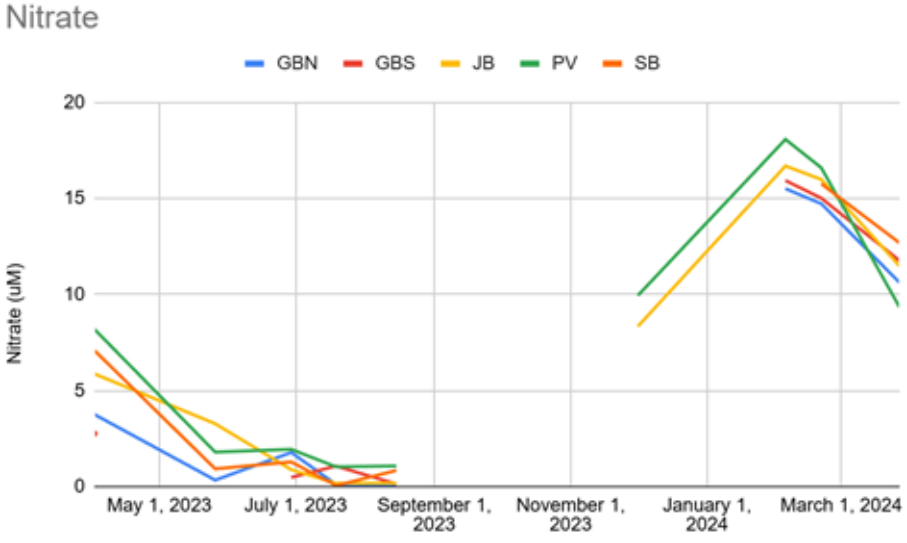


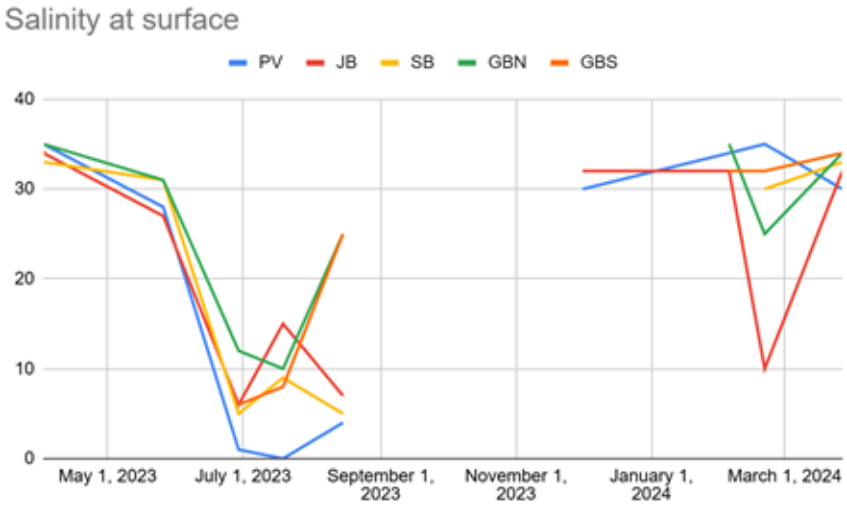
What Goes into Picking a Site?

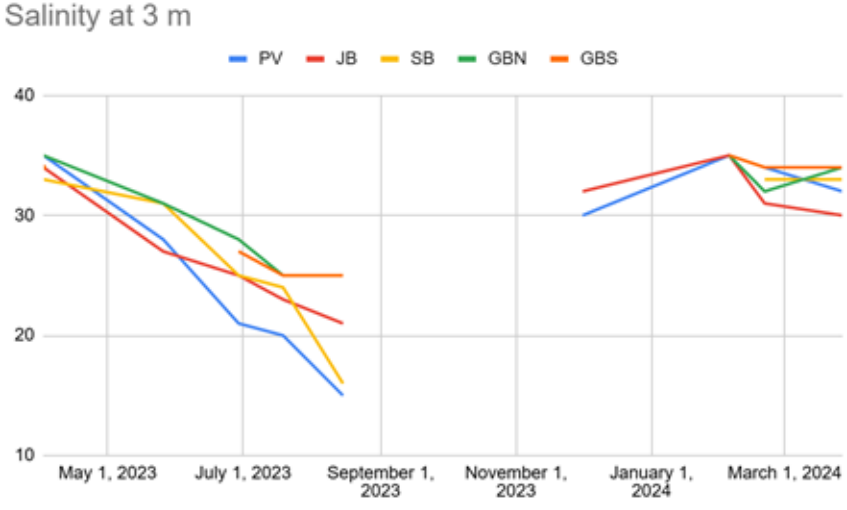
- Gas cost
- Mileage
- Ease to get to year round
- Water sampling data
- Depth
- Biofouling
- How busy the area is
- Environmental conditions
- Possible Hazards
- Regulations
- Historical significance
- Educational Opportunities

Site Selection Data



- Water Sampling: Nitrate, Nitrite, Phosphate, Silicate, Ammonium, Temperature, Salinity, Turbidity, Flow Velocity, Flow Direction, and Weather.
- The data varies as there was a time we were unable to get out on the water
- High Nitrate levels fuels HAB (16ppm or lower)
- Site selection was chosen with Valdez Native Tribe





Site Selection Data Pt. 2

- Salinity between 14-28 ppt is optimal for oysters
- Testing salinity at different depths can show freshwater input, density, stratification, circulation, etc.
- Freshwater lens
- Kelp and Oysters need lots of nutrients to grow
- Jack Bay was chosen due to historical significance, proximity, and conducive mariculture production water quality parameters.

How will our kelp be utilized?

BIOFOULING ON LANTERN NETS AT VNT OYSTER FARM

FIFISH

02

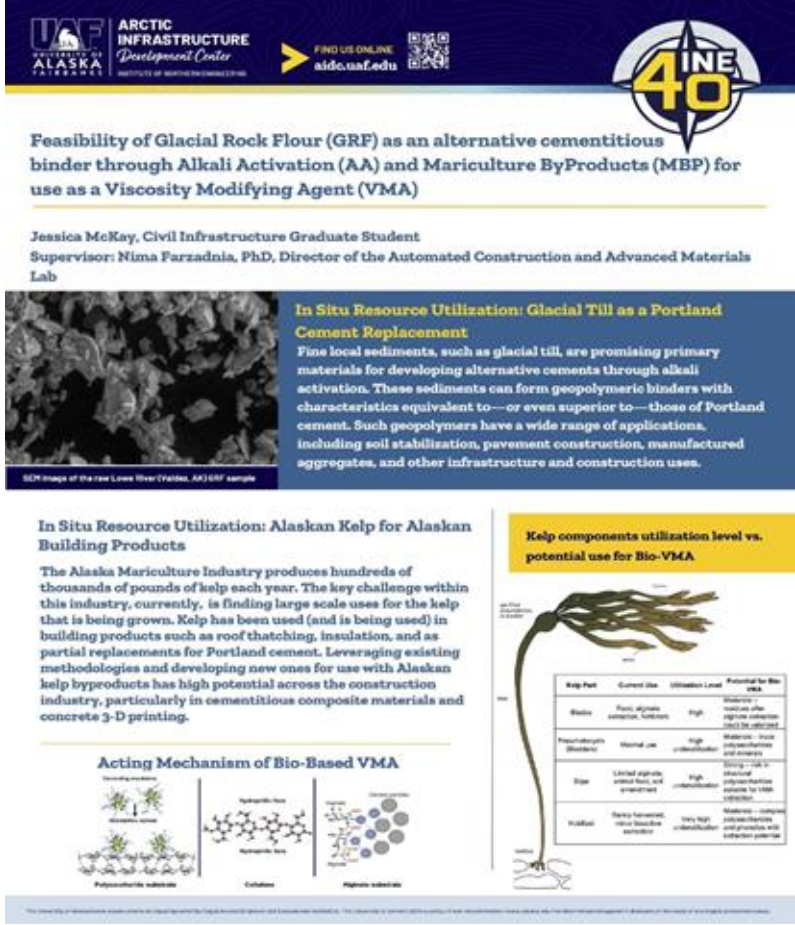
Partnership with the Automated Construction and Advanced Materials Lab (ACAM) at UAF

ACAM

- Using local materials in construction
- Kelp as a construction material

My ACAM Contact–Jessica McKay

Want to manufacture kelp building materials such as tiles, drywall, bricks and insulation? - jsmckay@alaska.edu

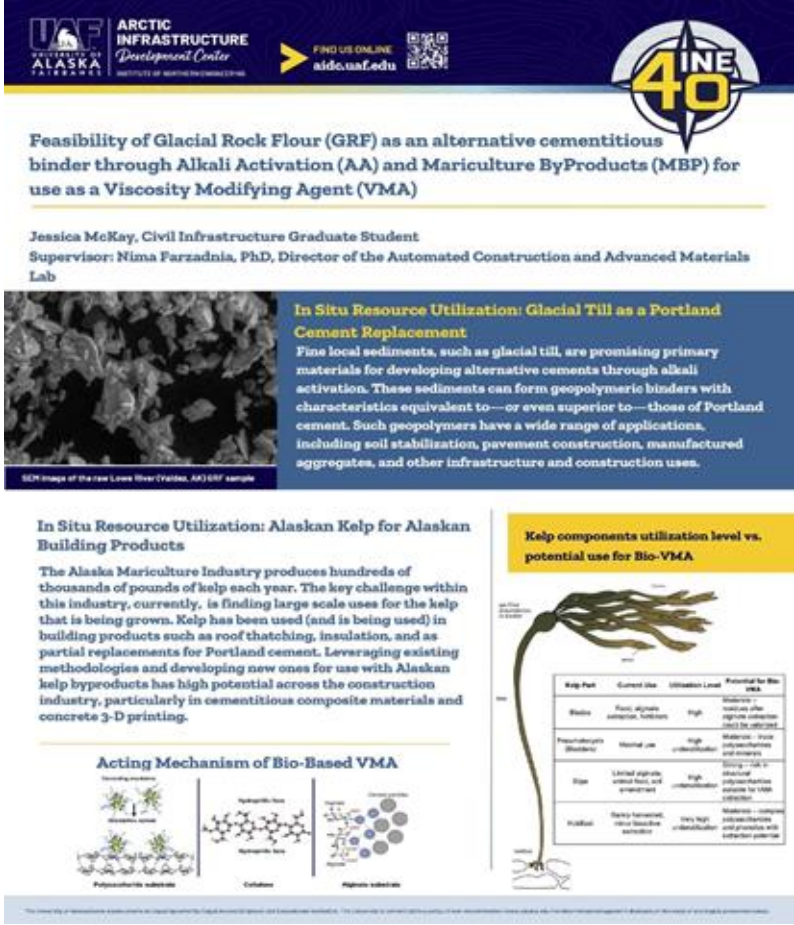


Partnership with the Automated Construction and Advanced Materials Lab (ACAM) at UAF

Cement replacement

- Locally sourced glacial flour, coal fly ash, kelp, and **imported calcium oxide (lime)**

Can Alaska manufacture our own lime?

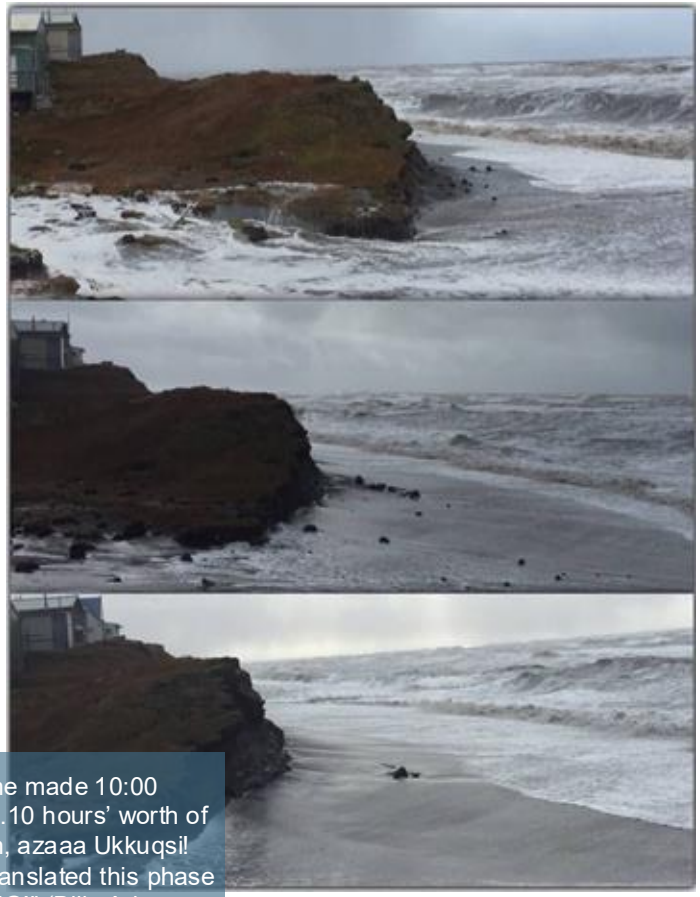


Why would Alaska want to manufacture our own lime?

- Climate change is causing **usteq**

  Requires imported cement to adapt

  - high cost and high CO_2 emissions
  - Lime is important in construction and cement



This one made 10:00 news....10 hours' worth of erosion, azaaa Ukkuqsi! (Billy translated this phase as "OMG!" (Billy Adams AAOKH, 2015)
Location: Utqiagvik

Photo: Hump Island Ketchikan oysters

How do we manufacture lime?

Simplified Process:

Calcination

$CaCO_3\ (s) \rightarrow CaO\ (s) + CO_2(g)$

(Thermal decomposition of calcium carbonate to produce calcium oxide (lime))

What are local $CaCO_3$ sources?

- Oyster shells
- Bones
- Limestone

Manufacturing Lime from Oyster Shells

Simplified Process:

- Oyster shells are 95% or greater $CaCO_3$
- Reduction of CO_2 emissions
- Economic diversification
- Shorten supply chains

Considerations and Challenges Moving Forward

Facility location:

- Near calcium-rich waste sources and energy source
- Informed community consent to facility placement

Oyster shell recycling:

- Develop strategies
- Do we have enough?

Community involvement:

- Increase awareness of where building materials come from
- How can we positively involve Native Alaskan communities?

Na'en ch'ghednu'
(We are working outdoors)

Working with Alaska Native communities and people in a good way

VNT OYSTER FARM AT LOW TIDE

03

Introductions & Background

Introductions

- My introduction
- Why are introductions important?
  - Relationship building
  - Accountability

How does Mariculture tie into Alaska Native communities?

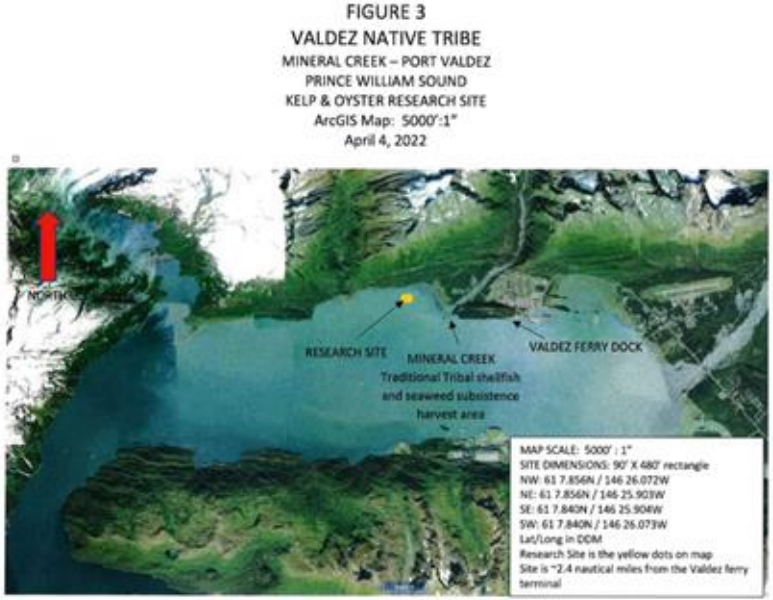
- People in the Mariculture industry want to work with Alaska Native communities in a good way

Kelp & Oyster Farming in the Prince William Sound

- Previously worked with Valdez Native Tribe, would like to continue working with Valdez Native Tribe in the future

Automated Construction and Advanced Materials Lab (ACAM)

- Lots of experience working with Alaska Native rural communities and is committed to continuing to work with them in the future



A framework for co-production of knowledge in the context of Arctic research

The outer ring: Tools for undertaking research that build equity
The action circle (inner ring):Represents different parts of the research process

"Our Indigenous communities contain incredible knowledge. They are of their lands and waters. Their existence is an expression of the interconnectedness of all things. Reciprocity, humility, and respect for beings we coexist with and rely on are at the center of our Way of Life. Customary laws and unwritten protocols exist in each community around the sharing of knowledge. Relationship building and recognition of parallel and equal knowledge systems
is critical."
Lisa Navraq Ellanna
(Katirvik Cultural Center Director; King Island Inupiaq)

“Learning Together”: Braiding Indigenous and Western Knowledge Systems to Understand Freshwater Mussel Health in the Lower Athabasca Region of Alberta, Canada

Final guiding framework (Bald eagle—protector; sweetgrass or sage braid and tobacco—ceremonial protocols [smudging, offering]; field notes—qualitative tools; field water quality probe—quantitative tools

Free, Prior & Informed Consent

Respect

Ethical

Common Themes

Reciprocity

Relationship

Sovereignty

NNA CO

Challenges & Solutions

Challenge: Lack of knowledge about Native and remote/rural communities

Solutions:
- Education
- Building relationships

Challenge: Understanding how Tribes work

Solutions:
- Education
- Respecting tribal sovereignty

Challenge: Innovation fatigue

Solutions:
- Understanding communities' histories
- Building relationships

Here is a picture of Hannah taking percent cover at the VNT oyster farm

Conclusions and future direction

- Our why, revisited
- Honored past work (PWSC, VNT)
- Made new connections (ACAM)
- Established framework for 2027
- …and beyond!

CHIN'AN/QUYANA/ THANK YOU!

Interested in knowing more??
Reach out to Tommy Sheridan!
Email:
tmsheridan@alaska.edu

Acknowledgements:
We would like to say thank you to NNA CO, The City of Valdez, UAF Alaska Blue Economy Center, PWSC, VNT, ACAM, Dr. Amanda Glazier, Jessica McKay, Jane Churchill, and Tommy Kimberlin!

SCAN ME

Works Cited Page