Rural Alaskan Fresh Food Supply Chains and Constraints

ALASKA FOOD PROTECTION TASK FORCE | EDUCATIONAL WORKSHOP (FEB 4, 2025)

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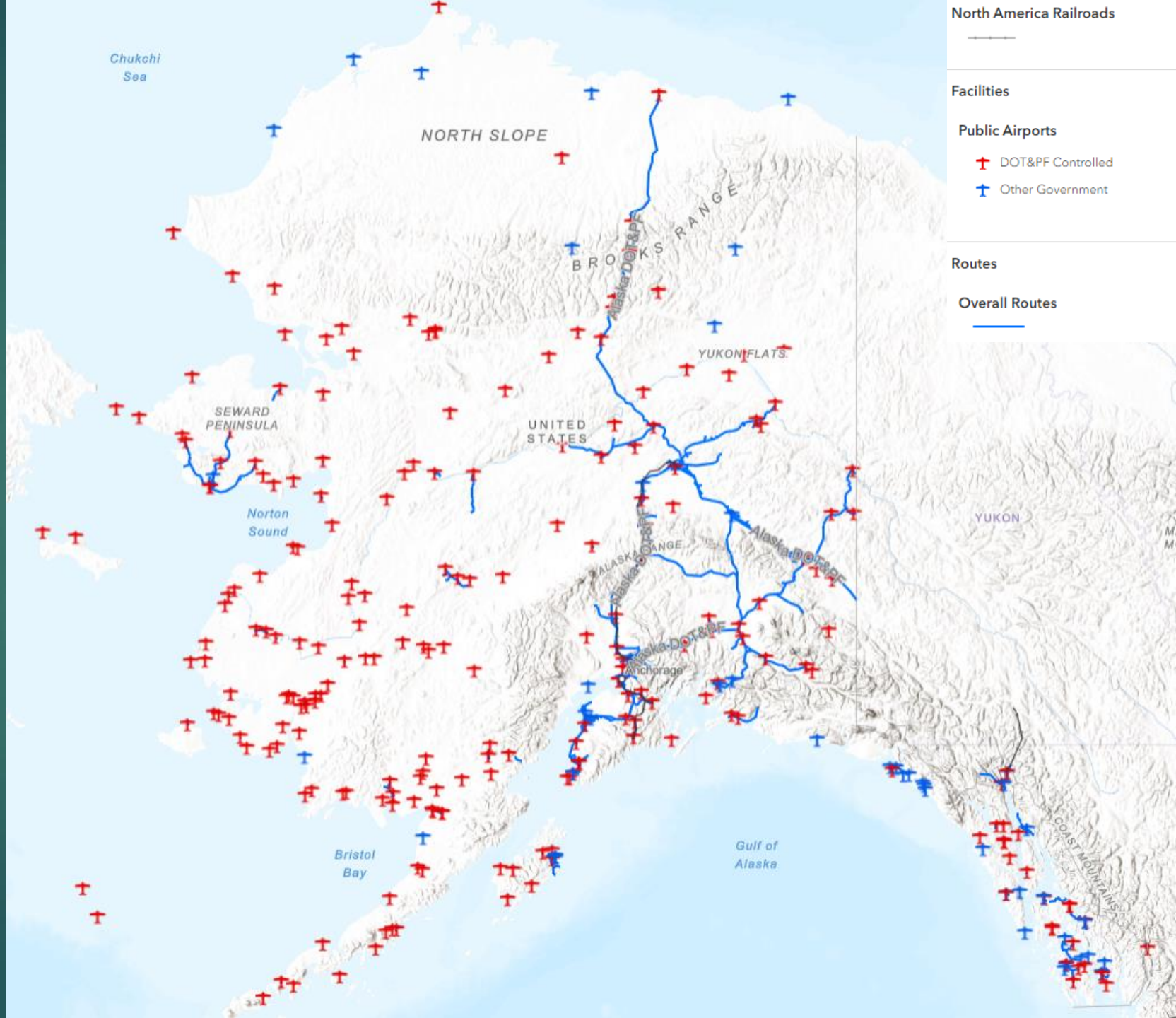
The size of the challenge



Food sources and food systems

Wild Food Collection

Home/Community Cultivation

AK Farms and fisheries to retail

"Outside" sources for retail market

2022 USDA RFSP Action plan:

Alaska Food Security Action Plan

THE GOAL OF THE MULTI-STAKEHOLDER ACTION PLAN is to democratically address food system challenges through inclusive, participatory action, building the capacity for resiliency and sustainability in the Alaskan food system.

RECOMMENDATIONS BASED ON ASSET WORKSHOP AGGREGATE DATA

The data generated from all of the regional asset-mapping workshops is archived by AFPC and is openly accessible to all interested parties for continued work. While each region articulated cultural and place-specific assets that could be used to leverage positive food systems change, aggregate data indicates significant shared interest areas.

A review of these key themes is provided as a basis for developing a statewide food security plan that is inclusive of the interests and assets of each region. After this section, the Action Plan digs deeper into actionable steps. The goals are more general, while the objectives provide detail, with potential strategies for achieving the listed goals. Please note, there is no hierarchy in how these goals are listed.

IMPROVING FOOD SYSTEM LITERACY AND SKILLS TO BUILD GREATER CAPACITY, AWARENESS, AND INTEREST IN FOOD SECURITY

- Youth food education
- Youth and Elder mentorship programs
- Preserving and (re)discovering traditional foods and foodways
- Harvest, production, processing, compost, and healthy consumption skills

BUILD/IMPROVE FOOD SYSTEM PHYSICAL INFRASTRUCTURE

- Community commercial kitchens
- Food storage space
- Food processing/ slaughtering facilities
- Community composting
- Food hubs
- Growing season extension options

PROMOTE FOOD JUSTICE, FOOD SOVEREIGNTY, GREATER ACCESS, AND CULTURAL AWARENESS OF FOODWAYS AND TRADITIONS

- Preserving and expanding traditional knowledge and foodways
- Food justice and tribal outreach for Alaska Natives
- Food chain relationships
- Create stronger regional food systems networks
- Local food availability awareness
- Food waste recapture (seafood, gardening, animal processing, etc.)

PROVIDE TECHNICAL EXPERTISE AND GRANT OPPORTUNITIES TO INCREASE FOOD SYSTEM CAPACITY

- Exploring Mariculture (sea lettuce, sea asparagus, kelp)
- Exploring kelp harvesting as livestock feed
- Regional website/ resource library development
- Grant-writing workshops and funding resources

ENHANCE, IMPROVE, AND CREATE NEW MARKETS AND FOOD PRODUCTION

- Increase Viability of Local Agriculture
- Build relationships between food producers, institutions, distributors, and local restaurants and breweries
- Address Food Waste

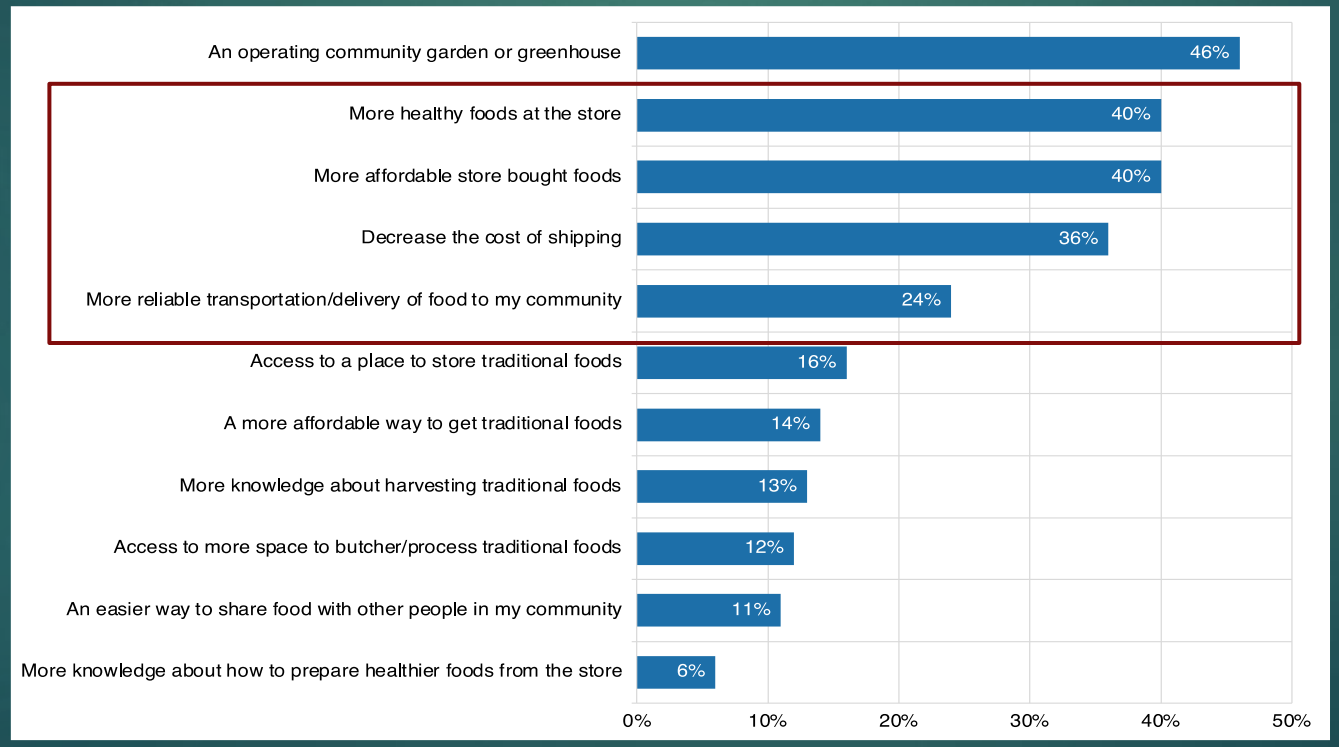
Retail food supply chains are a *part* of a much broader set of food system concerns

Source: AFPC

Stores remain an important source of nutrition on & off road:

Survey results of APIA survey (n=402) [PI: Ruby Fried (UAA)]

What would improve access to food in your (APIA) community?



Fried, Stewart and Unger (2023) "Food Security in the Aleutian Pribilof Islands Region: Traditional, Store-bought, and garden foods"

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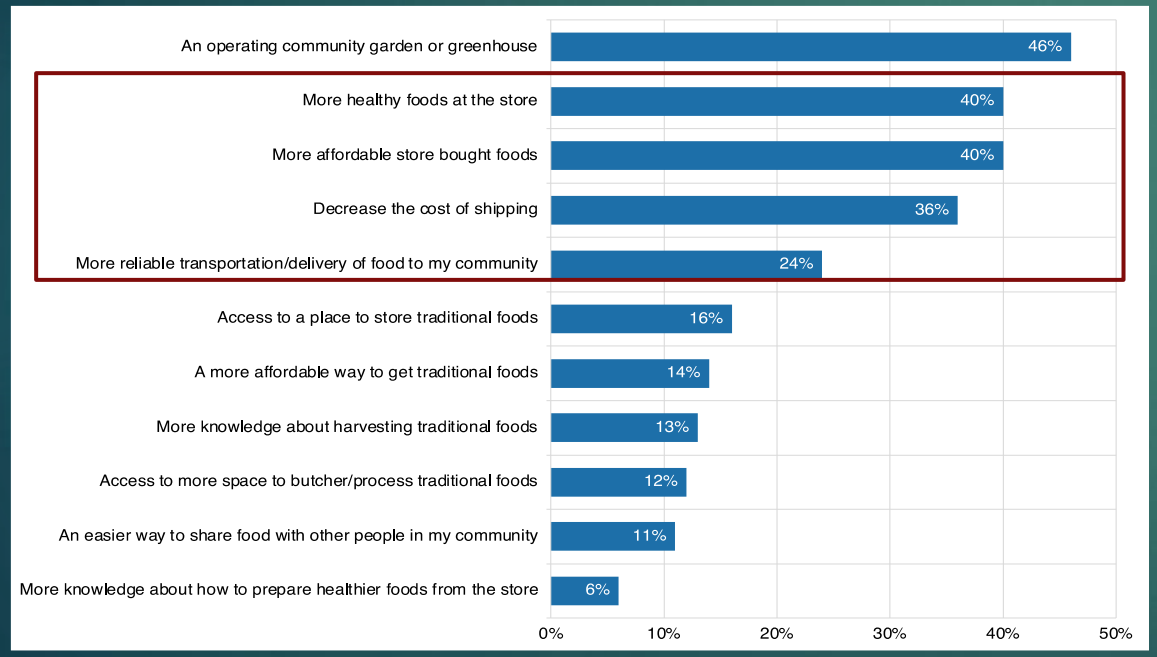
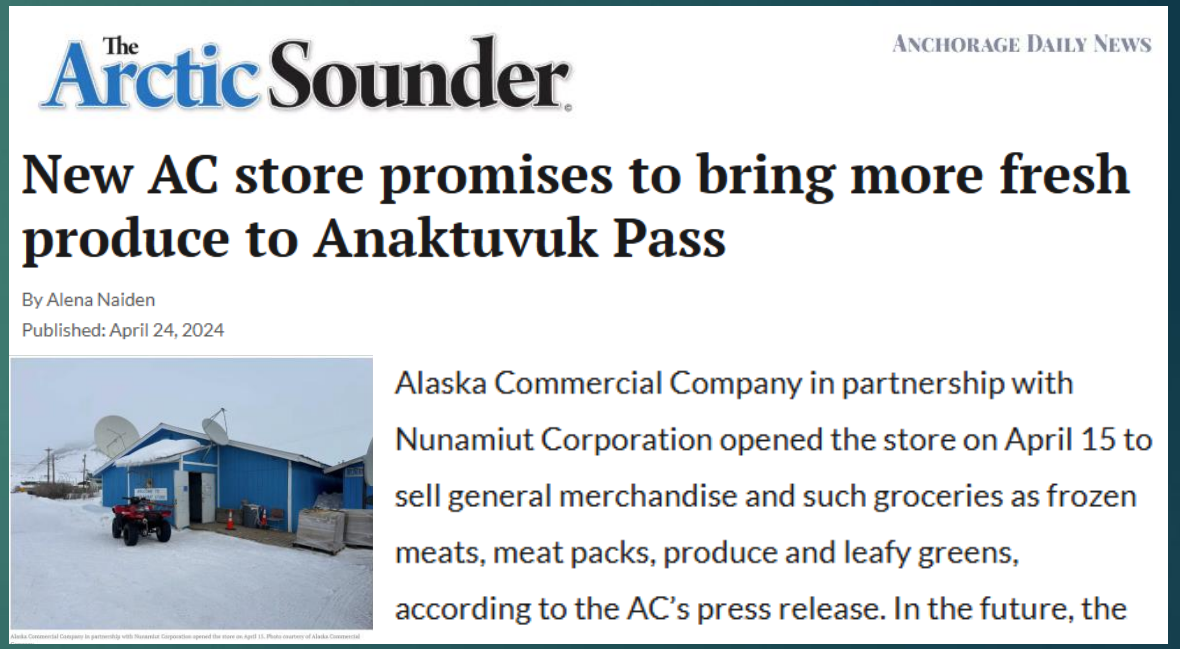




The Arctic Sounder

ANCHORAGE DAILY NEWS

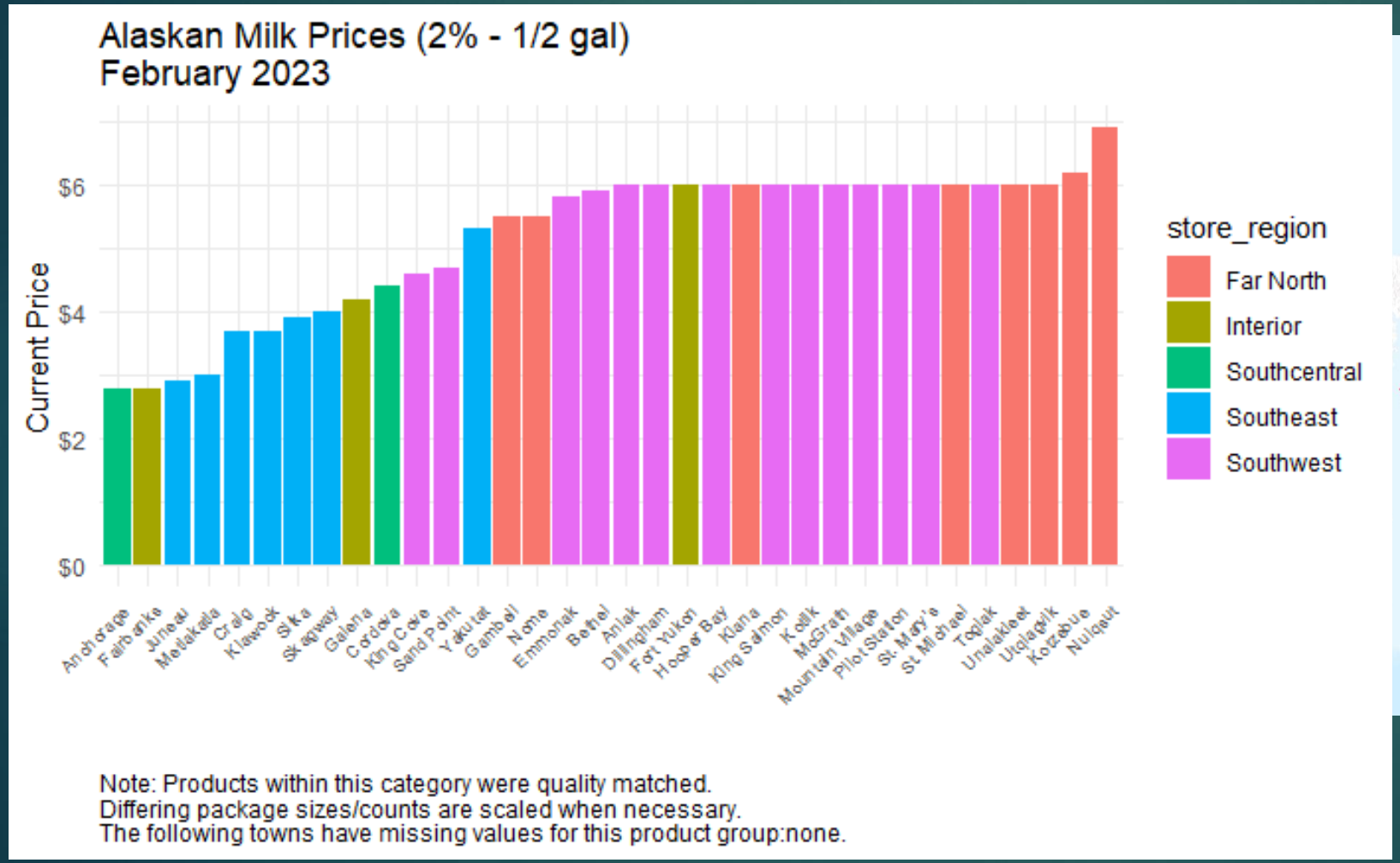
New AC store promises to bring more fresh produce to Anaktuvuk Pass

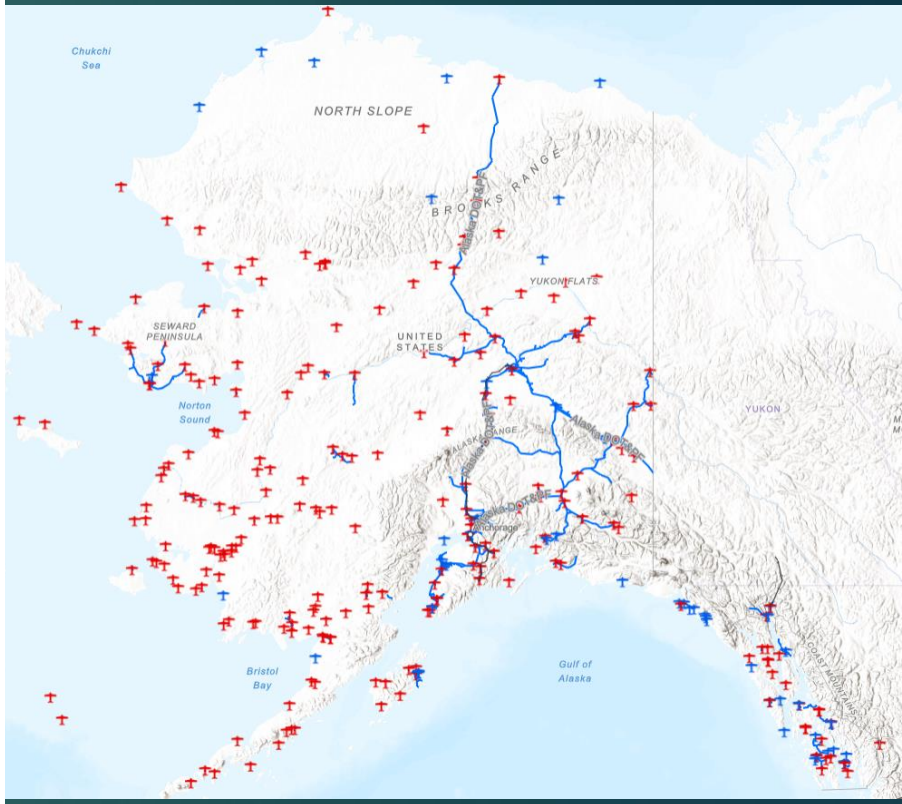
By Alena Naiden
Published: April 24, 2024

Alaska Commercial Company in partnership with Nunamiut Corporation opened the store on April 15 to sell general merchandise and such groceries as frozen meats, meat packs, produce and leafy greens, according to the AC's press release. In the future, the

Fried, Stewart and Unger (2023) "Food Security in the Aleutian Pribilof Islands Region: Traditional, Store-bought, and garden foods"

How would increased throughput and transport cost reductions impact Alaskans?





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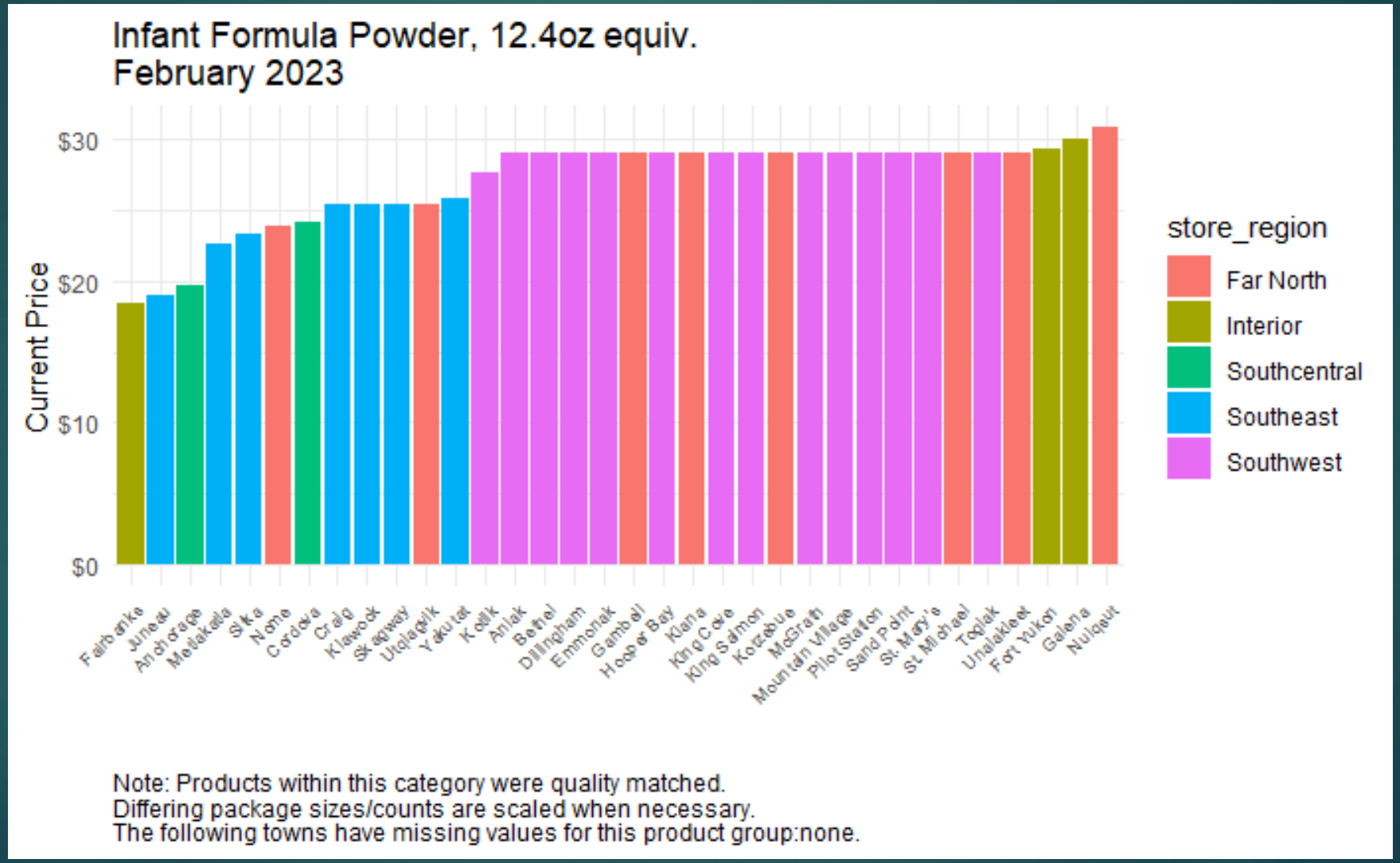

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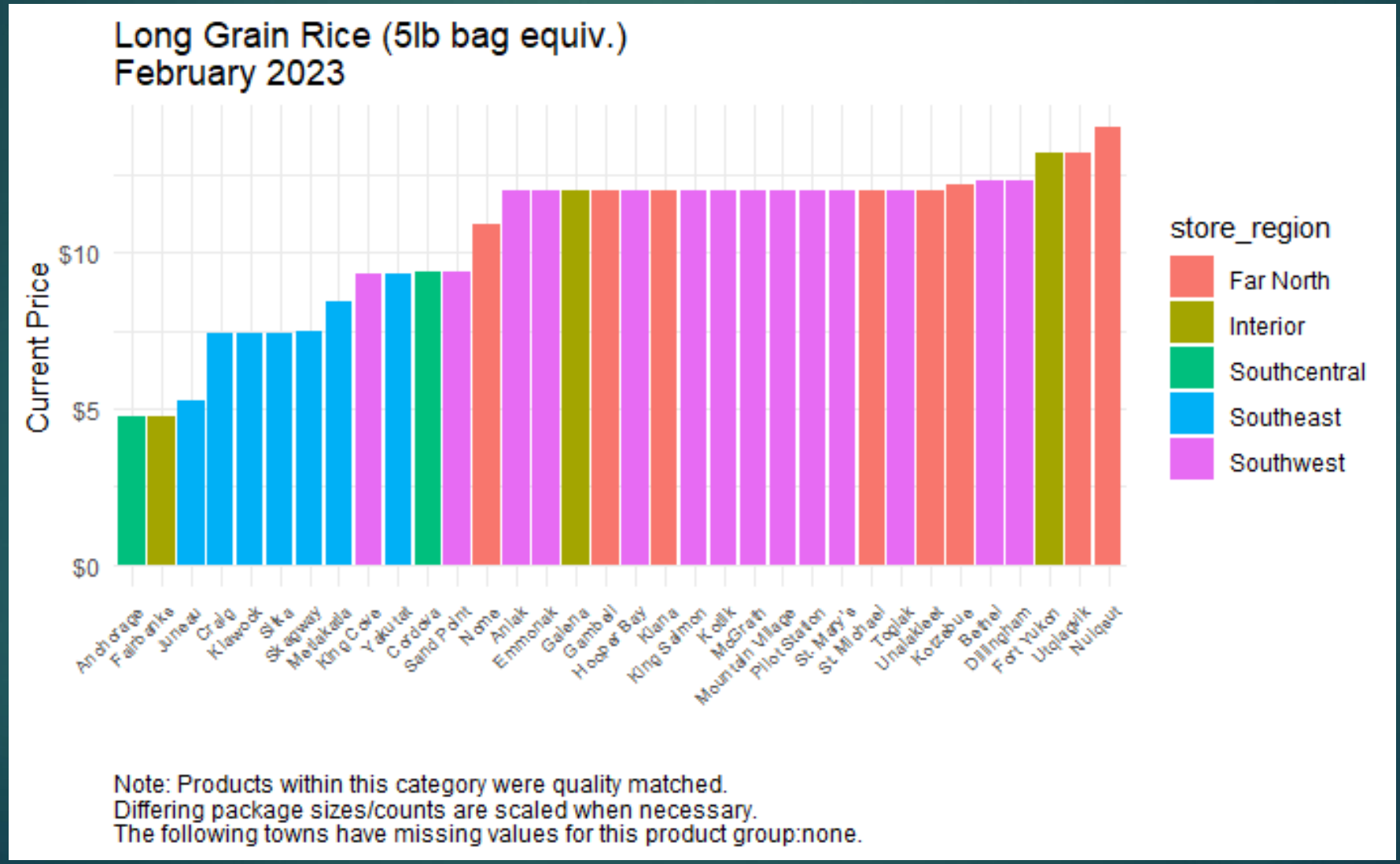
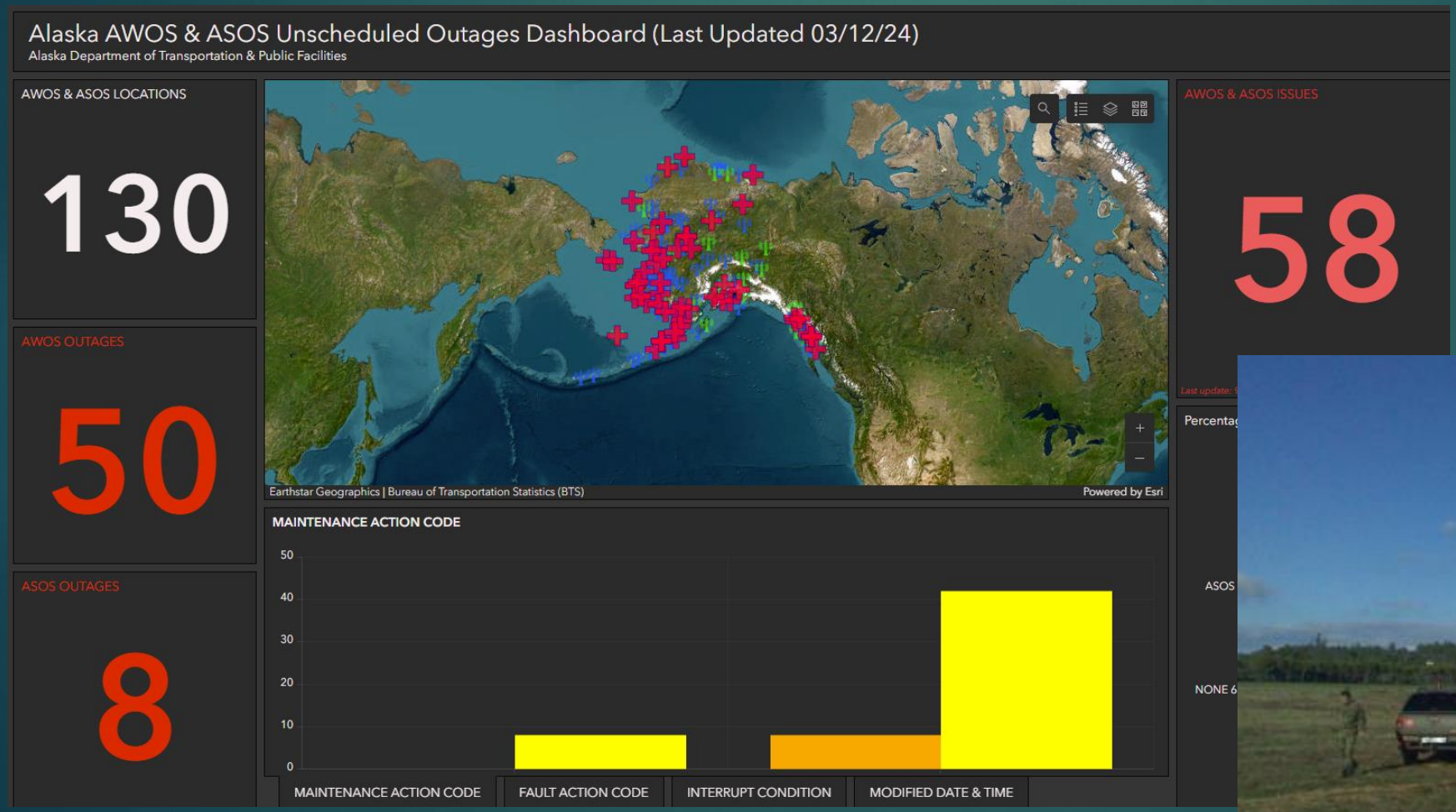


Identifying likely drivers of cost differentials

- Transportation costs and limitations
  - Fuel prices
  - Labor constraints
  - Quality preservation
  - **Airport infrastructure issues – AWOS**
  - **Redundancy needs**
- Seasonality (likely)
  - Shifting available modes of transport
  - Demand
  - **Temperature**
- Market structure, competition

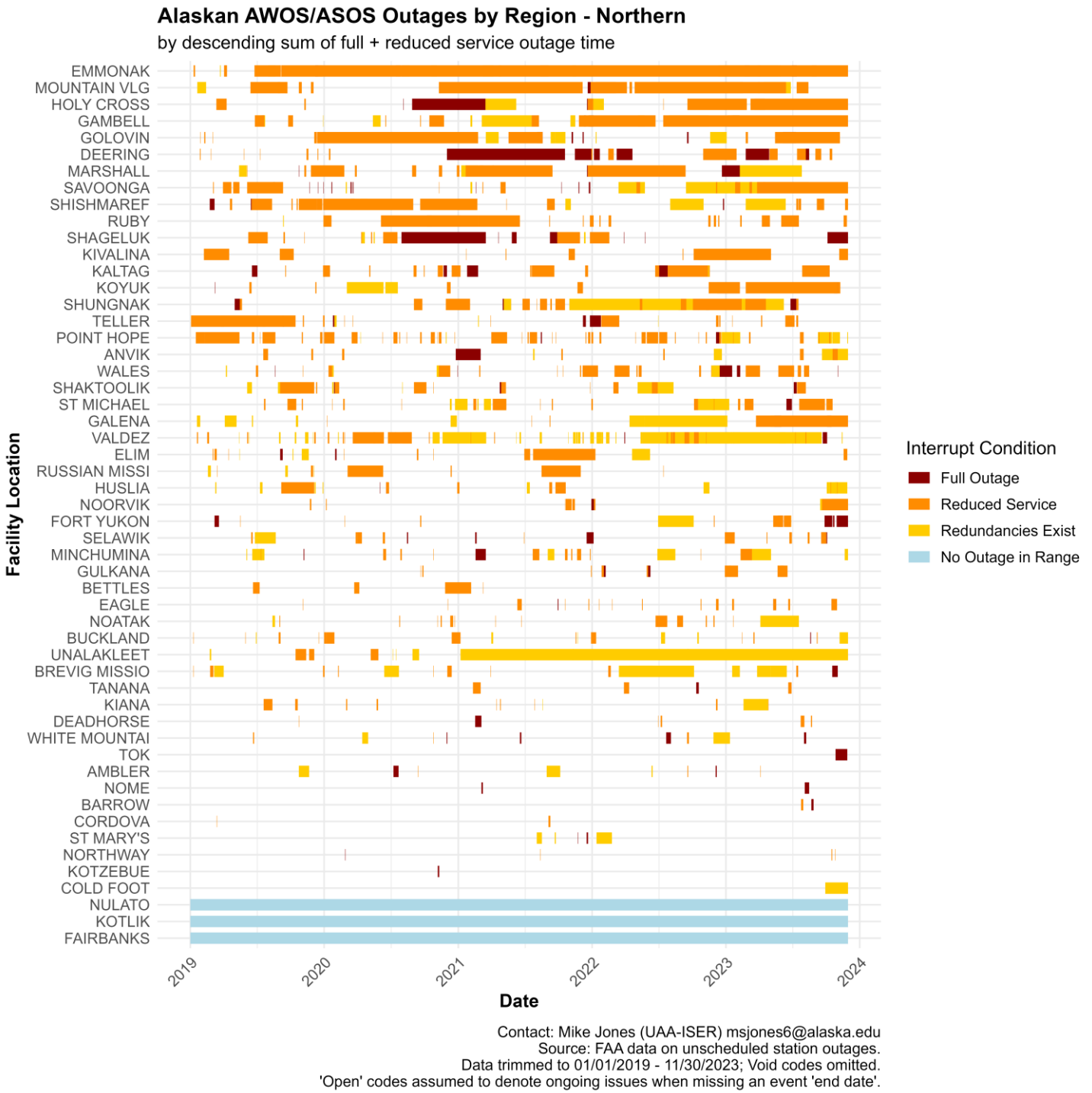
Weather station outages are a major pain point



Outages over space & time

- **Some simultaneous outages***
- **Outage Frequency (**≥1 incident; FAA units):
- Full Outage = 59% of stations
- Reduced Service = 77% of stations

Outage Length (Percentile)	FAA Unit Full Outages (Days)	FAA Unit Reduced Service (Days)
25th	0.8	1.1
Median (50th)	**3.3**	**4.4**
75th	10.5	14.8
90th	25.5	54.5
Max	**154; 201; 231; 316; 805**	**637; 665; 699; 858; 1,545**



Carriers say AWOS/ASOS station outages disrupt flow and lead to food backlogs in hangars

AWOS/ASOS Station Outages

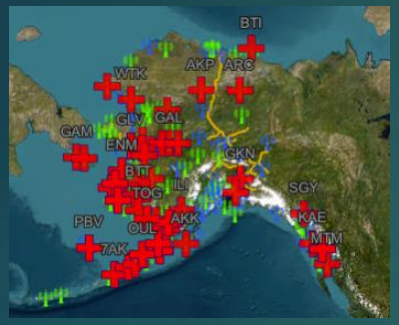


Image Credit: DOT-SWA

Lack of FAA-mandated authorization to fly

Other aviation issues: (runway plowing, maintenance, logistical issues, labor constraints, platform availability)

Backlogs at a community's hub, overwhelming very low cold storage capacity

Cascading effect reducing flow/preservation of cargo to other communities; backups into ANC

Food Spoilage from heat or extreme cold; reduced attempts to send produce to rural AK

Outcome contribution: Fresh produce in rural AK is very expensive with poor, inconsistent availability

Trade offs: time and temperature

In many hubs, well known that bush carrier chill storage is severely lacking (statewide inventory study in progress)

Mainline carrier (above)

Bush carrier (left)

… also, loading/unloading times may be a big temp. 'shock'

INTERNATIONAL JOURNAL OF CIRCUMPOLAR HEALTH
2021, VOL. 80, 1961393
https://doi.org/10.1080/22423982.2021.1961393

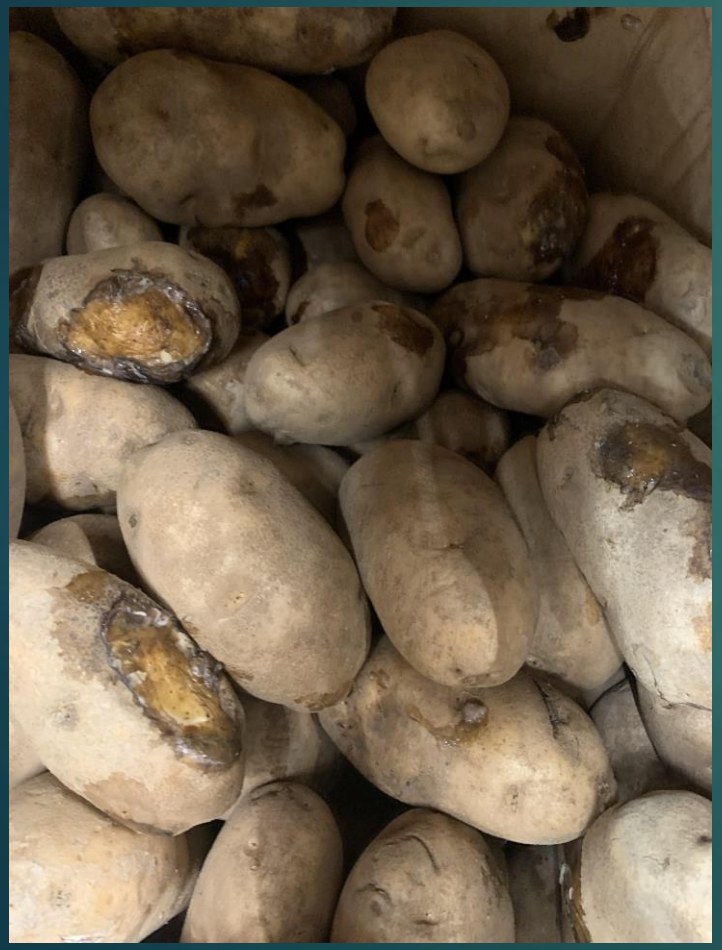
Storekeeper perspectives on improving dietary intake in 12 rural remote western Alaska communities: the "Got Neqpiaq?" project

Kathryn R. Koller [a], Christie A. Flanagan [b], Jennifer Nu[c], Flora R. Lee[d], Christine Desnoyers[e], Amanda Walch[f], Lucinda Alexie[g], Andrea Bersamin[h] and Timothy K. Thomas [i]

Fruit and vegetable availability and sales

At least one store in every community sold fresh produce. In general, fresh produce sold well. However, food spoilage due to air shipping delays, primarily during winter months, was a challenge. Storekeepers reported profit losses of up to 50% due to food spoilage and the cost was assumed by the store and passed onto customers. One storekeeper lamented, *"… there's times they come in … too rotten from the travelling"*. Another stated, "*You learn once it gets below a certain temperature outside, you learn not to even try getting certain items …* " While the majority of stores do not have trouble storing fresh produce, they order only enough to shelve when delivered and do not keep additional inventory.

Frequent produce spoilage on arrival (Tanana Comm. Co.)



Frequent produce spoilage on arrival challenges store outlook

Several partially overlapping themes

- Aviation infrastructure performance
- Commercial air carrier flight patterns
- *Environmental conditions (temperature, civil twilight range, others)*

- **Retail grocery fresh food availability**
- **Retail grocery fresh food spoilage-in-transit**

- Downstream impact on community

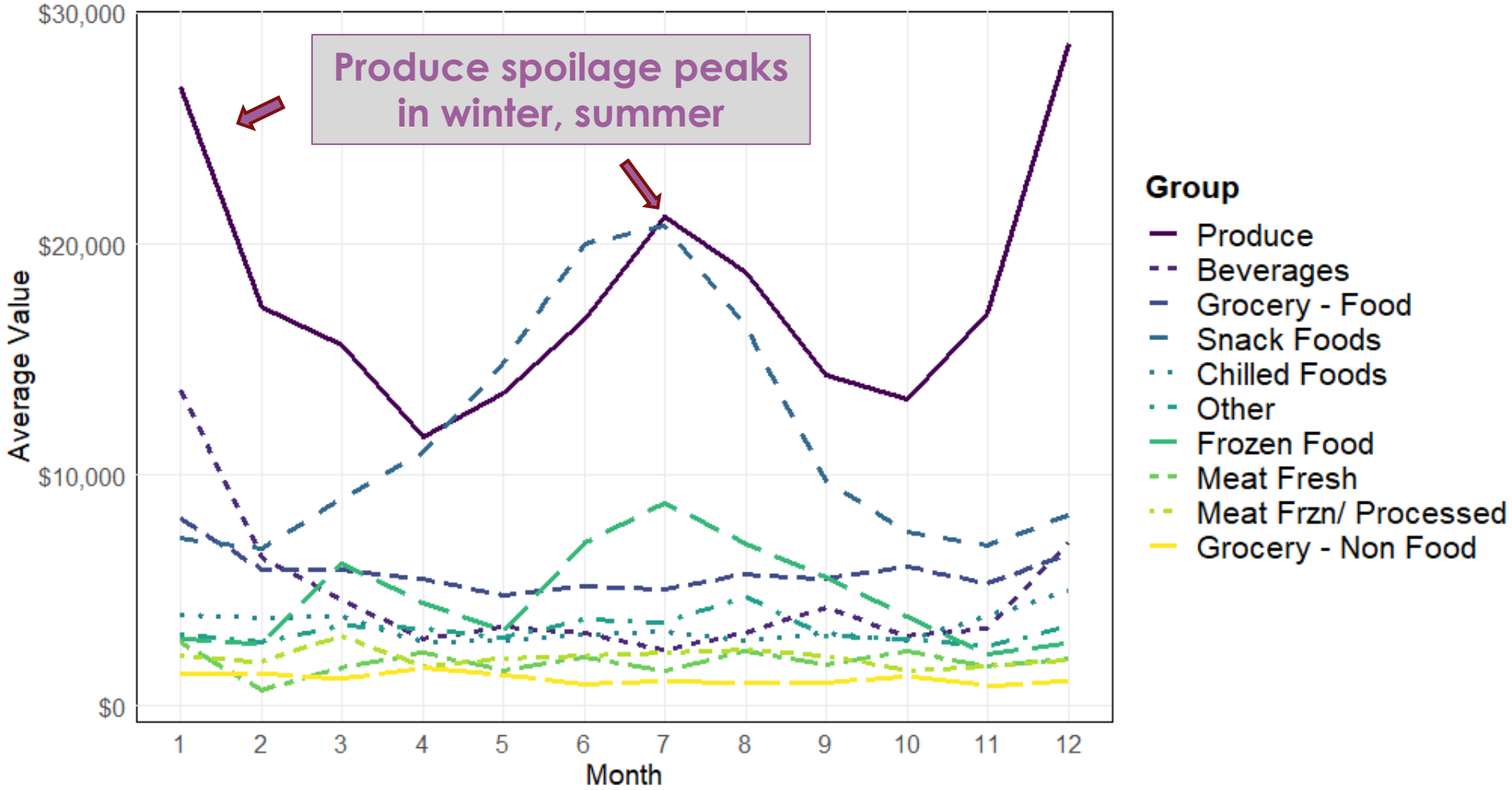
Foundational research questions

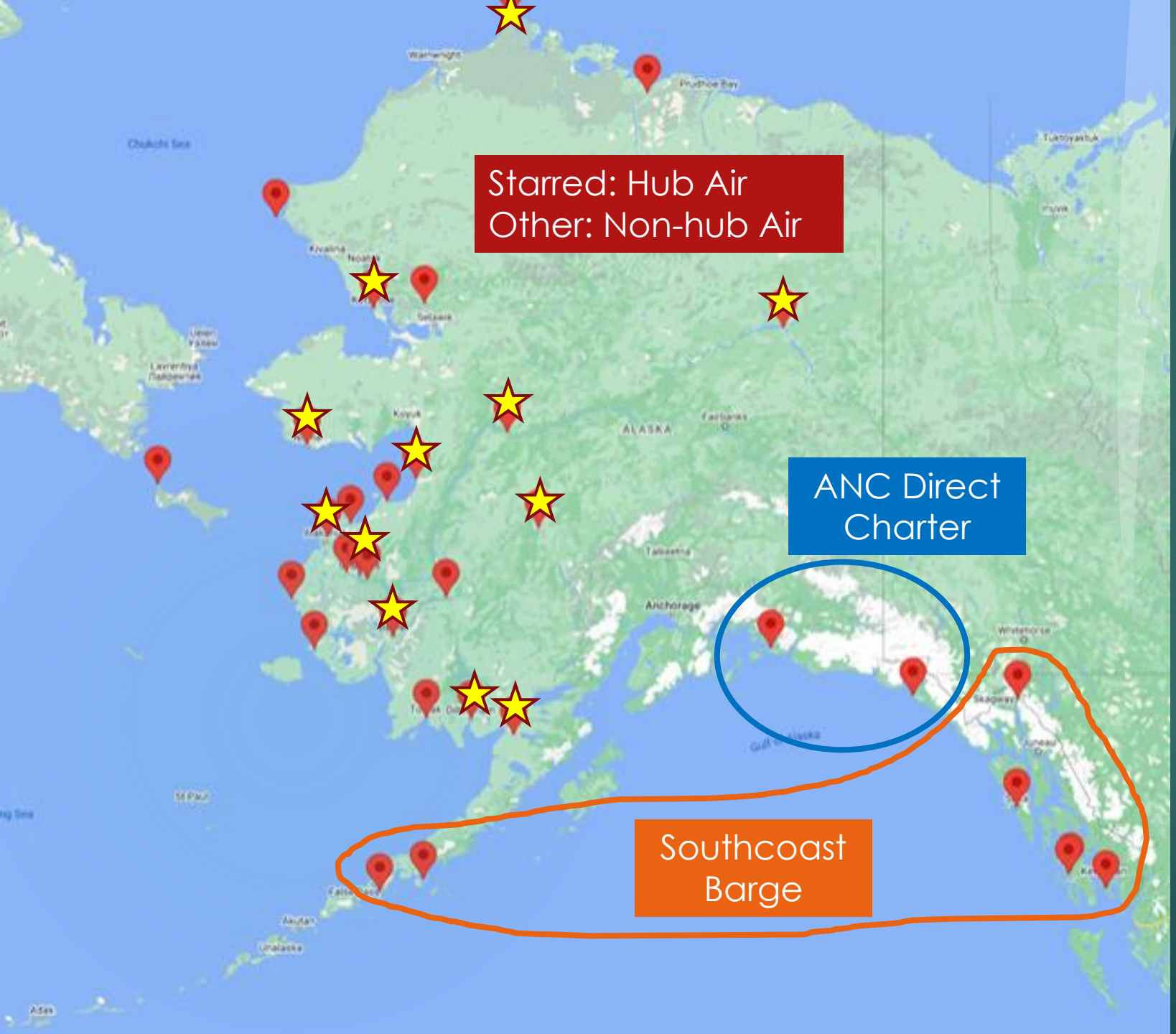
- **Does supply chain mode impact the availability of fresh produce and the intensity of spoilage-in-transit?**
  - **… and is there variation across seasons?**

Which leads into [ongoing work]…

- Does the performance of the aviation supply chain impact the availability and spoilage intensity of fresh food in rural groceries?

Monthly Variation in Shrink Costs Due to Product Non-sellable on Arrival: By Product Category (Alaska Commercial Company, 2018-2022)





Alaska Commercial Co. grocery store locations and groupings by produce supply mode (air/barge) and remoteness (hub/non-hub)

1) Southcoast barge
2) Direct ANC charters (non-hub)
3) Hub Air
4) Non-hub Air

Retail grocery data: AC stores

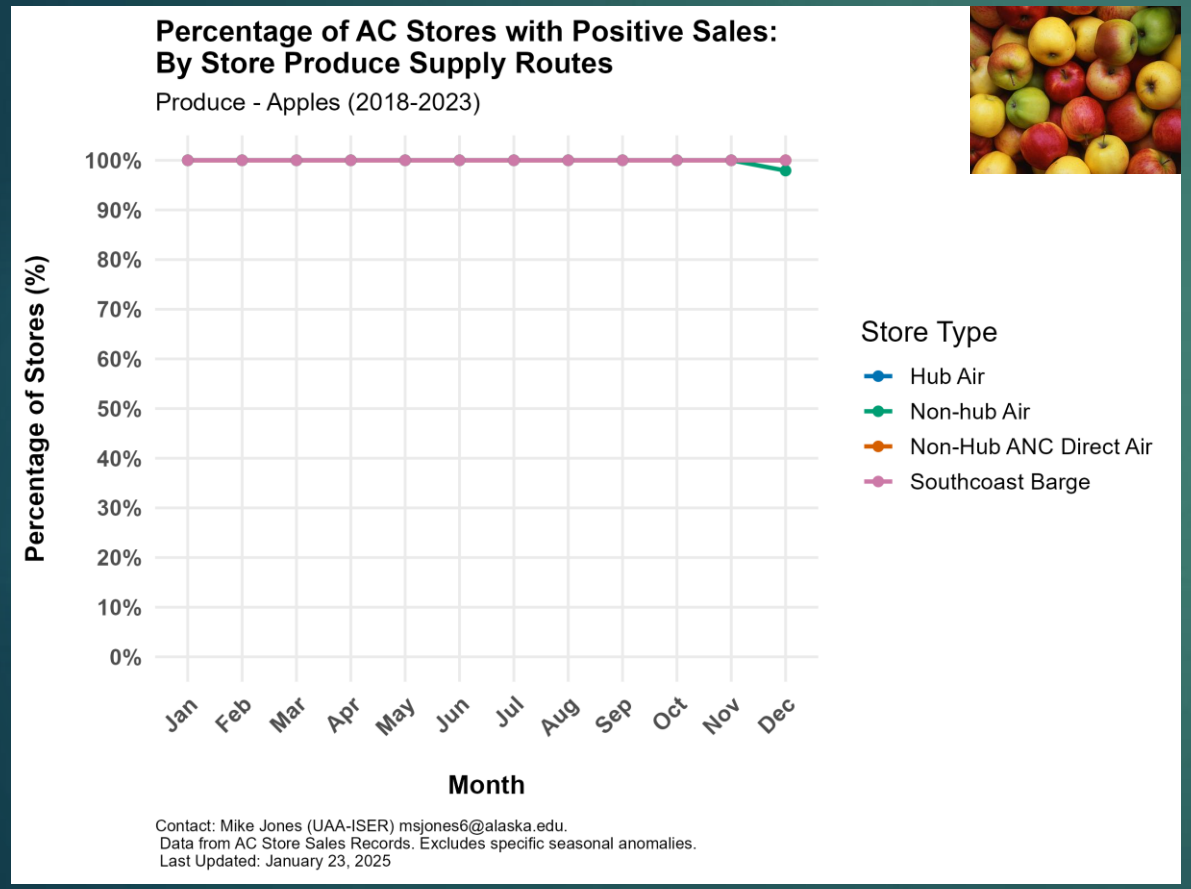
- Sales quantities (not prices) by UPC-store-month
- Matching 'nonsellable-on-arrival' data – i.e., spoilage in transit
- **First time AC has ever shared this level of data with researchers*

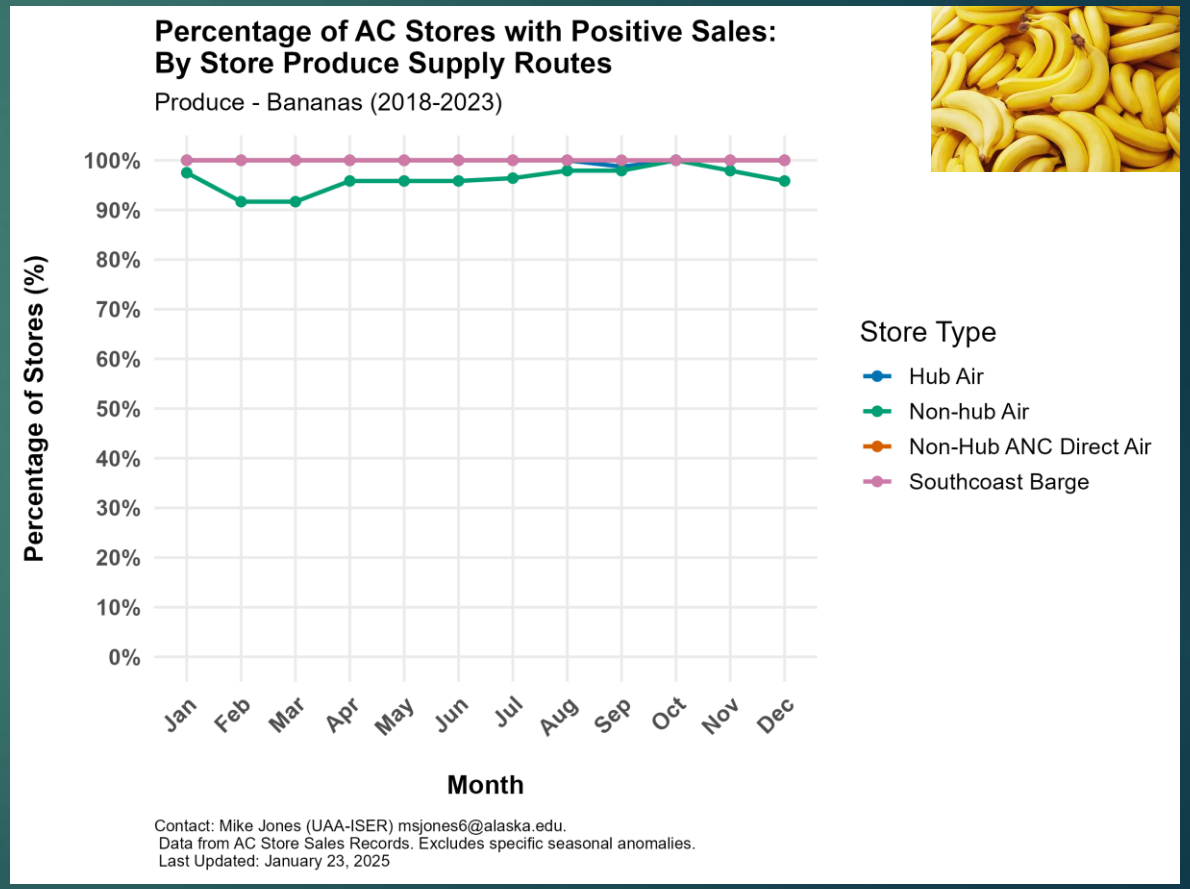
- UPCs consistently clustered under three main and sub-categories
  - GROUP → DEPARTMENT → **CLASS** → UPC

Product class categories within 'Produce'	
Apples	**Bananas**
Berries	*Bulk Nuts**
Celery	**Citrus Fruit**
Cooking Vegetables	*Envelope Mixes**
Fresh Mushrooms	*Garden seeds**
Grapes	**Lettuce**
Melons	*Natural Foods**
Onions	**Pears**
Peppers	**Pkgd Prepared Salads**
Potatoes	**Salad Vegetables**
*Snack Foods**	**Soft Fruit**
Specialty Fruit	**Specialty Vegetables**
Tomatoes	**Value Added Fruit**
Valued Added Veg	*Dried Fruits/Veg**
*Tofu/Vegetarian**	*Plant/Garden; Juice**

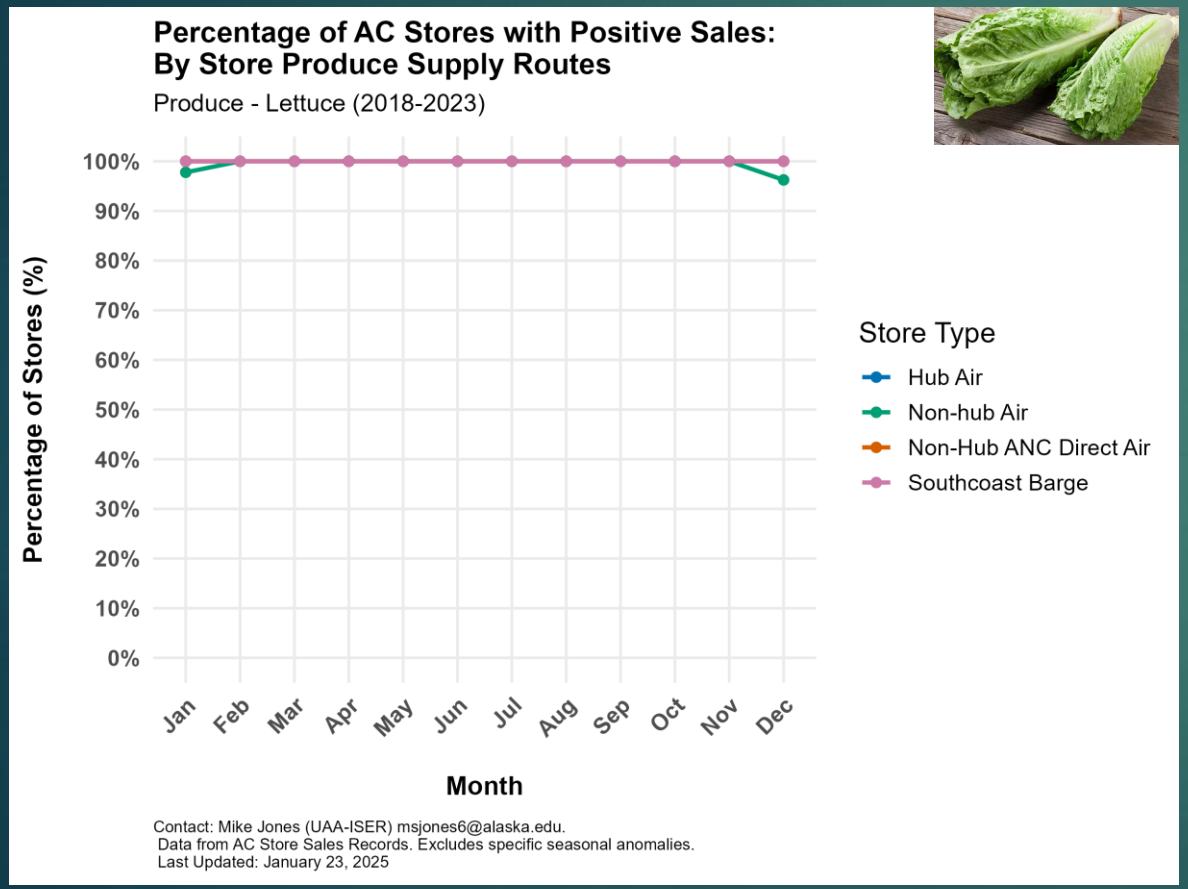
(*) removed in analysis

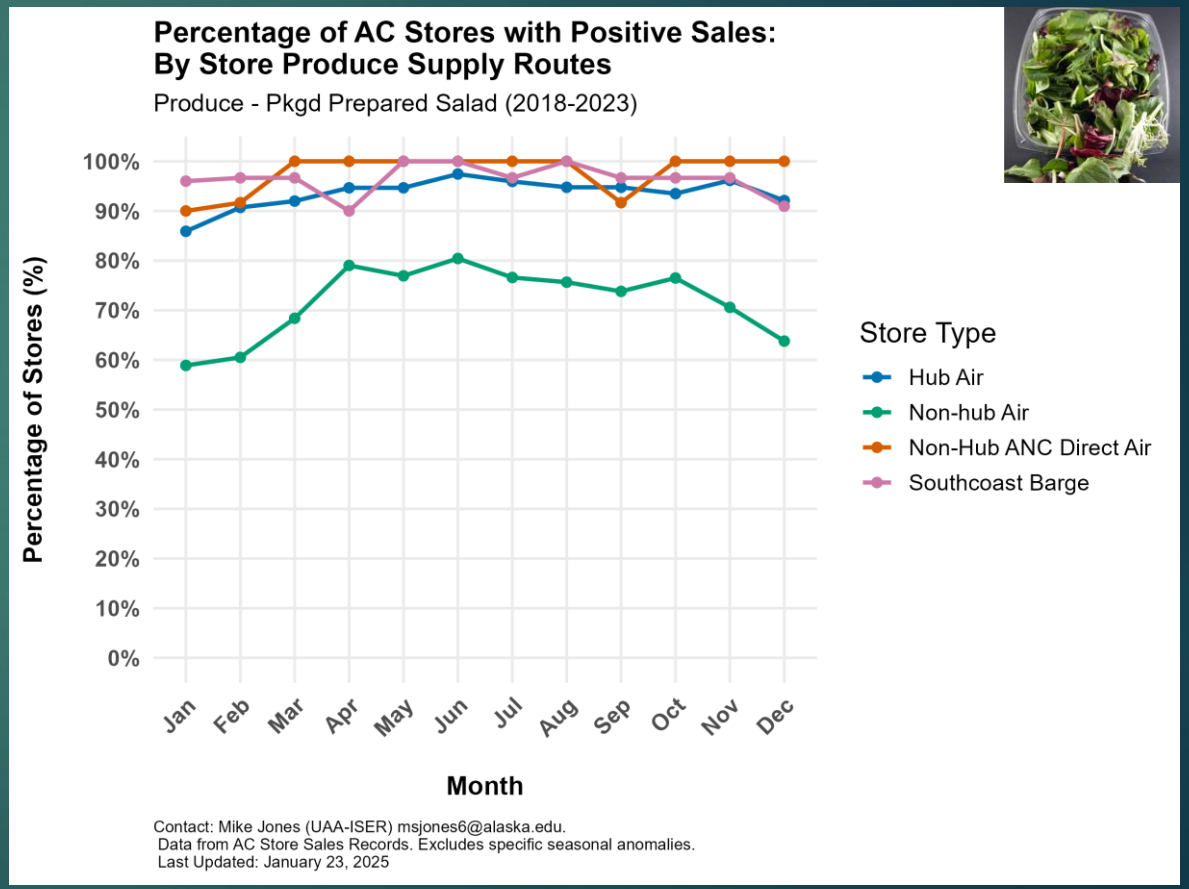
Binary produce ‘availability’ (>0 sales/m) doesn’t change much for many products





Binary produce ‘availability’ doesn’t (usually) change much





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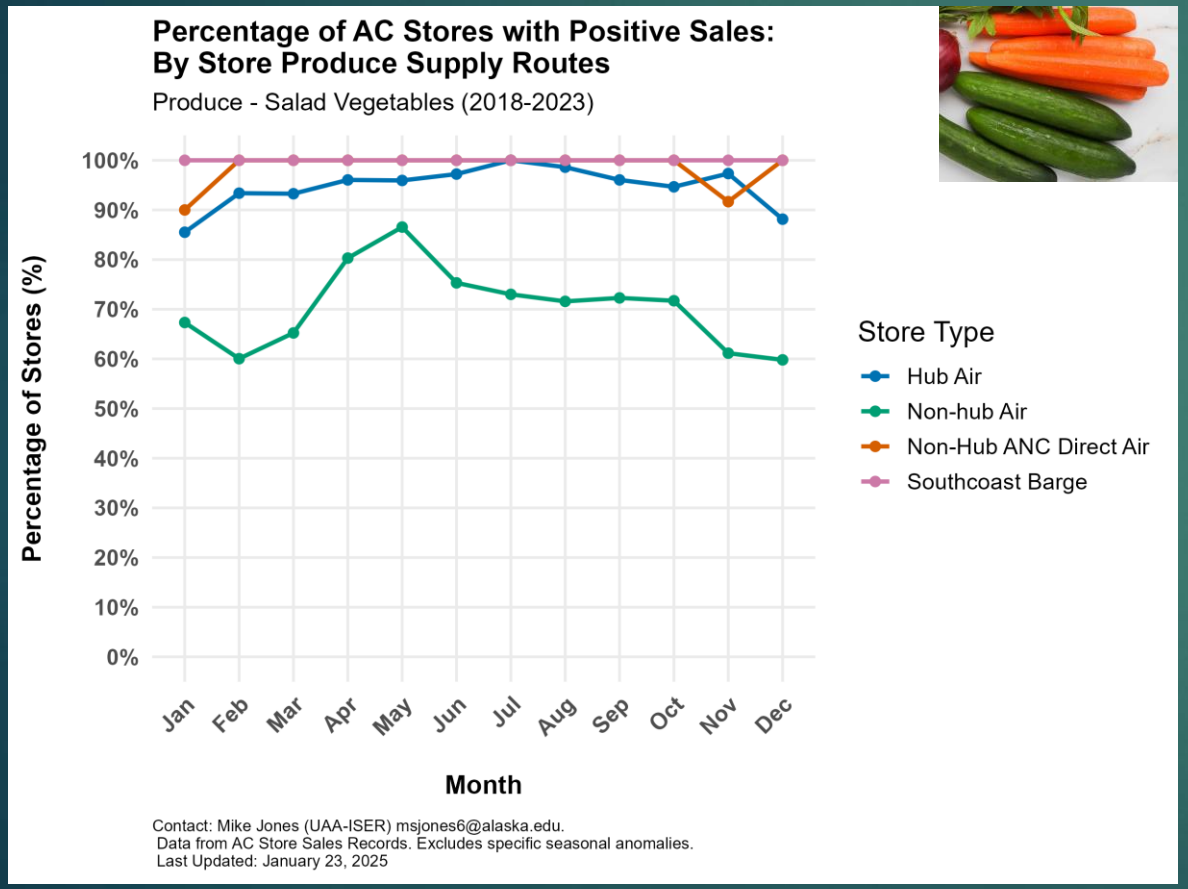
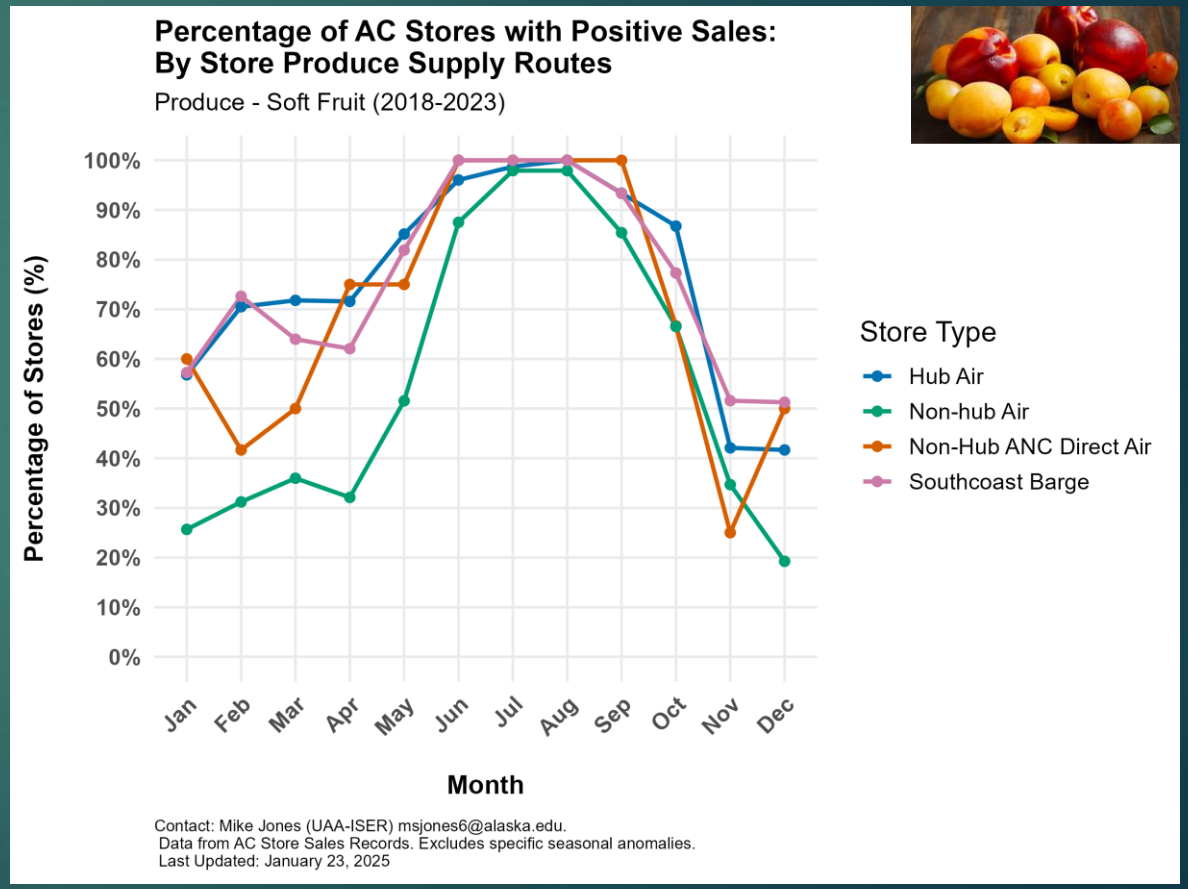
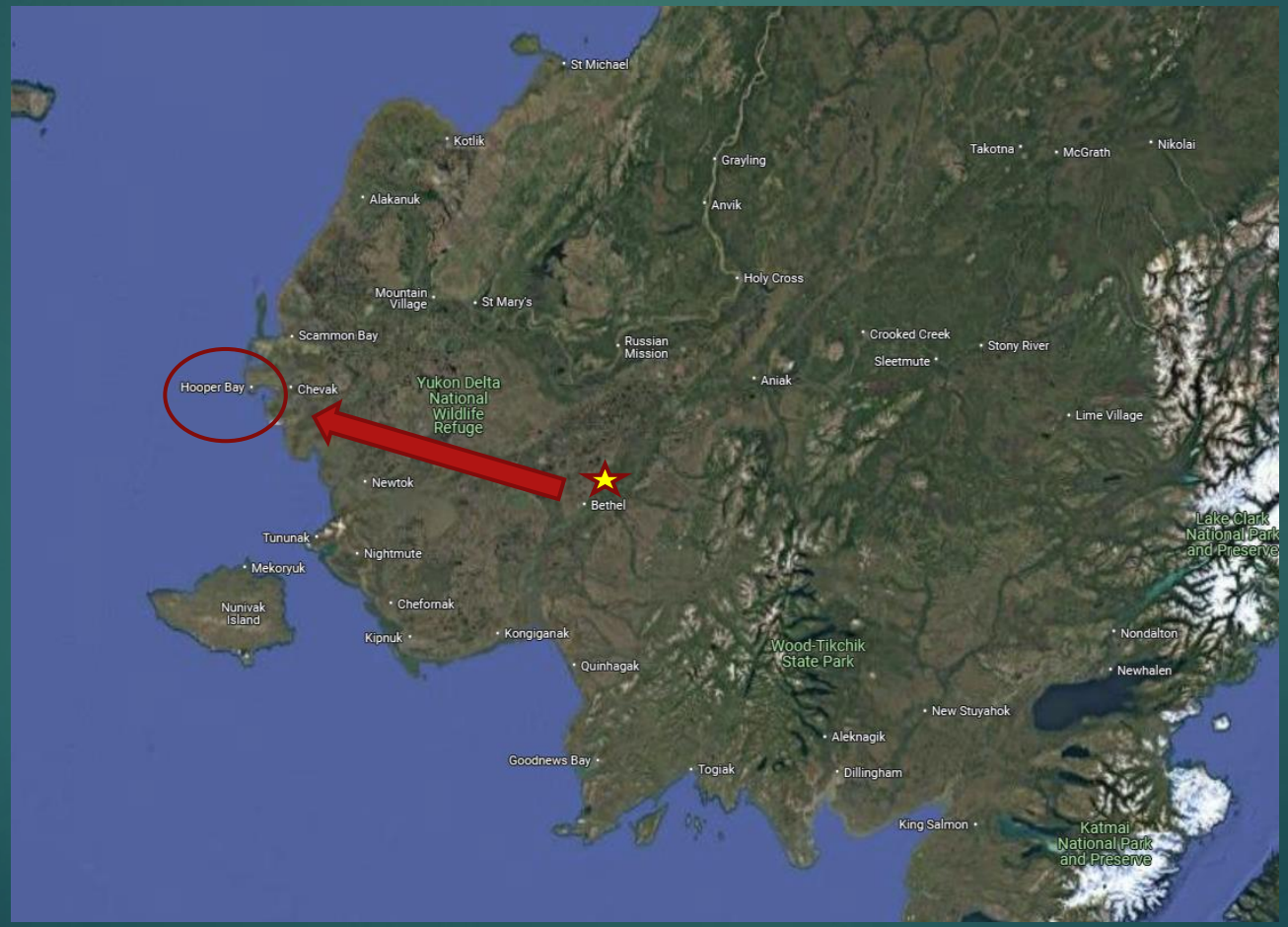




Spoilage case examples illustrate variation over time/product/location



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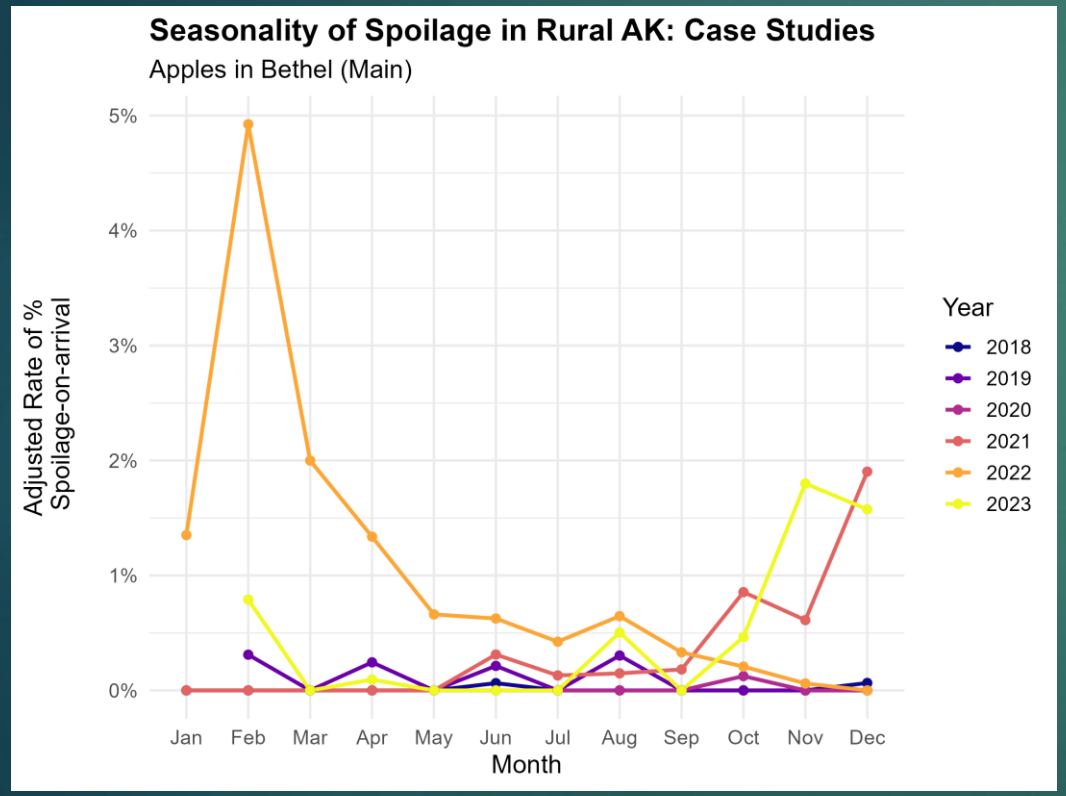
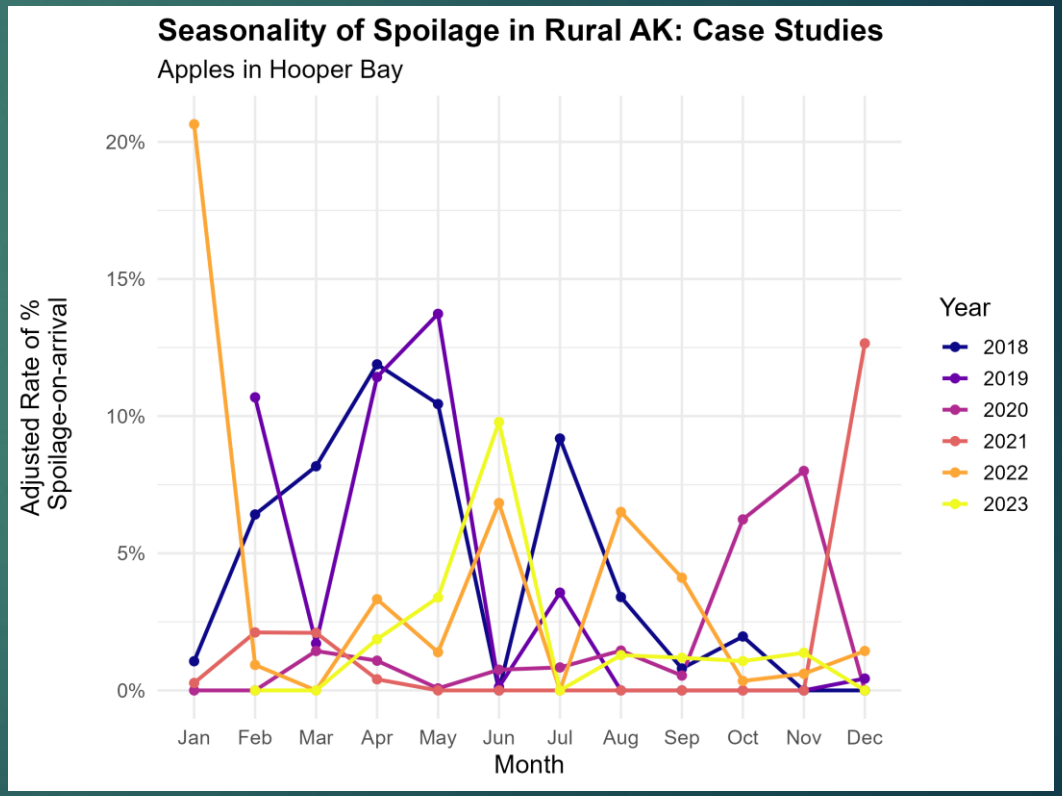
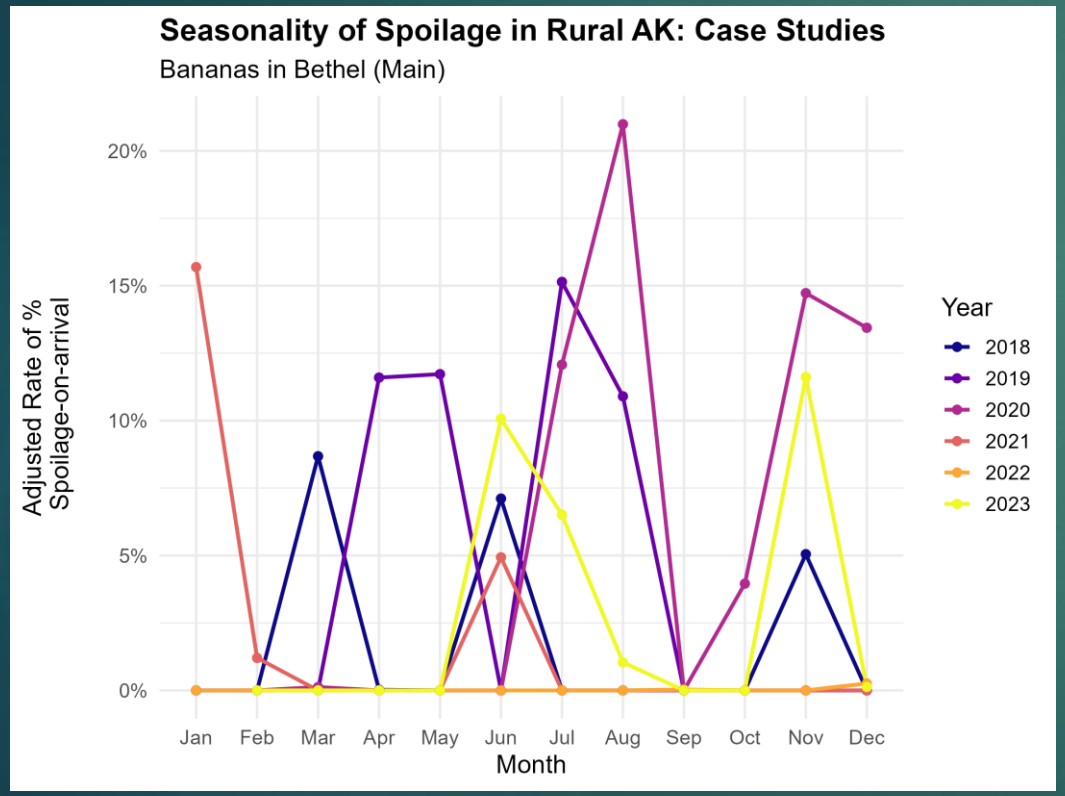


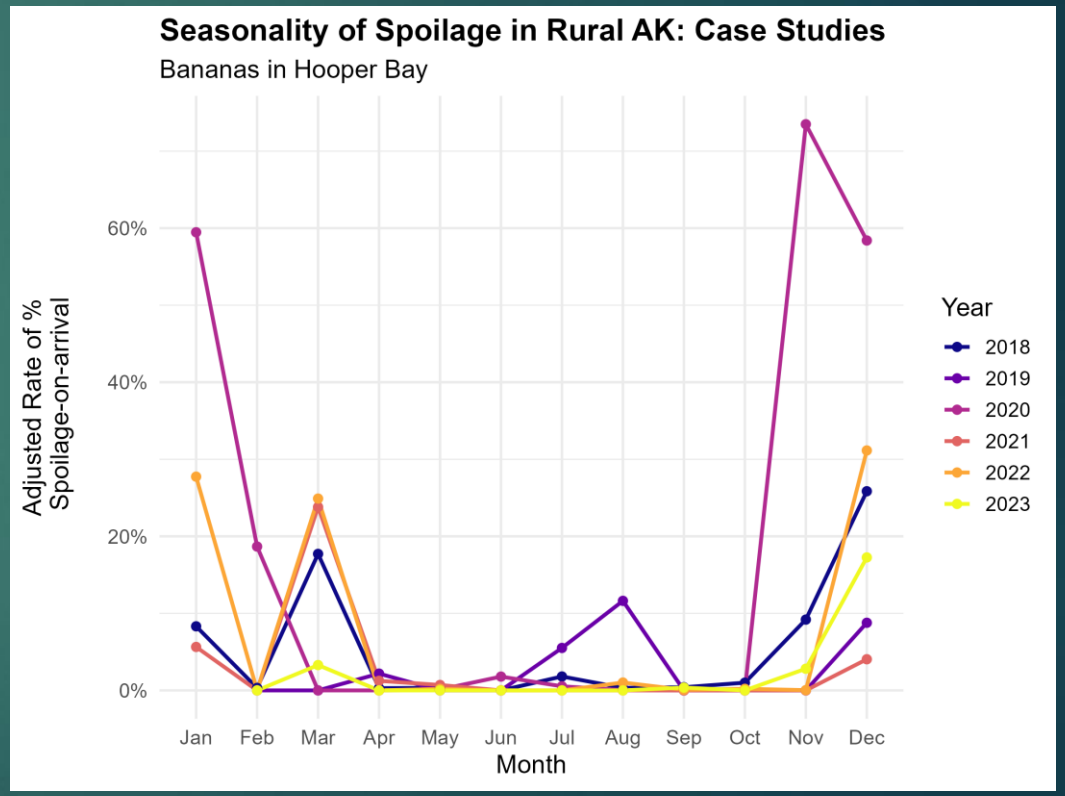
Lower, typically <1%



Much higher, typically 3-6%

Spoilage cases illustrate variation over time/product/location





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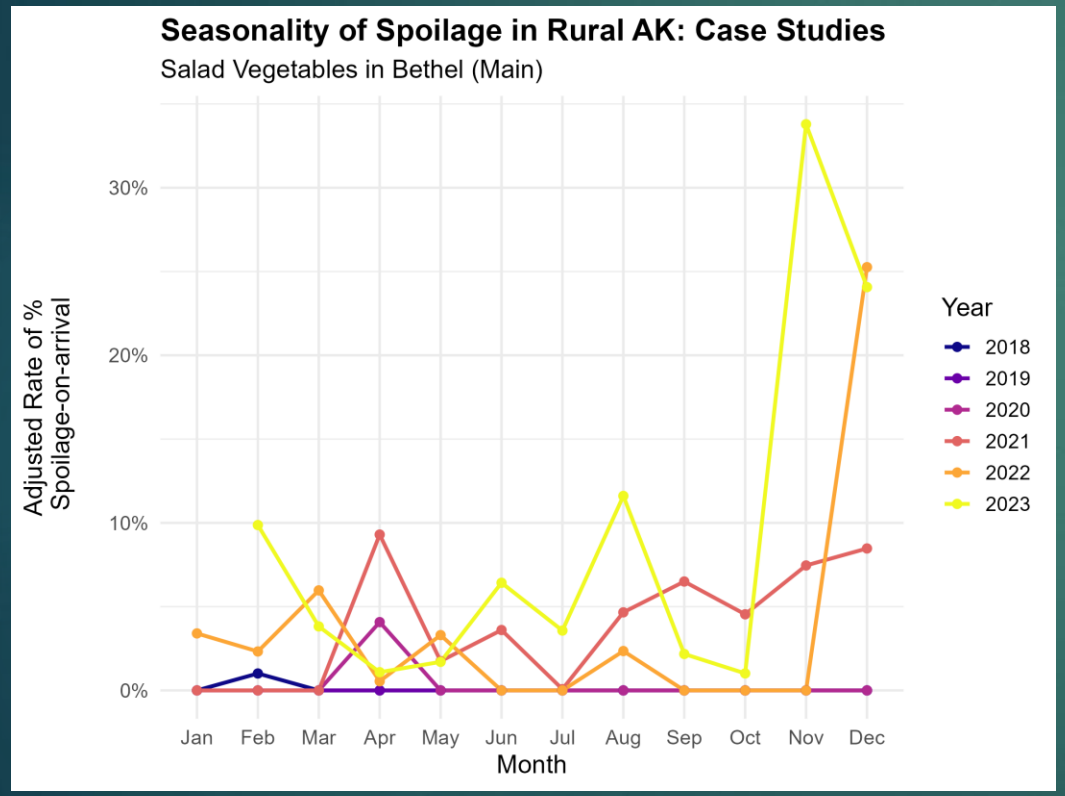
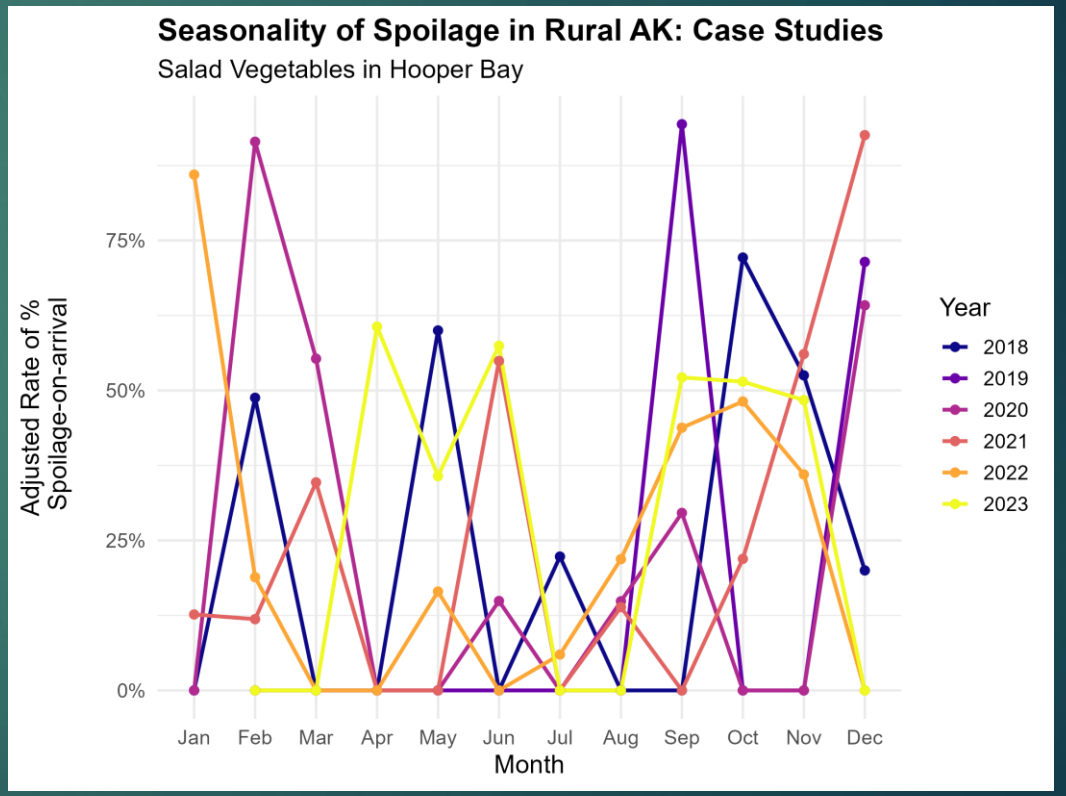
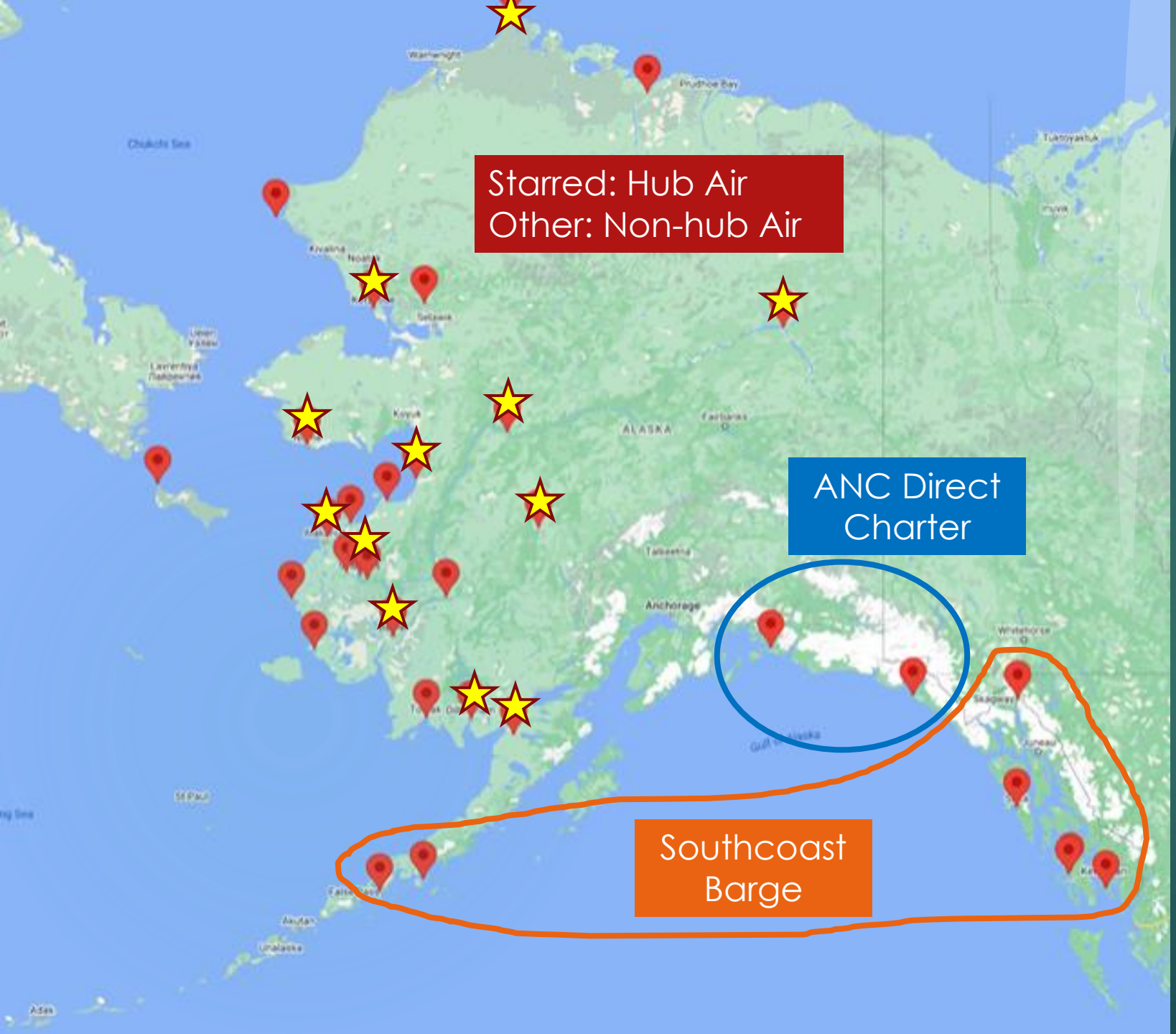
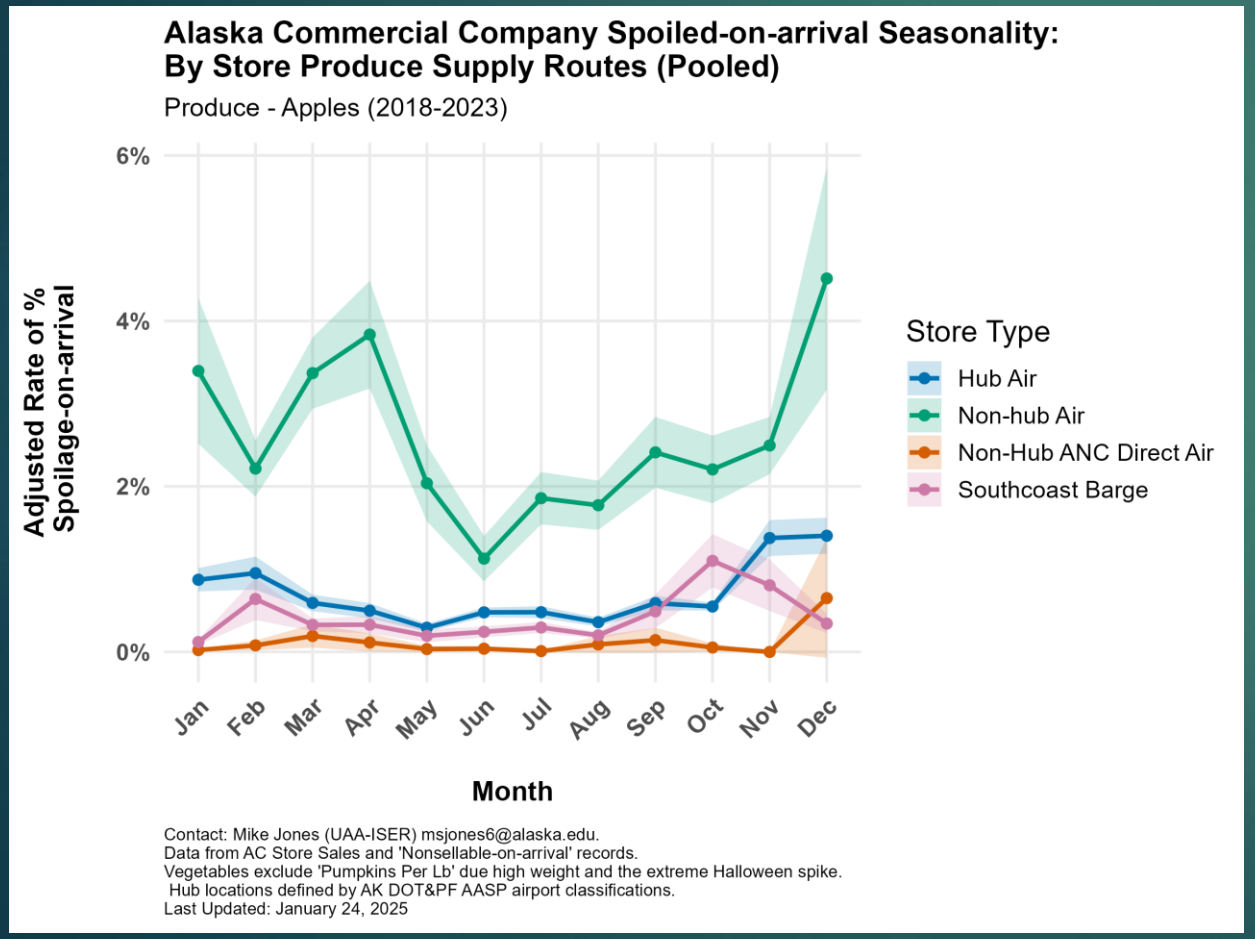






Aggregated comparisons of spoilage rates, by supply chain route

Apples

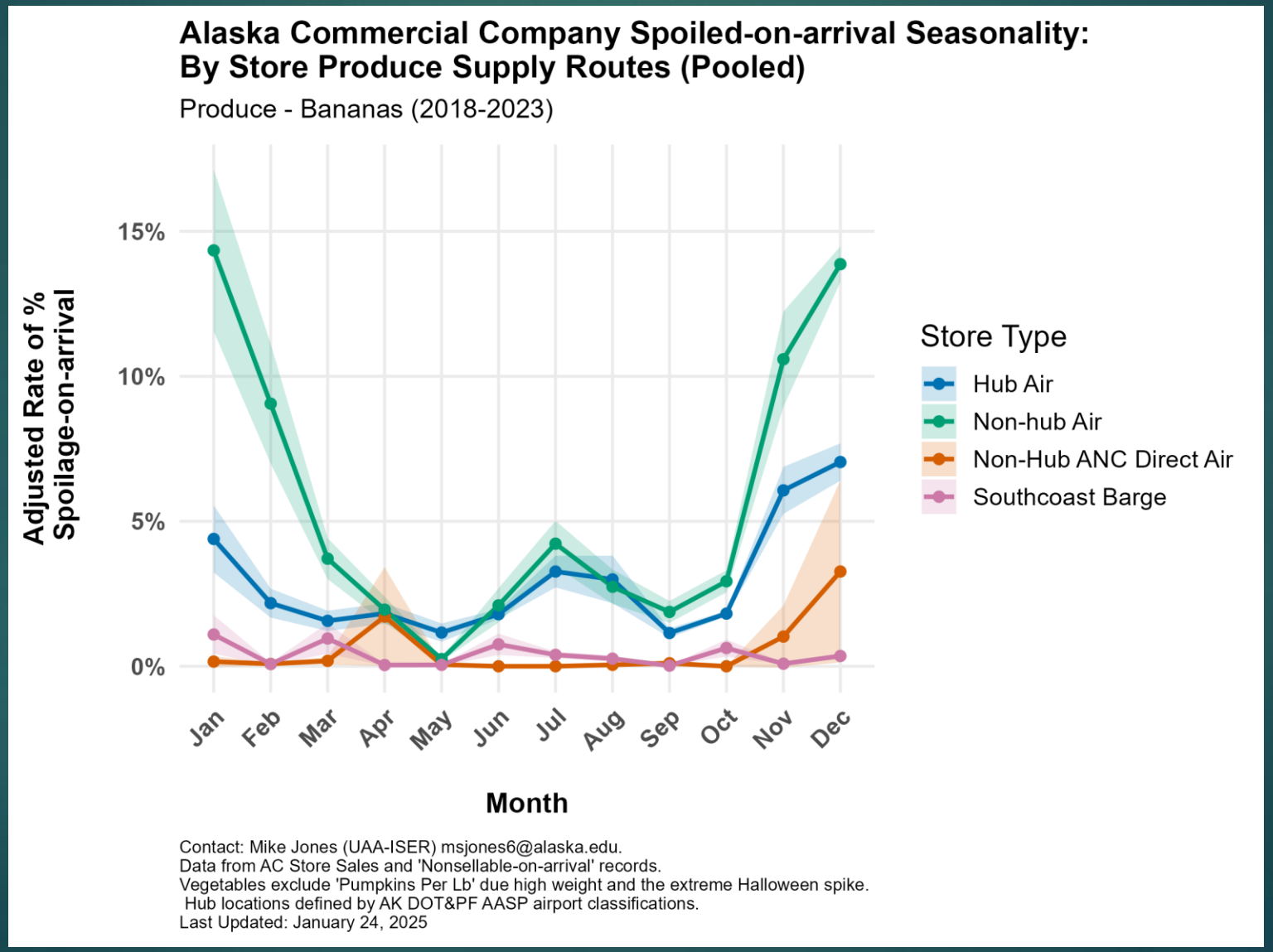


Interpretation:

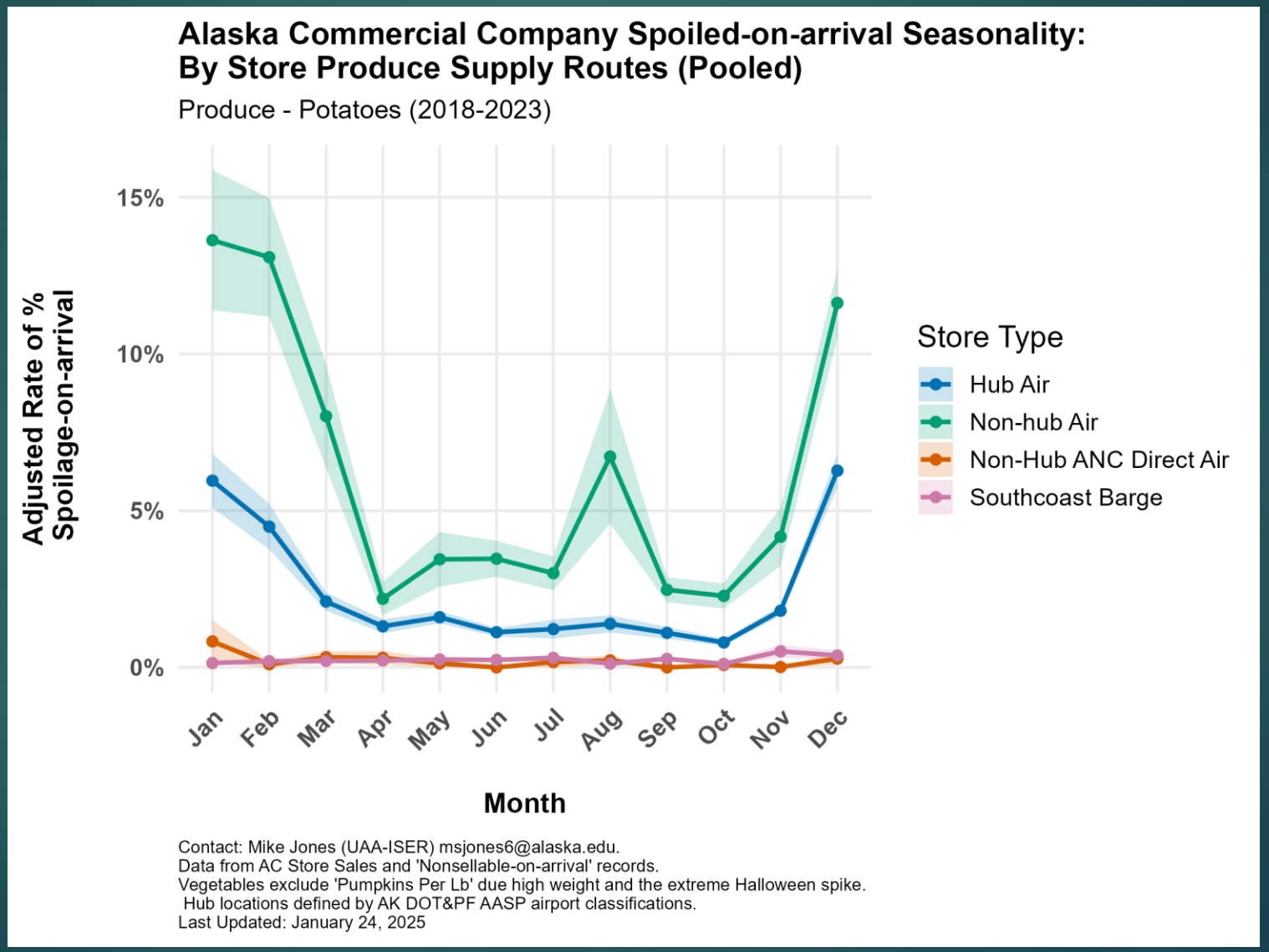
"On average, in January, about 3.4% of apples sent to (all) 'Non-hub' village stores were spoiled-on-arrival"

(denominator is [sales + spoilage-on-arrival] and excludes in-store shrink)

Bananas


Alaska Commercial Company Spoiled-on-arrival Seasonality:
By Store Produce Supply Routes (Pooled)
Produce - Bananas (2018-2023)
Adjusted Rate of % Spoilage-on-arrival
15%
10%
5%
0%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Store Type
Hub Air
Non-hub Air
Non-Hub ANC Direct Air
Southcoast Barge
Contact: Mike Jones (UAA-ISER) msjones6@alaska.edu.
Data from AC Store Sales and 'Nonsellable-on-arrival' records.
Vegetables exclude 'Pumpkins Per Lb' due high weight and the extreme Halloween spike.
Hub locations defined by AK DOT&PF AASP airport classifications.
Last Updated: January 24, 2025

Potatoes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Produce - Potatoes (2018-2023)
Adjusted Rate of % Spoilage-on-arrival
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5%
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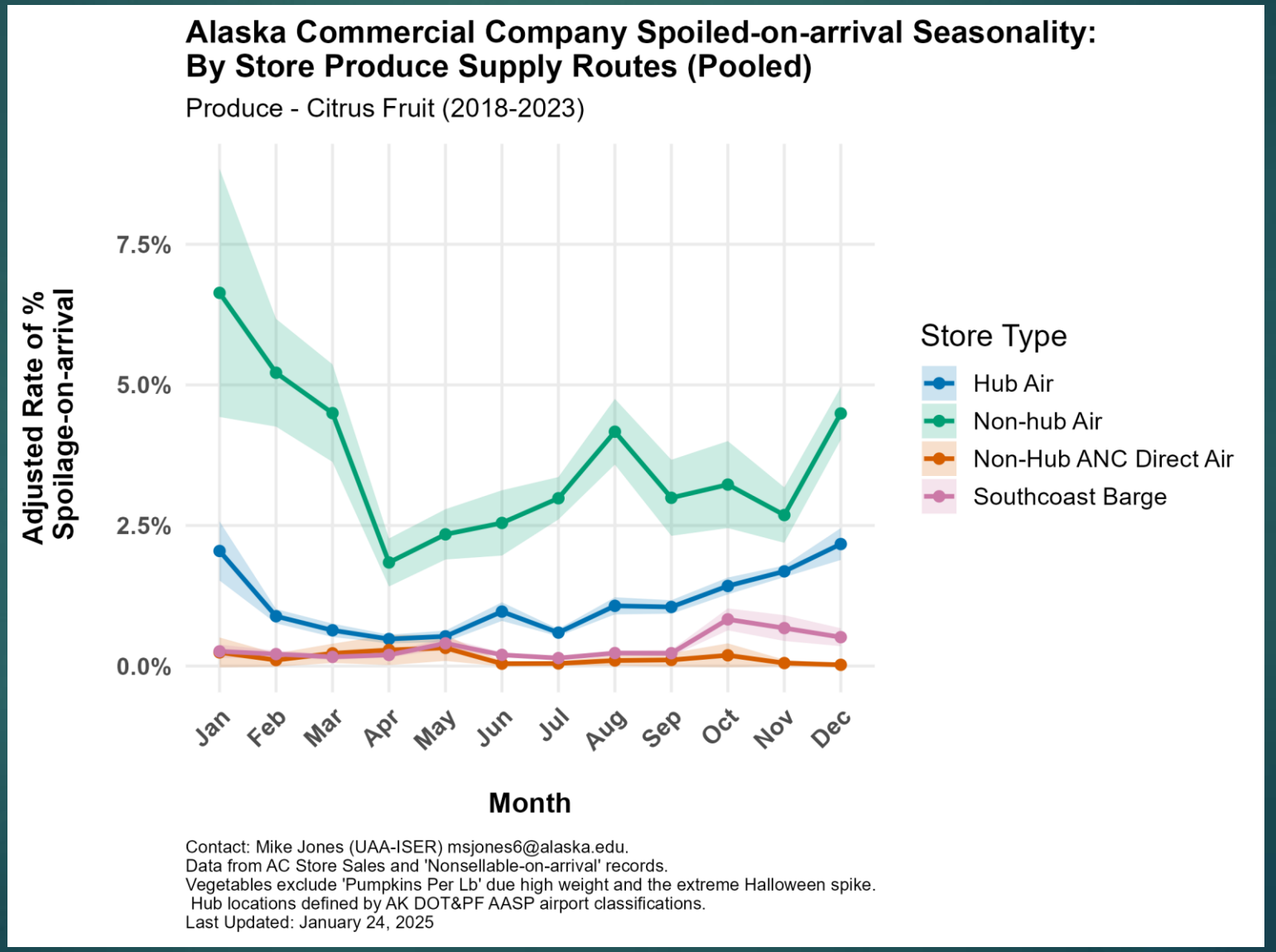
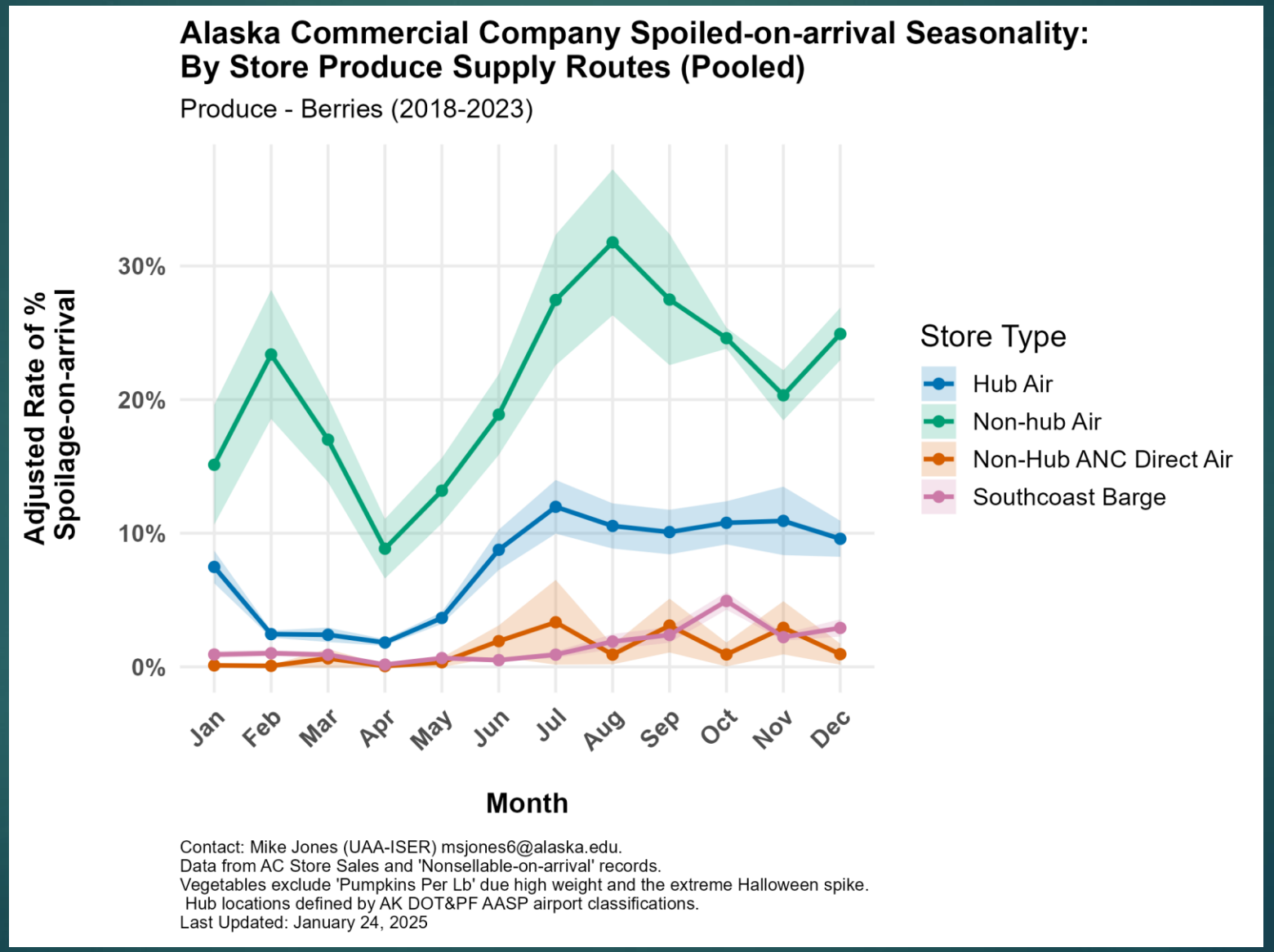
Citrus Fruit



Berries


Alaska Commercial Company Spoiled-on-arrival Seasonality:
By Store Produce Supply Routes (Pooled)
Produce - Berries (2018-2023)
Adjusted Rate of % Spoilage-on-arrival
30%
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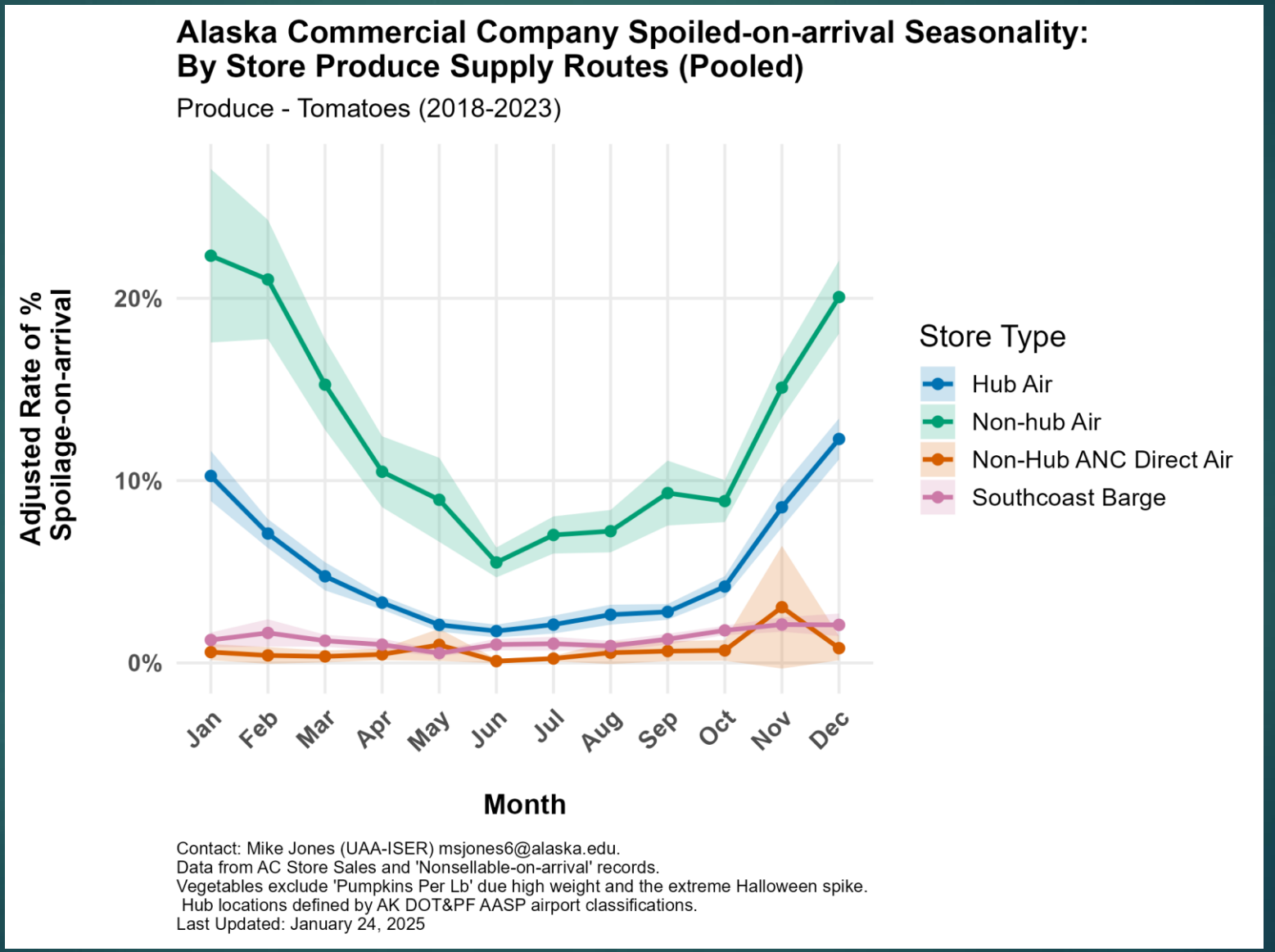
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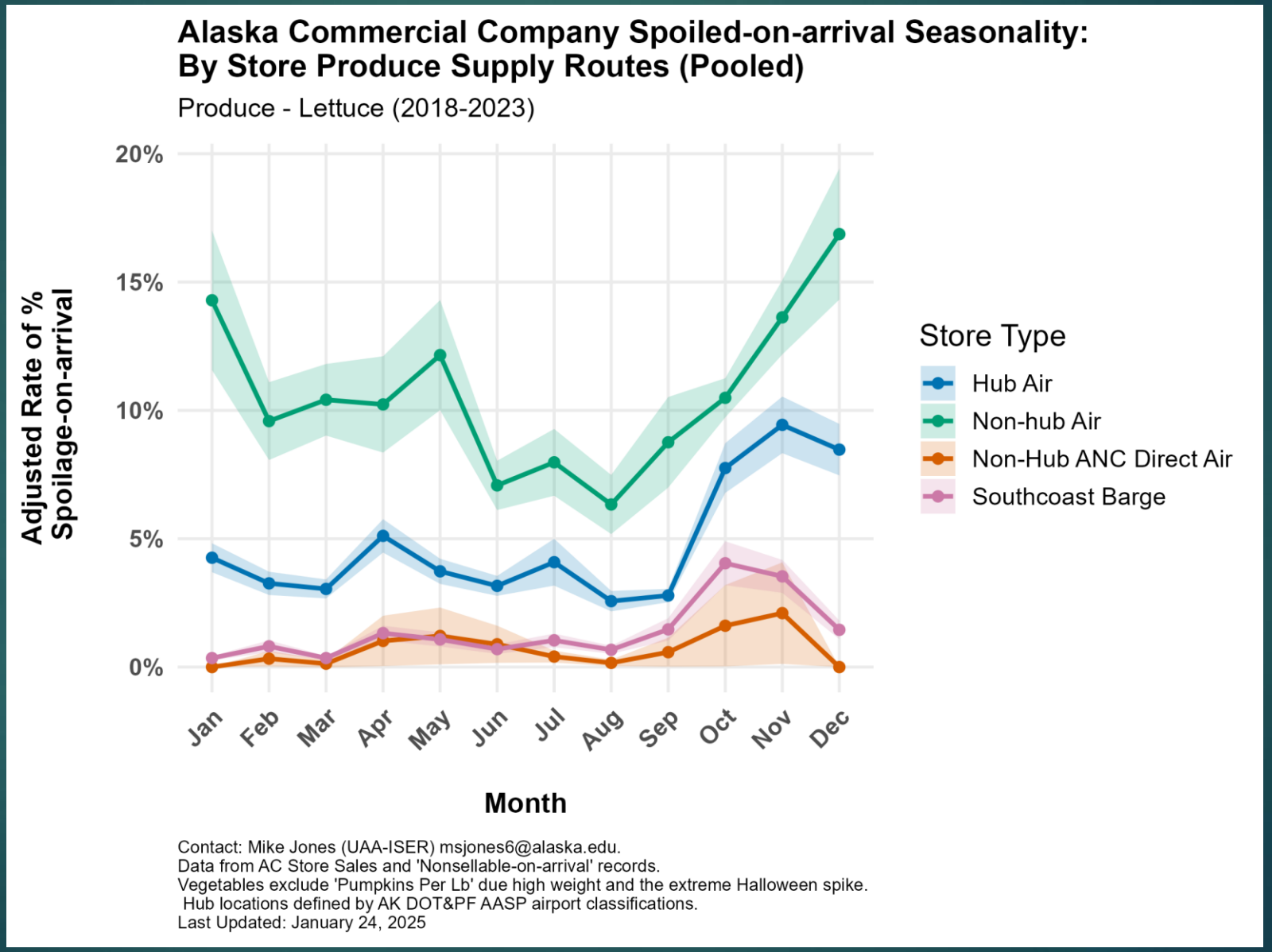
Lettuce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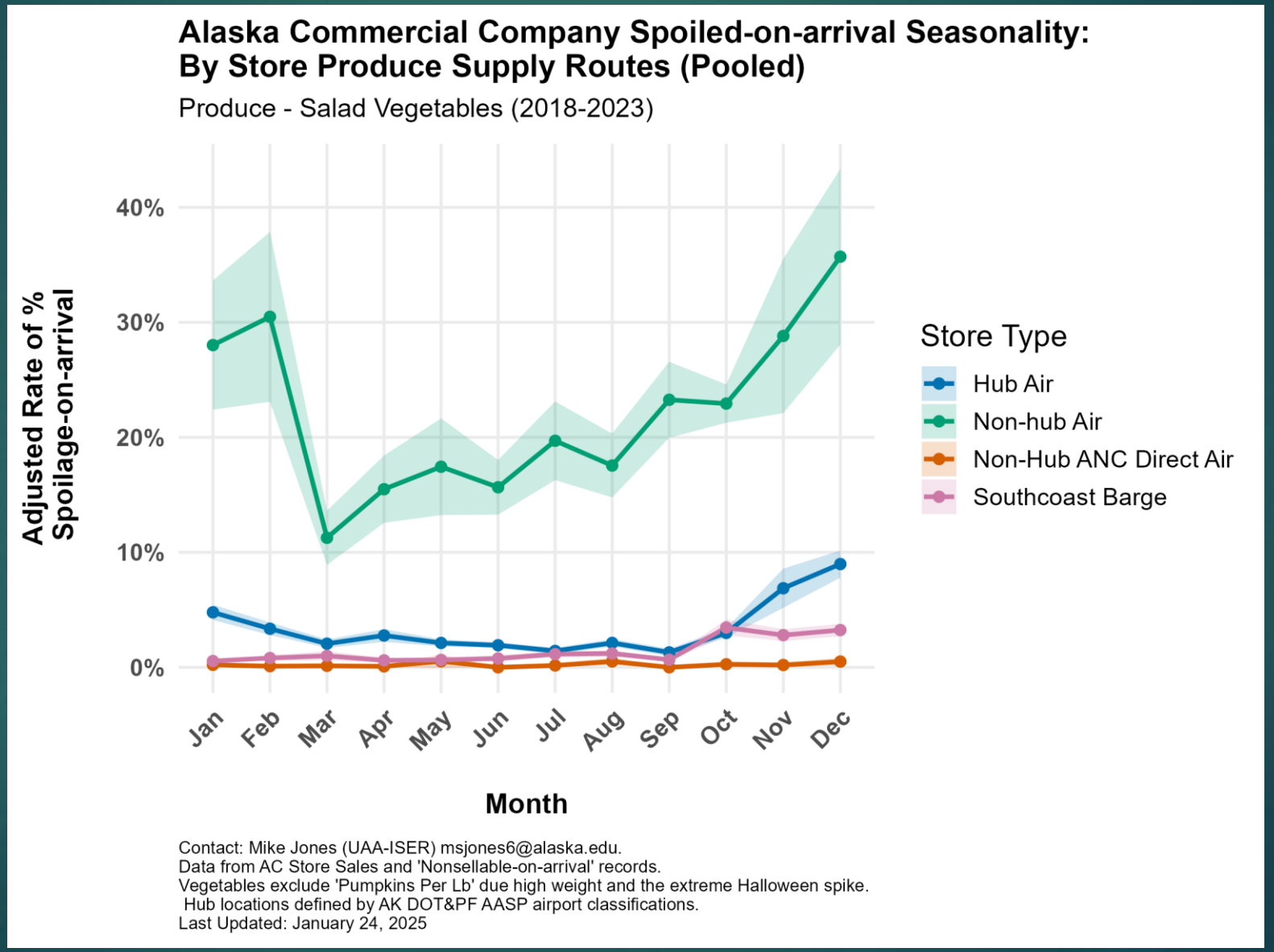
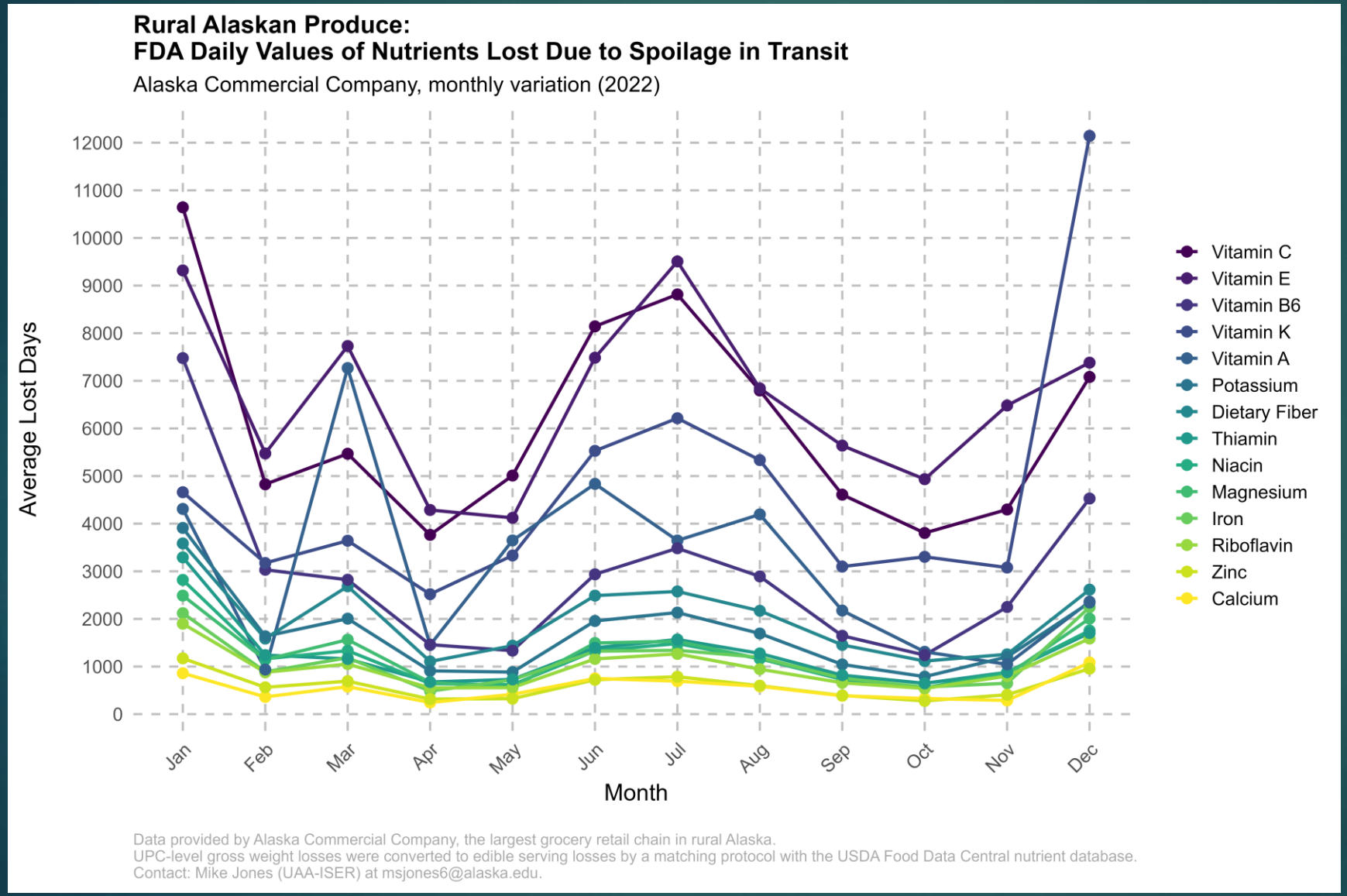
Non-Hub ANC Direct Air
Southcoast Barge
Contact: Mike Jones (UAA-ISER) msjones6@alaska.edu.
Data from AC Store Sales and 'Nonsellable-on-arrival' records.
Vegetables exclude 'Pumpkins Per Lb' due high weight and the extreme Halloween spike.
Hub locations defined by AK DOT&PF AASP airport classifications.
Last Updated: January 24, 2025

Salad Vegetables



Which nutrients have the highest intensity of loss?



In 2022, 360k USDA servings of fruits and vegetables were spoiled in transit

Legend order runs from highest to lowest value in January

**To be scaled up to a community-level retail grocery sector estimates with market share adjustments based on store footprint*

Mapping into multi-agency priorities

- Implementing nutrition-based interventions centering on fresh produce requires a robust, reliable supply chain for perishables
- We seek to understand drivers of rural-urban disparities in price and availability due to infrastructure frictions

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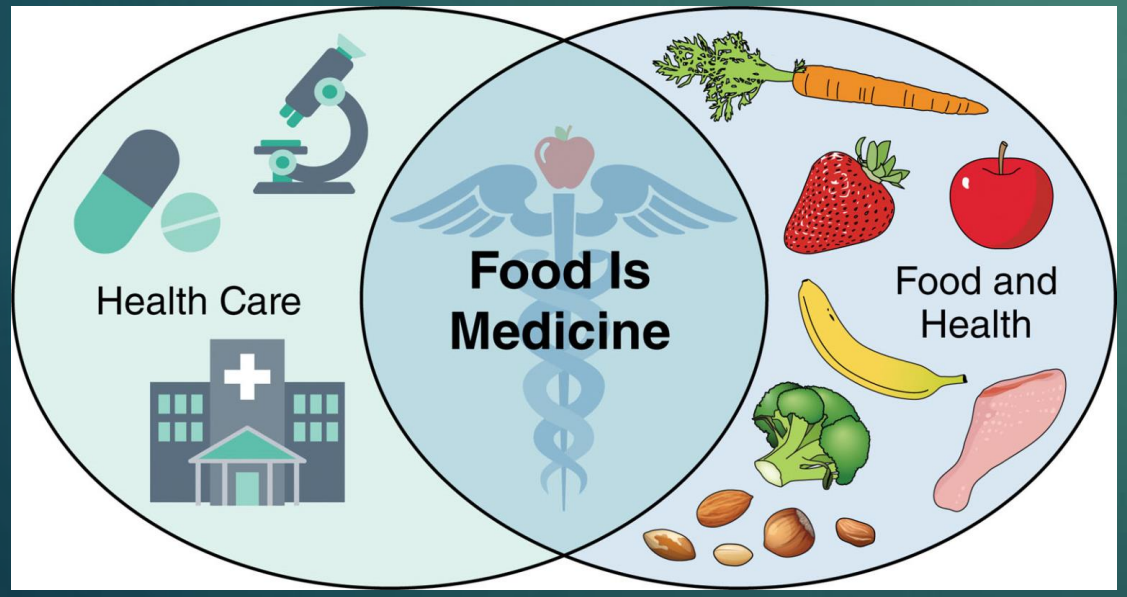
Correspondence | Published: 06 October 2022

A Food is Medicine approach to achieve nutrition security and improve health

Dariush Mozaffarian ✉, Heidi M. Blanck, Kathryn M. Garfield, Alissa Wassung & Ruth Petersen

Nature Medicine **28**, 2238–2240 (2022) | Cite this article



Volpp et al. (2023)

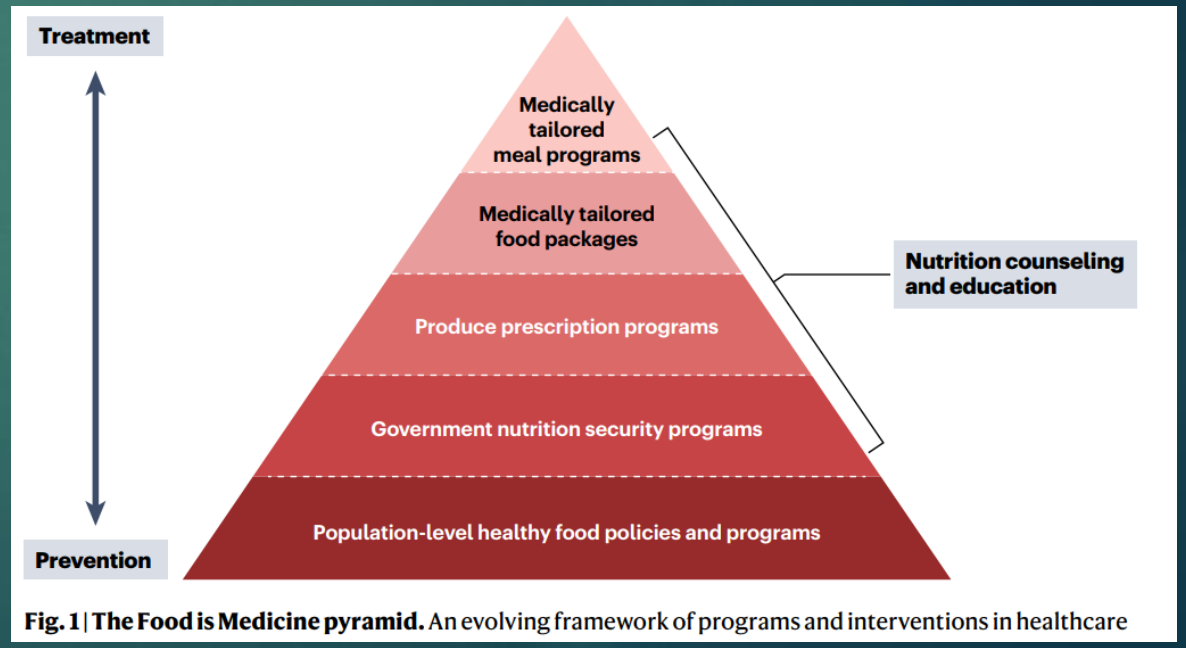
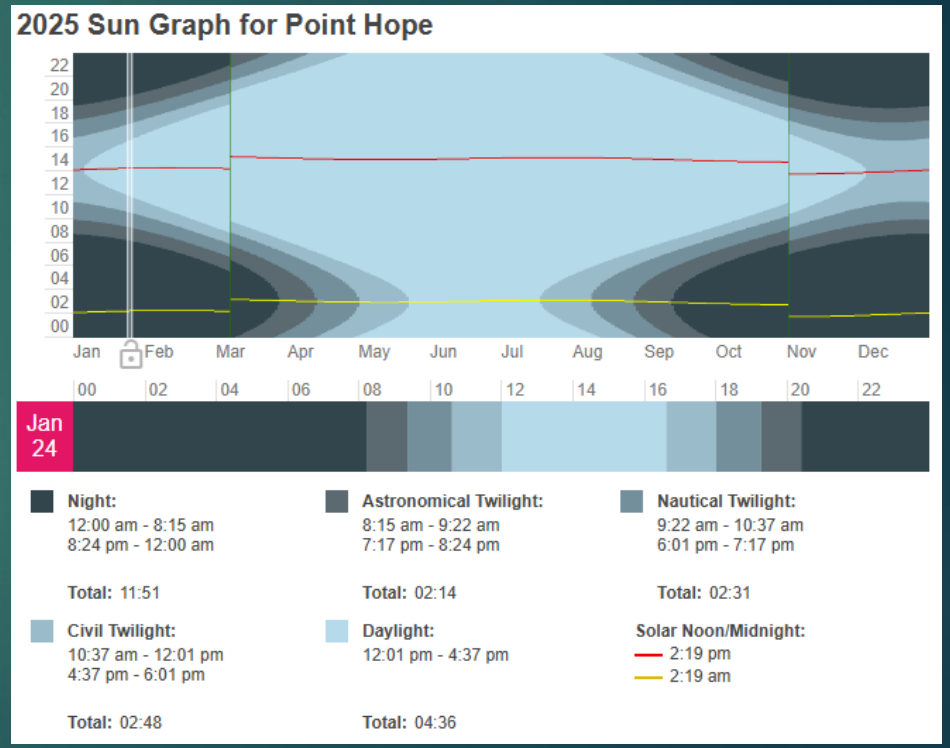


Fig. 1 | The Food is Medicine pyramid. An evolving framework of programs and interventions in healthcare

(Ongoing) Drawing causal links between supply chain constraints and these outcomes

- Aviation Infrastructure outages (daily level)
- Flight Records (daily level)
  - FAA (sparse coverage in bush Alaska)
  - Four bush carriers (confidential data, some just received and in processing)
- Environmental characteristics: civil twilight hours (VFR regs), temperature, other weather?
  - Hang-ups with granular availability
- Cold chain deficits in rural hub airports

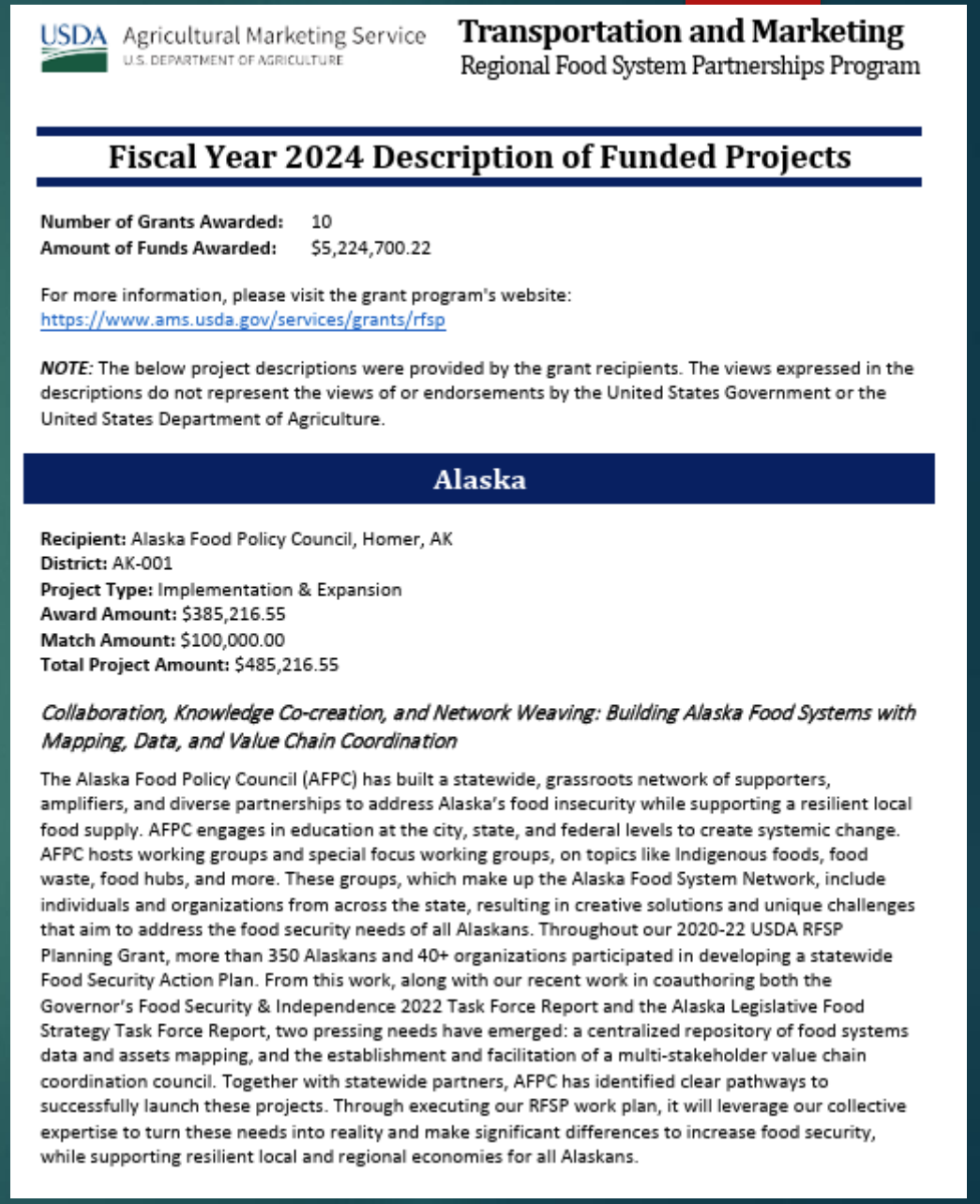
- → community-level outcomes, like spoilage



Ongoing adjacent work (USDA, w/ AFPC):

→ Food Price Dashboard

→ Food Supply Chain Coordination Council



USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

Transportation and Marketing
Regional Food System Partnerships Program

Fiscal Year 2024 Description of Funded Projects

Number of Grants Awarded: 10
Amount of Funds Awarded: $5,224,700.22

For more information, please visit the grant program's website:
https://www.ams.usda.gov/services/grants/rfsp

NOTE: The below project descriptions were provided by the grant recipients. The views expressed in the descriptions do not represent the views of or endorsements by the United States Government or the United States Department of Agriculture.

Alaska

Recipient: Alaska Food Policy Council, Homer, AK
District: AK-001
Project Type: Implementation & Expansion
Award Amount: $385,216.55
Match Amount: $100,000.00
Total Project Amount: $485,216.55

Collaboration, Knowledge Co-creation, and Network Weaving: Building Alaska Food Systems with Mapping, Data, and Value Chain Coordination

The Alaska Food Policy Council (AFPC) has built a statewide, grassroots network of supporters, amplifiers, and diverse partnerships to address Alaska's food insecurity while supporting a resilient local food supply. AFPC engages in education at the city, state, and federal levels to create systemic change. AFPC hosts working groups and special focus working groups, on topics like Indigenous foods, food waste, food hubs, and more. These groups, which make up the Alaska Food System Network, include individuals and organizations from across the state, resulting in creative solutions and unique challenges that aim to address the food security needs of all Alaskans. Throughout our 2020-22 USDA RFSP Planning Grant, more than 350 Alaskans and 40+ organizations participated in developing a statewide Food Security Action Plan. From this work, along with our recent work in coauthoring both the Governor's Food Security & Independence 2022 Task Force Report and the Alaska Legislative Food Strategy Task Force Report, two pressing needs have emerged: a centralized repository of food systems data and assets mapping, and the establishment and facilitation of a multi-stakeholder value chain coordination council. Together with statewide partners, AFPC has identified clear pathways to successfully launch these projects. Through executing our RFSP work plan, it will leverage our collective expertise to turn these needs into reality and make significant differences to increase food security, while supporting resilient local and regional economies for all Alaskans.

Thank you!

MIKE JONES

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CYNTHIA & DALE ERIKSON, VICTOR JOSEPH, GREG DYER, KYLE HILL, GIDEON GARCIA, DC KATHERINE KEITH, CATHY CAHILL, AK DOT-SWA (MELANY, REBECCA, RYAN, TROY), & VANESSA COLLIER, CAROLYN TIX, FAITH GREEN AT UAA-ISER, WITH COMMENTS FROM BRETT WATSON, BROCK WILSON, KATIE CUEVA.

UAA Institute of Social and Economic Research
University of Alaska Anchorage

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