



Alaska Department of Transportation & Public Facilities DOT&PF Winter Weather Operations

House Finance

Katherine Keith, Deputy Commissioner
Sean Holland, P.E., Central Region Director

Kirk Warren P.E.
Chief M&O

Tim Glassett
Avalanche Program Lead

Jason Sakalaskas P.E.
Chief M&O

Brad Bylsma
Director SEF

Andy Mills
Legislative Liaison

February 2, 2024

October 10, 2023 – Snow Summit

"Gathering of state and local stakeholders to discuss winter operations, challenges, and innovations."

- Keeping Winter Roads Clear (M&O*)
- Winter Maintenance Priorities for Sidewalks Paths (FAST Planning)
- Designing for Complete Streets in Northern Climates (Pedestrian and Bike Planning)
- 511 Innovations and RWIS*** (DMIO**)
- Winter Snow Removal Operations (M&O*)
- Extreme Events: How DOT&PF Prepares (Commissioner)
- Avalanche Program and Innovations (Avalanche/Drone Teams)
- Seasonal and Ice Roads (UAF Arctic Infrastructure Development Center)
- Snowtrails: Snowmachine Grants (DOT&PF Resiliency Coordinator)
- Innovations: Winter Operations Dashboard and Mobile RWIS*** (DMIO**)

** Maintenance and Operations (M&O)*

*** Data Modernization and Innovation Office (DMIO)*

****Road Weather Information System (RWIS)*



Snow Summit Follow-Up: New Tools

Alaska DOT&PF Winter Maintenance Priority by District

Includes number of lane miles and airports by maintenance district and winter maintenance priority.

This dashboard summarizes lane miles by maintenance district. Multiple data sources have been combined to produce the project information presented on this dashboard.

Note: Lane miles are based off of the HPMS reporting definition of lane miles which "is calculated by multiplying the number of through lanes on a given roadway section by its centerline length."

Public Airports

Lane Miles

Winter Maintenance Priority

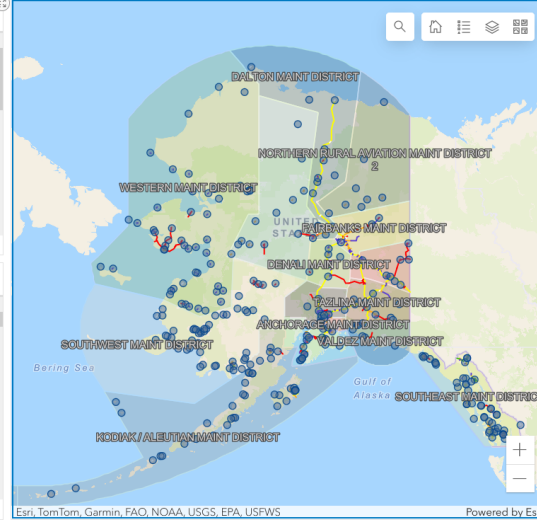


Maintenance District

Maintenance District	Lane Miles
Fairbanks	1,498.3
TOK	1,255.2
Dalton	1,244.9
Southeast	1,226.9
Tazlina	1,218.4
Mat-Su	1,192.8

Maintenance Station

Maintenance Station	Lane Miles
FAIRBANKS STATION	1,010.9
ANCHORAGE STATION	781.9
PALMER STATION	635.3
NOME STATION	553.5
DELTA JUNCTION STATION	377.1
TOK STATION	361.1



Total Lane Miles

12k

Winter Maintenance Priority	Lane Miles
1	1220.6614619
2	4628.4678151
3	2203.4006835
4	1272.5085622

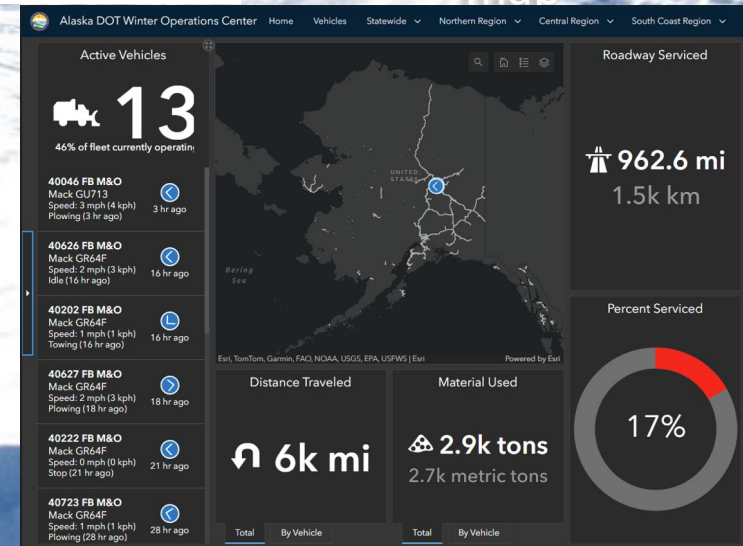
Maintenance District	Airports
Anchorage	6
Dalton	12
Denali	6
Fairbanks	4
Kenai Peninsula	16



Scan to explore the interactive priority

map

Data-driven approach to improving safety and innovating investment in Alaska



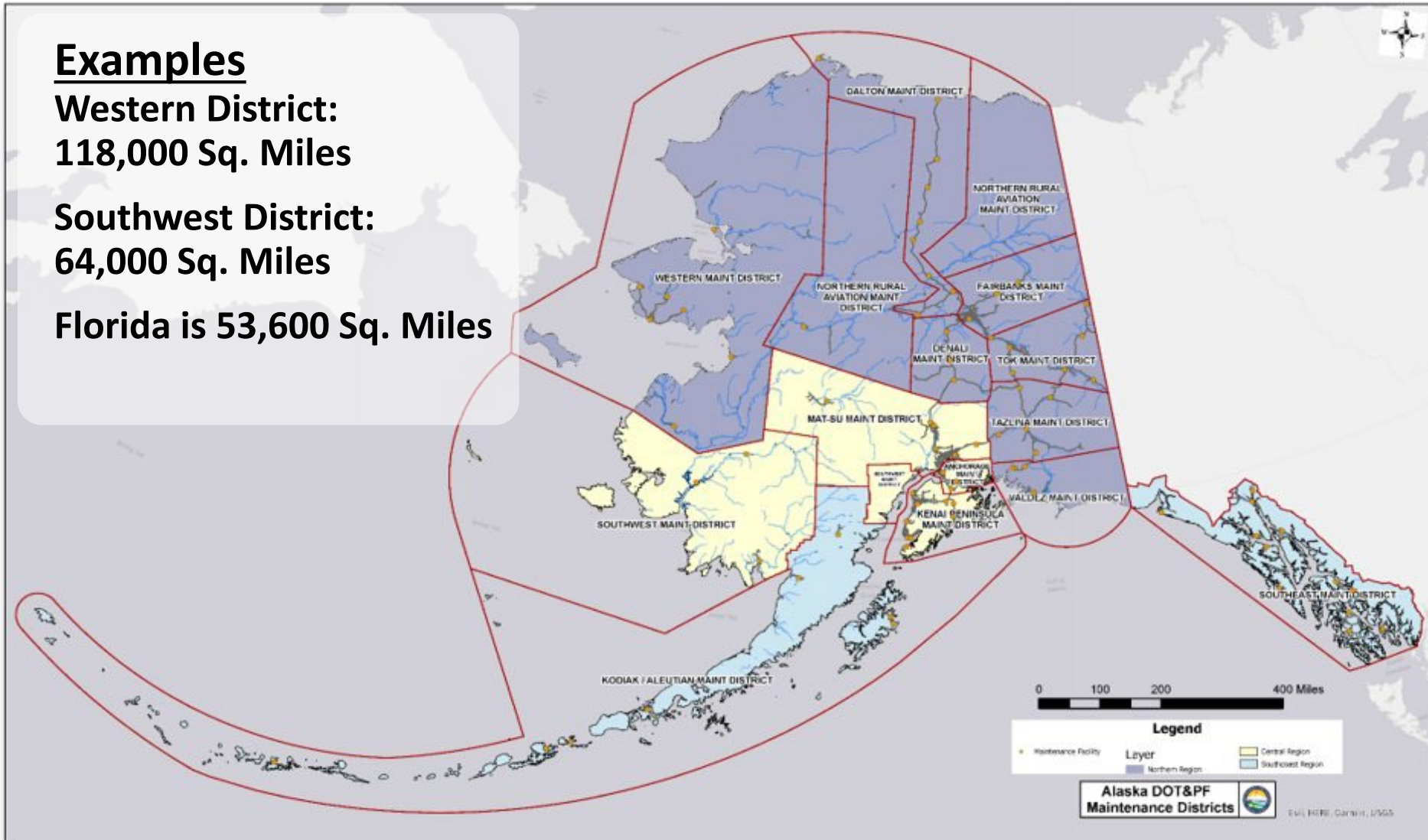
Winter Operations and Budgets

Examples

Western District:
118,000 Sq. Miles

Southwest District:
64,000 Sq. Miles

Florida is 53,600 Sq. Miles



Winter Operations and Budgets

Snow Removal Priority System

Category	Condition	Description
A	Good Winter Driving Conditions	Bare pavement, good visibility, snow removed from lanes and centerline, acceptable path widths.
B	Fair to Good Winter Driving Conditions	Some lane blockage, icy patches, snow cleared from the traveled way, generally good traction.
C	Fair to Difficult Winter Driving Conditions	Passable roads, standing water or loose snow, patches may cover some lane markings, slow traffic movement.
D	Difficult to Very Difficult Driving Conditions	Challenging travel, moderate snow accumulation, substantial traffic delays.
E	Hazardous Winter Driving Conditions	Travel not advised, considerable snow accumulation, roads may be icy, poor traction, extremely poor conditions.



Winter Operations and Budgets

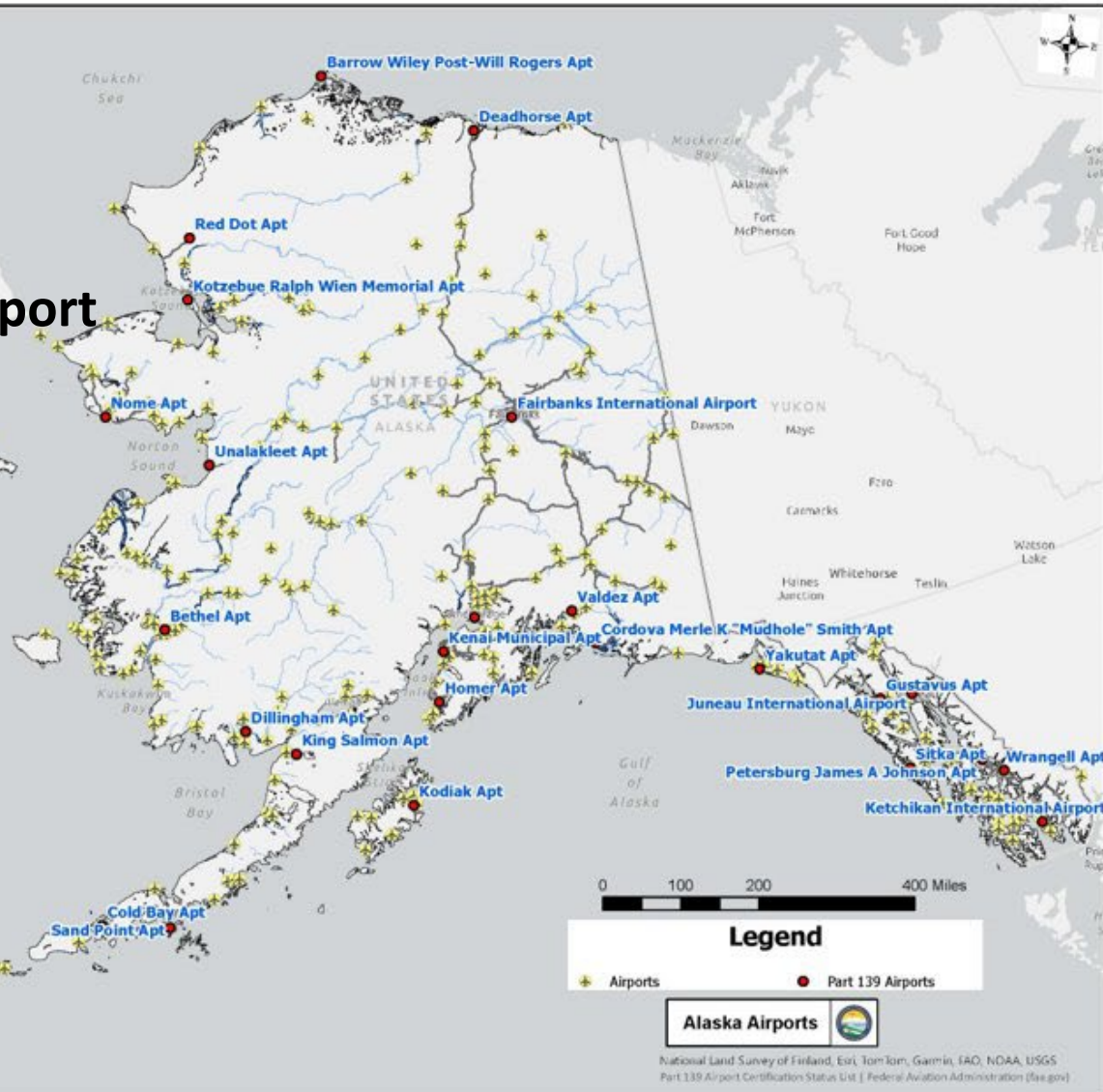
235 Rural Airports

26 are Part 139 Certified

Rural Airport Contracting

Average \$50K - \$100K per Airport

*~82% of communities
in Alaska rely on
aviation as their only
means of access*



Winter Operations Staffing

Maintenance District	Equipment Operator Positions	Vacancy Rate (as of Jan. 29, 2024)
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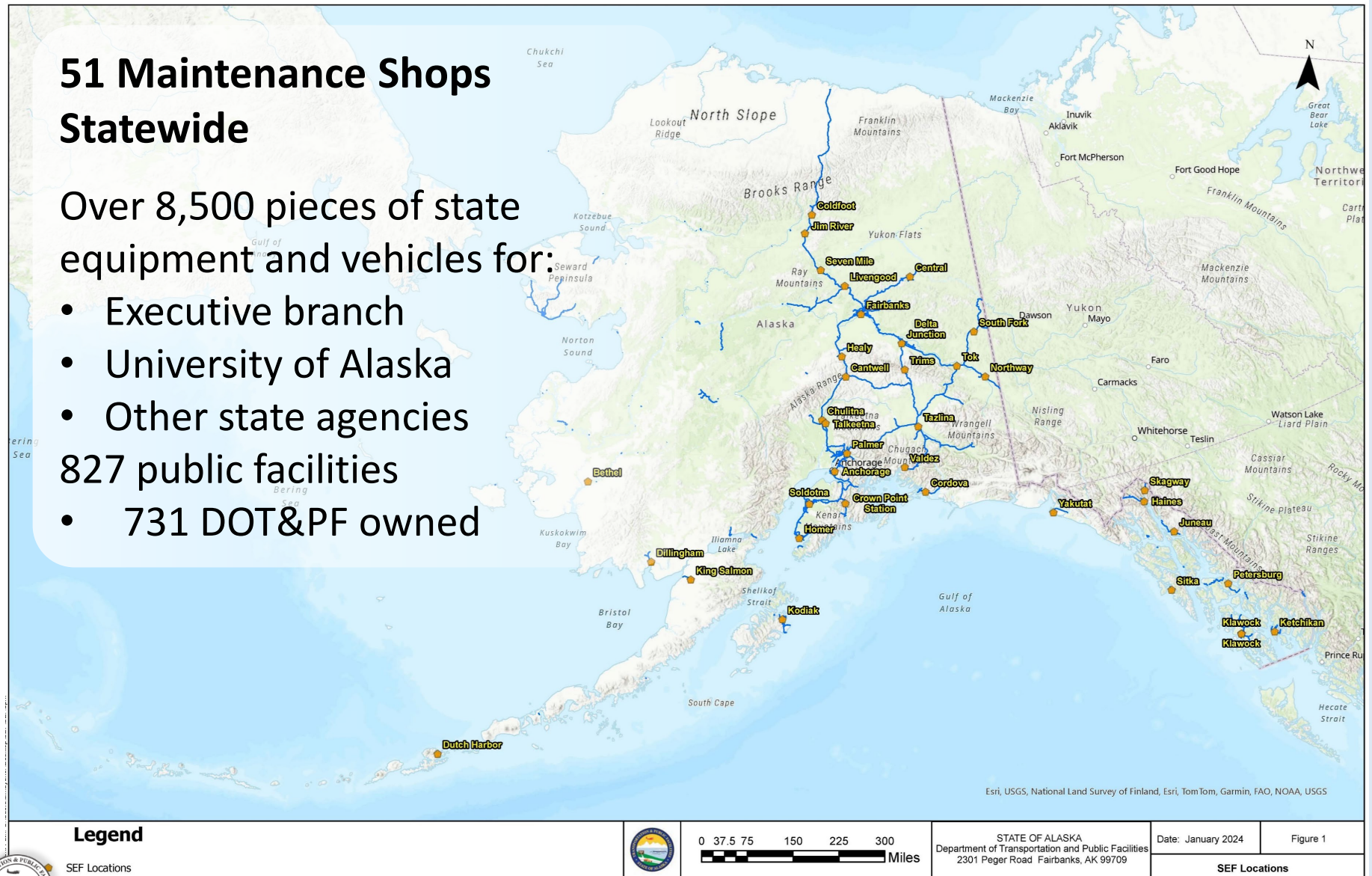
Anchorage	48	19%
Matanuska-Susitna	37	14%
Kenai Peninsula	53	25%
Southwest	19	16%
Dalton	70	26%
Denali	26	27%
Fairbanks	57	33%
Tazlina	42	33%
Tok	34	32%
Valdez	24	29%
Western	29	21%
Kodiak	32	4%
Southeast	56	11%
Total/Average	524	22.3%

Supporting Divisions: Statewide Equipment Fleet and Division of Facility Services

51 Maintenance Shops Statewide

Over 8,500 pieces of state equipment and vehicles for:

- Executive branch
 - University of Alaska
 - Other state agencies
- 827 public facilities
- 731 DOT&PF owned



Statewide Equipment Fleet and Division of Facility Services Staffing

Maintenance District	Total Mechanic Positions	Vacancy Rate	Total Facilities Positions	Vacancy Rate
Anchorage	19	26%	24	29%
Matanuska-Susitna	10	20%	2	0%
Kenai Peninsula	10	10%	2	0%
Southwest	7	29%	1	0%
Dalton	13	0%	5	20%
Denali	4	50%	0	0%
Fairbanks	18	22%	21	24%
Tazlina	7	57%	4	25%
Tok	8	13%	3	33%
Valdez	4	50%	3	0%
Western	8	38%	7	29%
Kodiak	3	33%	1	0%
Southeast	12	17%	16	19%
Totals/Average	123	24%	89	23%



Winter Event Response: Anchorage November 8-12, 2023

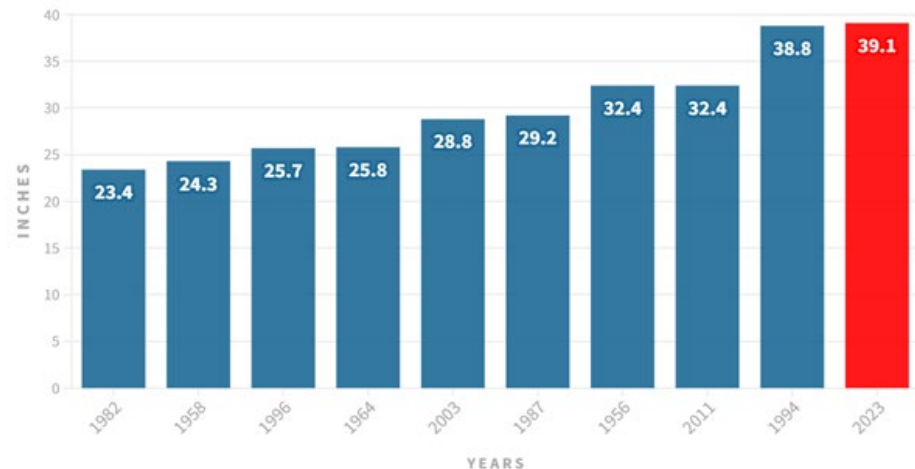
- **Nov. 8** Snowstorm starts. National Weather Service issues storm, high wind and flood warnings throughout Southcentral (Valdez, Thompson Pass, Anchorage, Turnagain Arm, Turnagain Pass, South & West Copper River Basin, Susitna and Matanuska Valleys, and Western Kenai Peninsula (over 50K sq. miles = New York). Temperatures around 30-31F.
- **Nov. 8** Breaks daily snow record with 9" of heavy wet snow
- **Nov. 9** Continues of up to 30" total snow fall, of high moisture content snow
- **Nov. 12** Another round of snow of over 7.5"

Relevant Factors

- Equipment down-time
- Moisture content of snow
- High-traffic volumes
- Winter shift change-overs just started
- Single snow haul site

Snowiest Novembers for Anchorage

Amounts shown in inches, 2023 total through Friday morning



Source: NOAA Data • KEVIN POWELL / Anchorage Daily News
Note: Records for the Anchorage airport weather station date back to 1953

Winter Event Response: Anchorage November 2023

Anchorage District In-house Resources, Emergency Contracts, Memorandum of Agreement

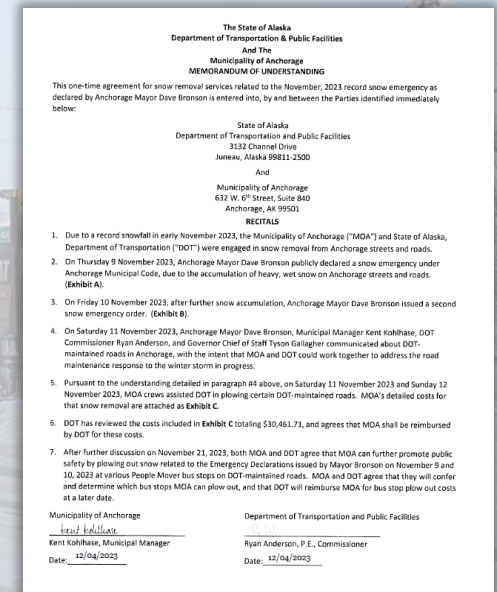
DOT&PF

- 48 equipment operators
- 13 plow trucks
- 9 graders
- 4 loaders
- 4 highway snowblowers
- 4 sidewalk snowblowers

\$1,175.6 FY2024 supplemental request pending for this event

Event-only Emergency Contracts

- Executed 3 emergency contracts due to November event
 - Provide 2 winter-equipped graders
 - Priority 3 and 4 roadways
 - Sidewalks



**Memorandum of Agreement between
DOT&PF and Municipality of
Anchorage for event response.**

\$ in thousands

2/2/2024

Winter Event Response: Moving Forward

TRANSFER OF RESPONSIBILITY (TORA) AGREEMENT
Between the
State of Alaska
Department of Transportation and Public Facilities
and the
Municipality of Anchorage
Maintenance & Operations Department
for
Winter Maintenance of Road Facilities

THIS AGREEMENT is entered into this 16th day of October, 2016, between the State of Alaska, Department of Transportation and Public Facilities, and the Municipality of Anchorage, Maintenance & Operations Department.

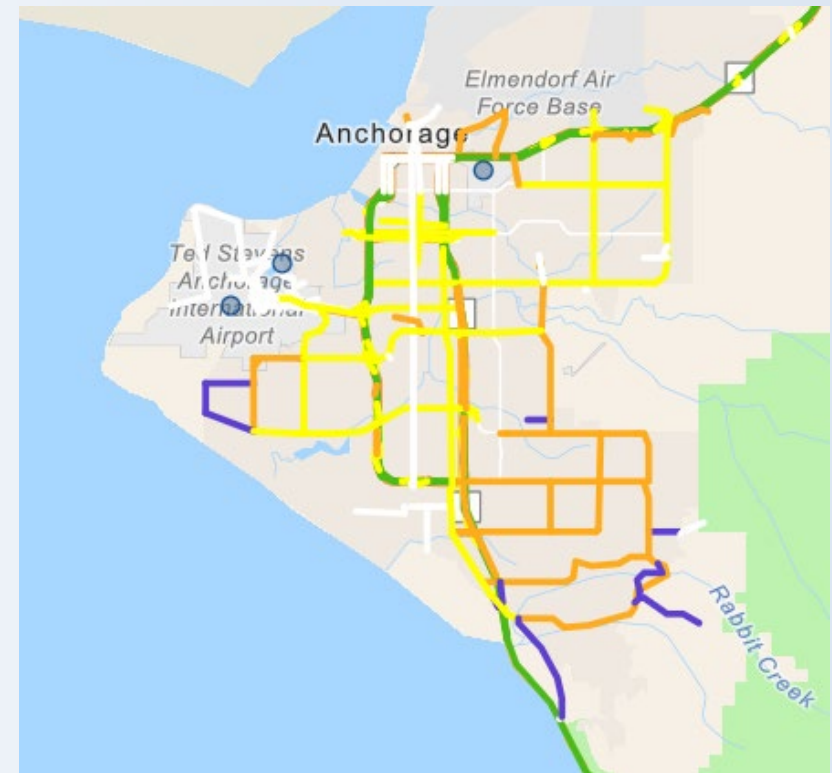
Transfer of Responsibility Agreement (TORA) between DOT&PF and the Municipality of Anchorage

By the order and authority of the Department, the Commissioner has been granted the authority by A.S. 19.10.030 and 19.20.010 to transfer responsibility for winter maintenance of certain road facilities to the Municipality and accept responsibility for winter maintenance of those municipal road facilities transferred in the exchange. The Commissioner has delegated this authority to the Regional Director of each Region as per the Department's Policy & Procedure 10-0017.

(B) The Maintenance & Operations Department, Municipality of Anchorage, has been authorized to accept exclusive winter maintenance responsibility for the road facilities exchanged by the Department and to exchange exclusive winter maintenance responsibility for municipal road facilities to the Department.

Section 3. EXCHANGE OF RESPONSIBILITY

(A) The Department hereby transfers to the Municipality all its right and obligation to perform routine winter maintenance work on the state road facilities listed in Attachment "A". The routine winter maintenance work hereby transferred to the Municipality means those regular winter activities necessary to keep such State road facilities and storm drains in operating condition. Those regular winter activities are identified in Attachment "B". They include those duties imposed upon the Department pursuant to 23 U.S.C. 116 relating to the winter maintenance of federally funded routes.



Long-Term Contracts in Place

Non-Motorized Paths: Old Glenn; Eagle River Loop; North Birchwood; O'Malley; Jewel Lake

Roads: Potter; Sand Lake; International; West Dimond; Kincaid

Roads: O'Malley; Elmore; Abbot; Hillside; Rabbit Creek; DeArmoun; Huffman; Birch

Roads: Post; Old Glenn; Eagle River Road; Eklutna Lake; Birchwood Loop



Winter Event Response: Moving Forward

Priority System in Anchorage: Non-motorized

- Significant pedestrian facilities to clear
- Limited snow storage
- "Complete Streets" policy pending



SIDEWALK/PATHWAY WINTER MAINTENANCE						
			DATE/TIME EVENT BEGAN	SNOW AMOUNT	DATE/TIME EVENT ENDED	
		completed time/date		completed time/date		completed time/date
	PRIORITY 1		PRIORITY 2		PRIORITY 3	
	Tudor Rd.		Boniface Parkway		O'Malley Rd.	
	Muldoon Rd.		Airport Heights Rd.		International A.P. Rd.	
	Northern Lights		Abbott Rd.		ML King Rd.	
	Benson Blvd.		W. Dimond Blvd.		Tudor Center Dr.	
	5th Avenue		Elmore Rd.		Glenn Hwy. Pathway	
	Old Seward Hwy.		Old Glenn Eagle Rvr.		Brayton Dr.	
	Dowling Rd.		Eagle River Road		Homer Dr.	
	Debarr Rd.		Eagle River Loop		I street 16- 15th	
	Dimond				Jewel Lake	
	Seward NB 36-15th				Boundary	

Sidewalk Priority

- 1) 66.1 miles
- 2) 35.3 miles
- 3) 46.7 miles

Total 148.1 miles



Winter Event Response: New Technology in Avalanche Mitigation

Pioneering Drone Dock Testing: First in the nation to test drone docks for automated imagery collection.

Purpose: Enhances snow depth modeling and weather observation.

Digital Transformation with GIS: Leading in digitizing avalanche paths for improved asset management.

Avalanche Hazard Reduction: Nationwide first to receive approval for using explosives with drones for avalanche control.

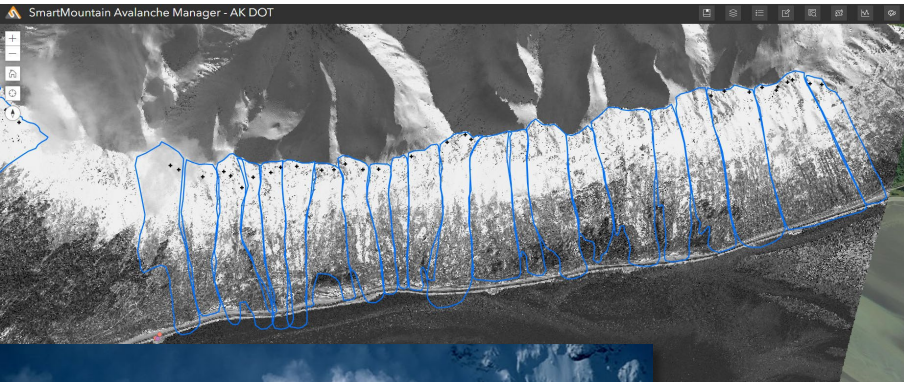
Bridging the Gap: Utilizing UAS (Unmanned Aircraft Systems) as a step towards long-term hazard mitigation.

Future Focus: Implementing RACs (Remote Avalanche Control Systems) for enhanced safety.



Winter Event Response: Avalanche and Highway Closures

Avalanche Mitigation Program



Color	Rating	AHI	Mitigation Measures
Red	Very High	>150	Full-time forecasting and mitigation with explosives, permanent structures, etc.
Orange	High	40-150	Forecasting and closures, limited explosive mitigation
Yellow	Moderate	10-40	Forecasting and closures, selected sites
Blue	Low	1-10	Rare closures or no mitigation
Green	Very Low	<1	No mitigation

Table 1: AHI Hazard Levels and Typical Mitigation (after Schaerer, 1989)

AMZ #	Highway Name	AHI	CBE
12 to 16	Seward Highway	212	309
5 to 7	Thompson Pass	136	263
1	Atigun Pass	98	131
21	Klondike Hwy.	86	143
9	Hatcher Pass	61	55
22	Thane Road	29	37
20	Pasagshak	16	16
8	Copper River	11	13

Table 2: AHI and CBE Levels for Moderate and Higher AMZs



Winter Event Response: Avalanche and Highway Closures

Resourcing Responses: Highway closures and public notifications



Alaska Department of Transportation & Public Facilities
Published by Sam Dapceovich · 1d ·

01/30, 12:00 pm UPDATE: Haines Highway Closure
The debris has been cleared at MP 20 and the Haines Hwy is now open to traffic. The Canadian side appears to be closed at this time. Check <https://511yukon.ca/> for more details on the Canadian portion of the highway.


01/30, 10:30 am UPDATE: Haines Highway Closure
Debris cleanup is taking place this morning. We should have another update within the next few hours. Please stay tuned.

01/29, 9:00 am UPDATE: Haines Highway... See more




Summary Atmospheric Surface TDP Cameras Metadata Extremes

Back to all camera views



Prev Slower Play Faster Next Set Start Set End Reset

Seward Hwy North 10/18/2023 13:20:00



SEWARD HIGHWAY AVALANCHE CONDITIONS

Date issued: January 30, 2024 (valid until changed)

ADOT&PF Employee Avalanche Hazard Rating for Seward Hwy Area
1 (One)

Expected Avalanche Behavior
Avalanche Debris unlikely to reach the roadway.

Recommended Action for ADOT&PF Employees.
Normal highway maintenance operations.


Comments
The storm has let up with potential flurries today and clear and cold back for the next several days. There is potential for North outflow winds that may increase the avalanche hazard but not expecting this to impact the highway. Storm total for Girdwood maintenance station was 16".

Alaska Department of Transportation and Public Facilities
Road Weather Information System

SEARCH DOT&PF

Travel Business News and Social Projects About Us

You are here: DOT&PF > Roads & Highways Information > RWIS

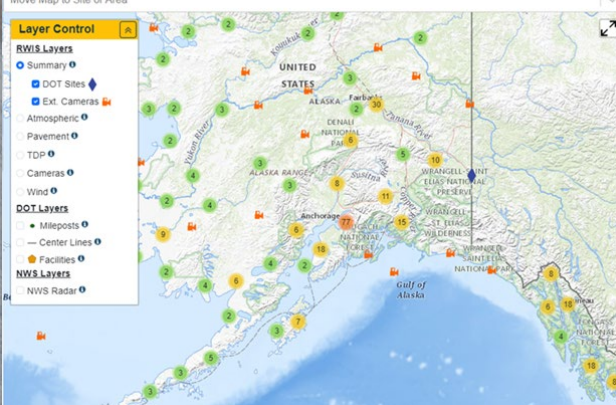


Home Sites Areas About AK Weather Links 511 - Traveler Info Login to RWIS

Move Map to Site or Area

Layer Control

- RWIS Layers**
 - Summary
 - DOT Sites
 - Ext. Cameras
 - Atmospheric
 - Pavement
 - TDP
 - Cameras
 - Wind
- DOT Layers**
 - Mileposts
 - Center Lines
 - Facilities
- NWS Layers**
 - NWS Radar



Winter Event Response: Avalanche and Highway Closures

Summary of Avalanches and Highway Closures 2023

Type	SubType	Count of EventId	Start Month
Incidents	Avalanche Debris On Roadway	1	March 2023
Incidents	Avalanche Debris On Roadway	5	December 2023
Incidents	Avalanche Hazard Reduction	1	January 2023
Incidents	Avalanche Hazard Reduction	2	March 2023
Incidents	Avalanche Hazard Reduction	1	November 2023
Incidents	Avalanche Hazard Reduction	2	December 2023
Incidents	Closure	2	January 2023
Incidents	Closure	3	February 2023
Incidents	Closure	1	March 2023
Incidents	Closure	1	September 2023
Incidents	Closure	3	November 2023
Incidents	Closure	4	December 2023
Incidents	Falling Debris Risk	3	September 2023
Incidents	Landslide	1	September 2023
Incidents	Landslide	1	October 2023
Incidents	Landslide	2	November 2023
Roadwork / Maintenance	Avalanche mitigation	5	January 2023
Roadwork / Maintenance	Avalanche mitigation	3	February 2023
Roadwork / Maintenance	Avalanche mitigation	6	March 2023
Roadwork / Maintenance	Avalanche mitigation	1	November 2023
Roadwork / Maintenance	Avalanche mitigation	4	December 2023
Weather Conditions	Snow advisory	1	January 2023
Weather Conditions	Snow advisory	1	February 2023
Weather Conditions	Snow advisory	9	November 2023
Weather Conditions	Snow advisory	3	December 2023



Scalable Solutions: Contracting and Funding

Successes in Contracting Models

- Northern Region
- Matanuska-Susitna
- Local Service Areas



Fairbanks Area Winter
Maintenance Contract - LOT #1

Road	Road Miles	Performance Target
Yankovich	1.7	C
Dalton Trail	1.1	C
Lawlor	0.6	C
Miller Hill	0.7	C
Auburn	0.9	B/C
Grenac	1.1	C
Crossman	0.3	C
Skyline	2.0	B/C
Skyridge	1.4	B/C
McGrath	2.9	C
Farmers Loop Spur	0.5	C
LOT #1 Total Road Miles Per Cycle	13.2	

Strategy Ahead

- Develop new performance targets and priorities
- Priorities 3 and 4, Non-motorized
- FY2025 Operating Budget Request

Scalable Solutions: Contracting and Funding

Annual Supplemental Re-Appropriations

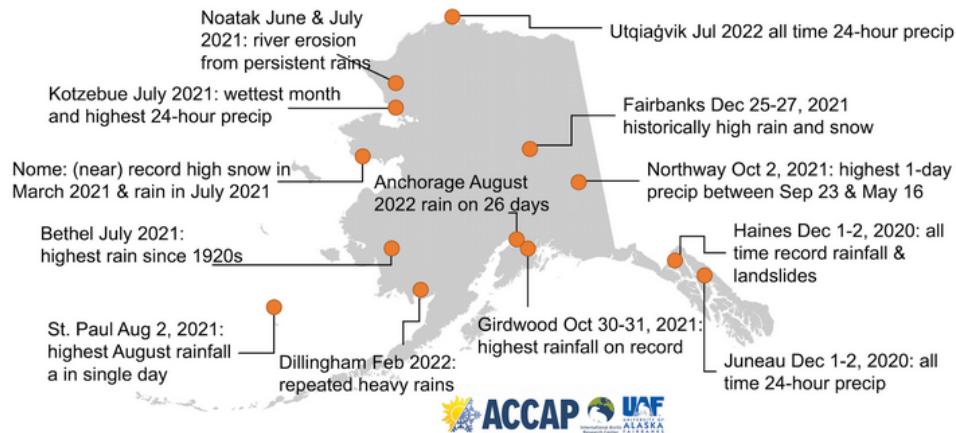
- FY2021 \$1,000.0
- FY2022 \$4,661.3
- FY2023 \$7,566.0
- **Balance: \$3,036.3**

FY2024 capital supplemental request, \$344.9 (Re-Appropriation)
Emergency Weather, Catastrophic Events, and Unforeseen Critical Maintenance Needs

FY2024 operating supplemental request, \$350.0 (UGF)
Fairbanks Area Winter Maintenance Contracts

FY2025 operating component, \$915.5 (UGF)
Statewide Contracted Snow Removal

Alaska's Extreme Precipitation December 2020-August 2022



Extreme precipitation events have occurred throughout Alaska with increasing frequency. Above are examples from December 2020-August 2022. Credit: Alaska Center for Climate Assessment and Policy.

September 2022

- Typhoon Merbok Emergency Repairs

January 2023

- Seward Highway: Ice Fall diversion
- Tok Cutoff Road closed: avalanche

May 2023

- Funny River Road MP 8 washout
- Taylor Highway Emergency Flooding Repairs
- Eagle Mission Road Emergency Flooding Repairs
- Richardson Hwy MP 330 Emergency Flooding Repairs
- Nome Kougarok Road Emergency Flooding Repairs
- Russian Mission Airport Emergency Flooding Repairs
- Stevens Village Aprt Rd Emergency Flooding Repairs
- Glenn Hwy MP 186-188 Emergency Flooding
- Dalton Highway MP 404 Emergency Repairs

June 2023

- Dalton Highway MP 404 Emergency Repairs continue
- Chitina O'Brien Creek Emergency Flooding Repairs
- Dalton Highway Koyukuk River #1 Bridge Emergency Repairs
- Elliott Highway MP 85.9 closure: failed culvert & erosion repair

July 2023

- Seward Hwy: partnered w/agencies to free sheep caught in rockfall mesh

August 2023

- Mendenhall River Emergency Flooding Repairs

September 2023

- Glacier Highway Rockfall

November 2023

- Wrangell: Zimovia Highway Landslide
- Southcentral widespread snowstorm/rain/wind

December 2023

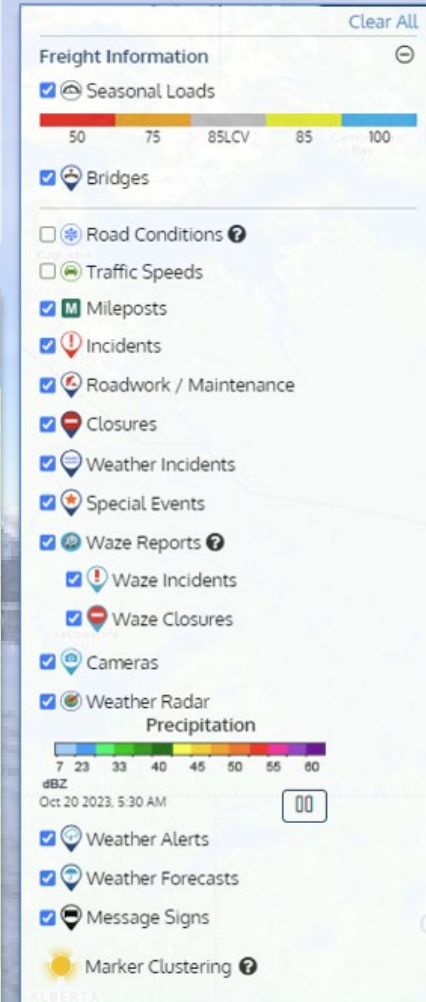
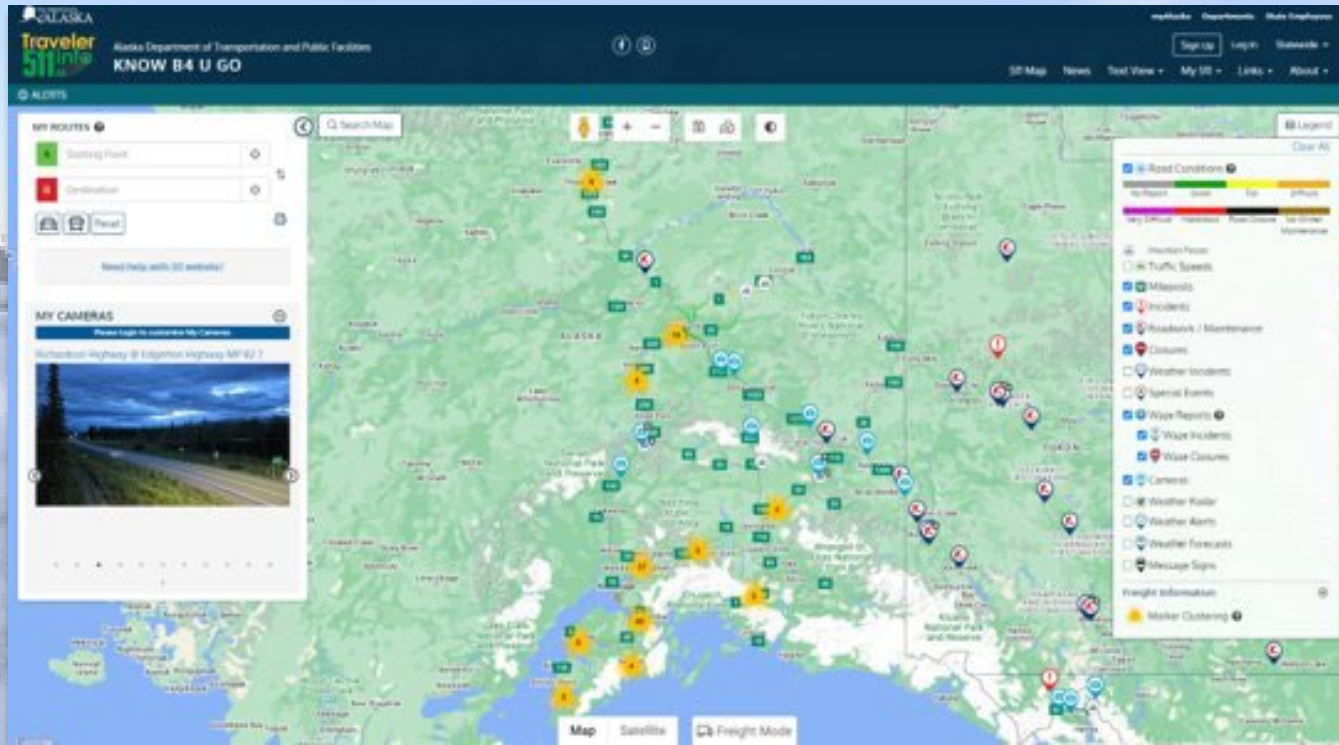
- Richardson Highway at Thompson Pass and MP 182-200 closed: avalanche
- Valdez/Glenallen: Richardson Hwy closed from milepost 12 to 65: numerous avalanches
- Klondike Hwy closed: heavy snowfall, inoperable plows
- Seward Highway Mileposts MP 36-40 closed: Avalanche
- Haines Highway closed: Rockfall

Technology: Improving Operations

“...expressing how invaluable the Turnagain Pass RWIS* cameras are. One of the camera images captured two large avalanches in a very popular area for snowmachining.

We were able to better alert backcountry recreationalists.”

Chugach National Forest Avalanche Center: January 25, 2024

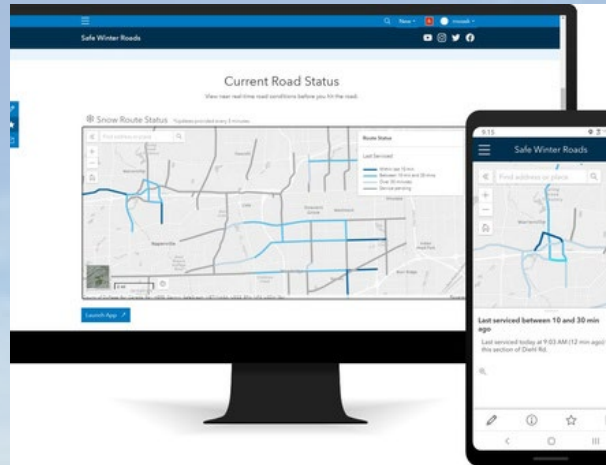


Technology: Improving Operations

Condition Reporting | real time plowing and condition reporting

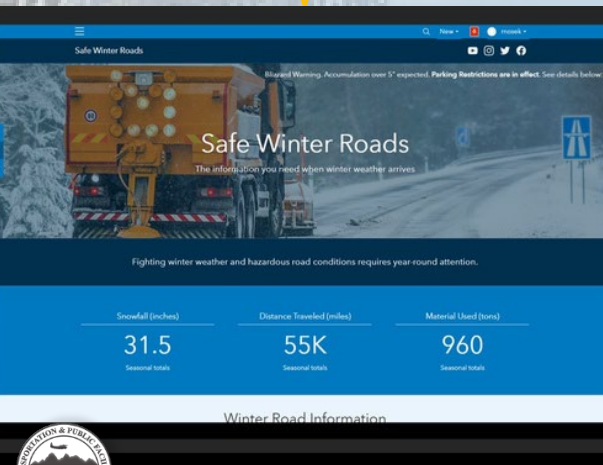
01 Today

Manual entry system that we are testing in a few vehicles across Alaska



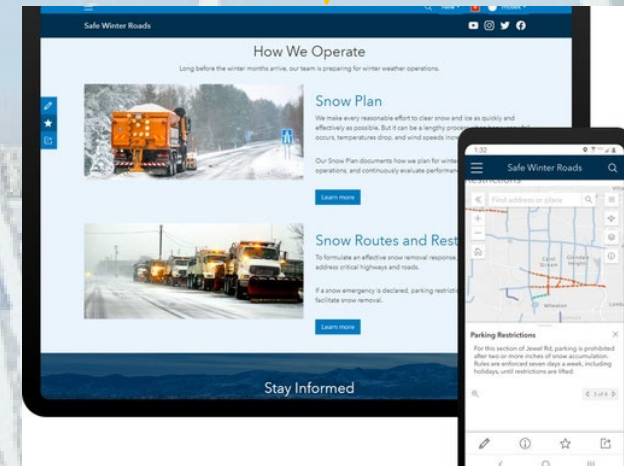
03 Vision in Action

Share public-facing aspects of technology on 511 and the winter outreach website



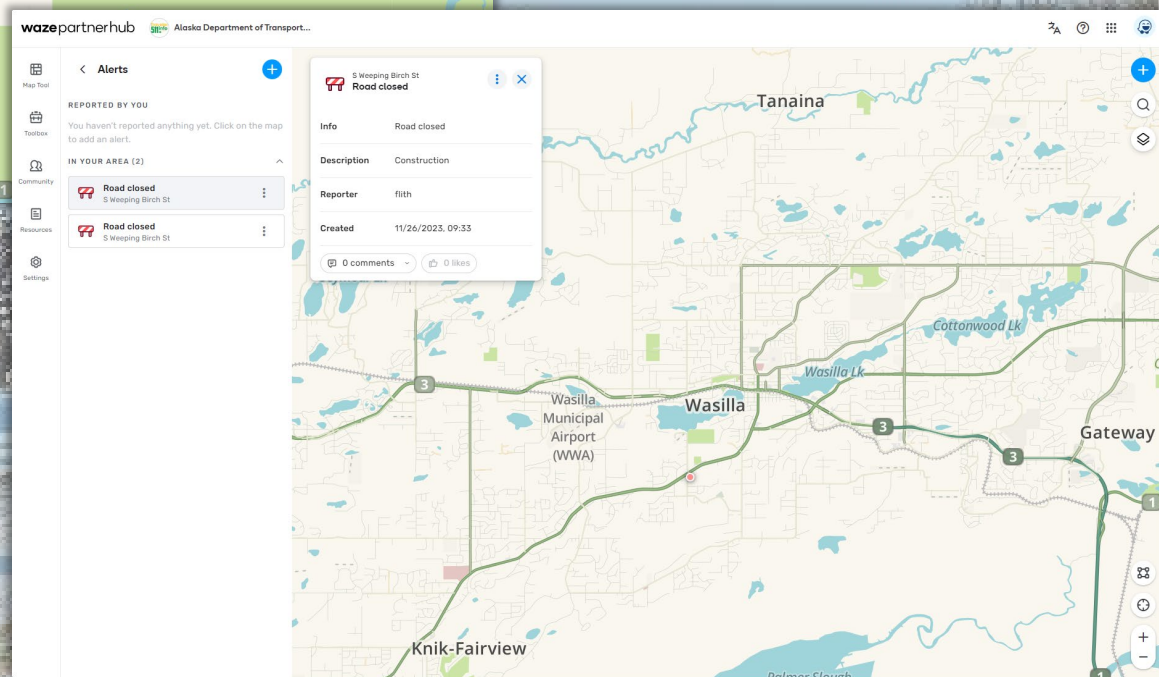
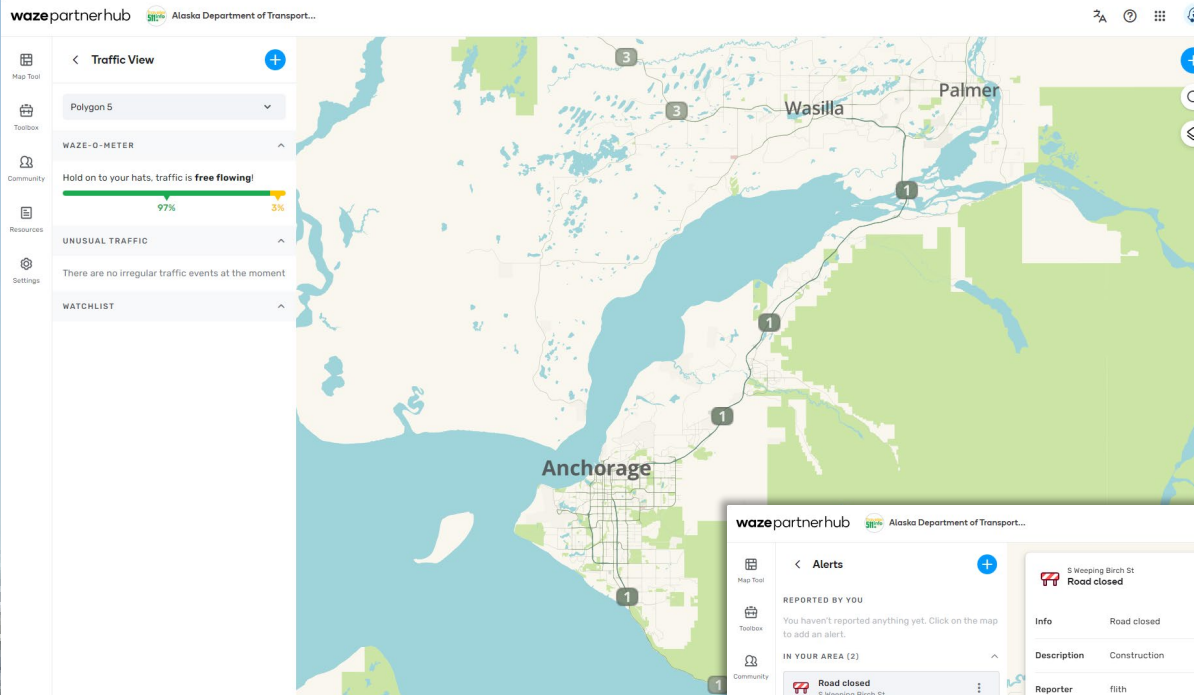
02 Continued Research

Exploring Automatic Vehicle Location systems for auto reporting to the system



Technology: Improving Operations

Waze is a community-focused traffic and navigation app that uses data supplied by drivers to help improve the travel experience



Thank you. Questions?

Sean Holland, P.E.

Director

Central Region

Sean.Holland@alaska.gov

907-269-0770

Katherine Keith

Deputy Commissioner

Katherine.Keith@alaska.gov

907-465-3900

Brad Byslma

Manager

State Equipment Fleet

Brad.Byslma@alaska.gov

907-269-0787

Tim Glassett

Avalanche Program Lead

Tim.Glassett@alaska.gov

907-269-0763

Jason Sakalaskas

Chief

Maintenance & Operations

Jason.Sakalaskas@alaska.gov

907-451-2214

Andy Mills

Legislative Liaison /

Special Assistant

Andy.Mills@alaska.gov

907-465-8124

