

Spruce Beetle Status

Jason Moan

*Forest Health Program Manager
Alaska Division of Forestry*

*Alaska Board of Forestry
February 23, 2022*





Alaska Division of Forestry

Forest Health Program

Program
funding
provided
by



- Forest health diagnostics – What is wrong with the trees and shrubs?
- Forest insect management recommendations
- Surveys and monitoring for native and invasive threats
- Investigation of forest insect impacts and improved management technologies
- Outreach and education through presentations, reports, training, etc.
- Administer the Western Bark Beetle Initiative program

Jason Moan, Program Manager

Jason.Moan@alaska.gov

LTNP Forest Health Forester
Vacant

Western Bark Beetle Initiative Grant Program

The Western Bark Beetle Initiative (WBBi) is a cost-share program designed to assist non-federal landowners statewide with bark beetle prevention, suppression, or restoration efforts.

A landowner must have a minimum of 5 acres to be eligible for this program. However, individual private landowners of multiple contiguous properties of less than 5 acres can pool their properties together to meet this minimum eligible acreage by submitting a package of individual WBBi applications for each property

The WBBi rules, application form, and related information are available at the links below. Please direct any questions about this funding to wbbi@alaska.gov or (907) 269-8460.

This funding cannot be used exclusively for the removal of hazard trees.

Please click the link that corresponds to your landowner status:

Individual Private Landowner
(5-499 acres)

*Not currently accepting
applications*

Large non-federal landowners
(500+ acres and/or Alaska
Native corporations, tribal
entities, local or state
governments)



www.alaskasprucebeetle.org

Spruce Beetle in Alaska's Forests



How we monitor forest health in a typical year

Cooperative efforts between

- USDA Forest Service - Forest Health Protection
- Alaska Division of Forestry - Forest Health Program

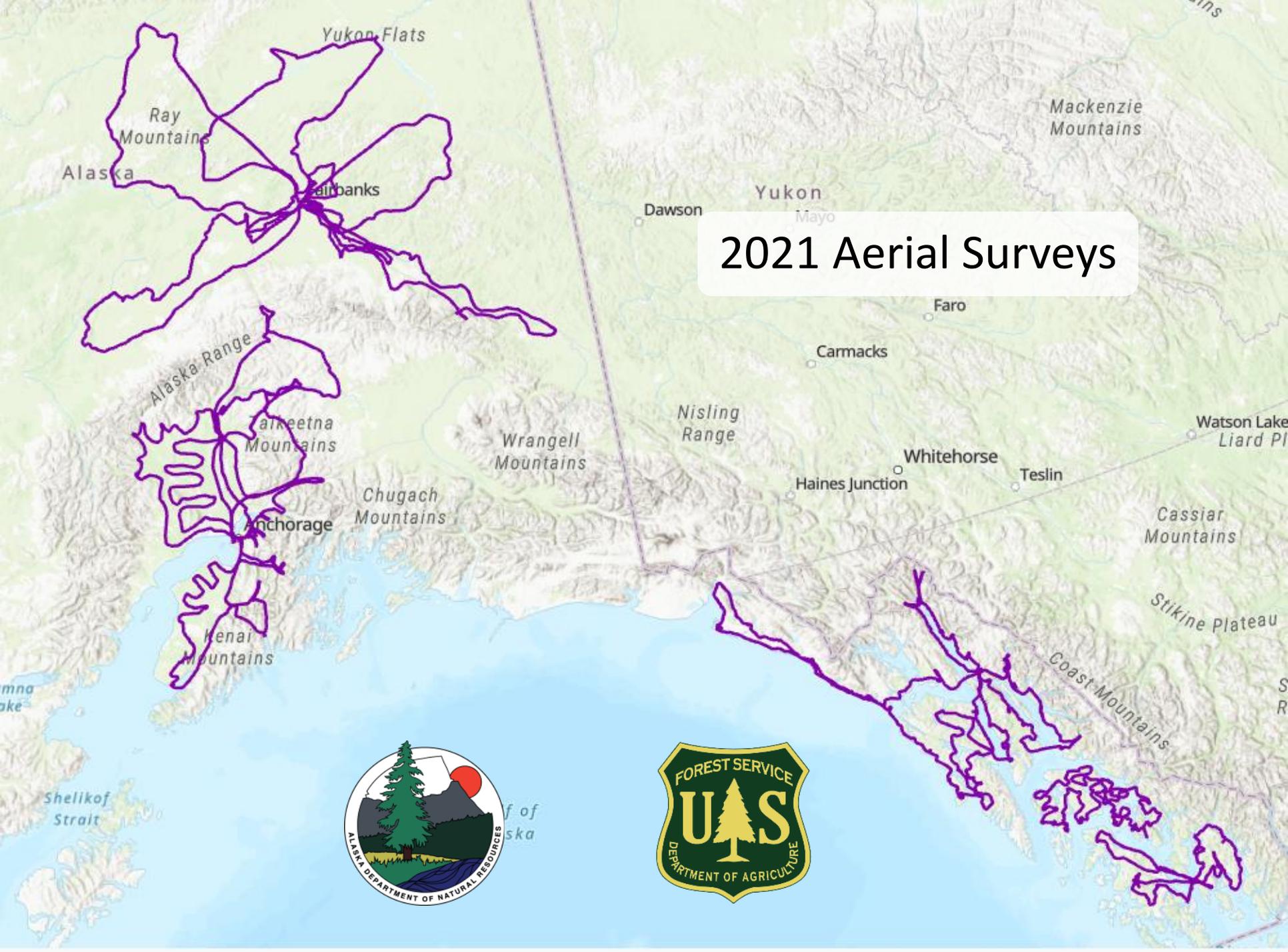


Aerial Surveys

Surveys occur each July and cover
~25-30 million acres statewide annually



2021 Aerial Surveys



- Provide assessments of attack severity, extent, success
- Can provide information on life cycle timing, affected hosts
- Provides localized flight period timing and duration



Ground-Based Surveys



Spruce Beetle



J. Moan, AKDOF



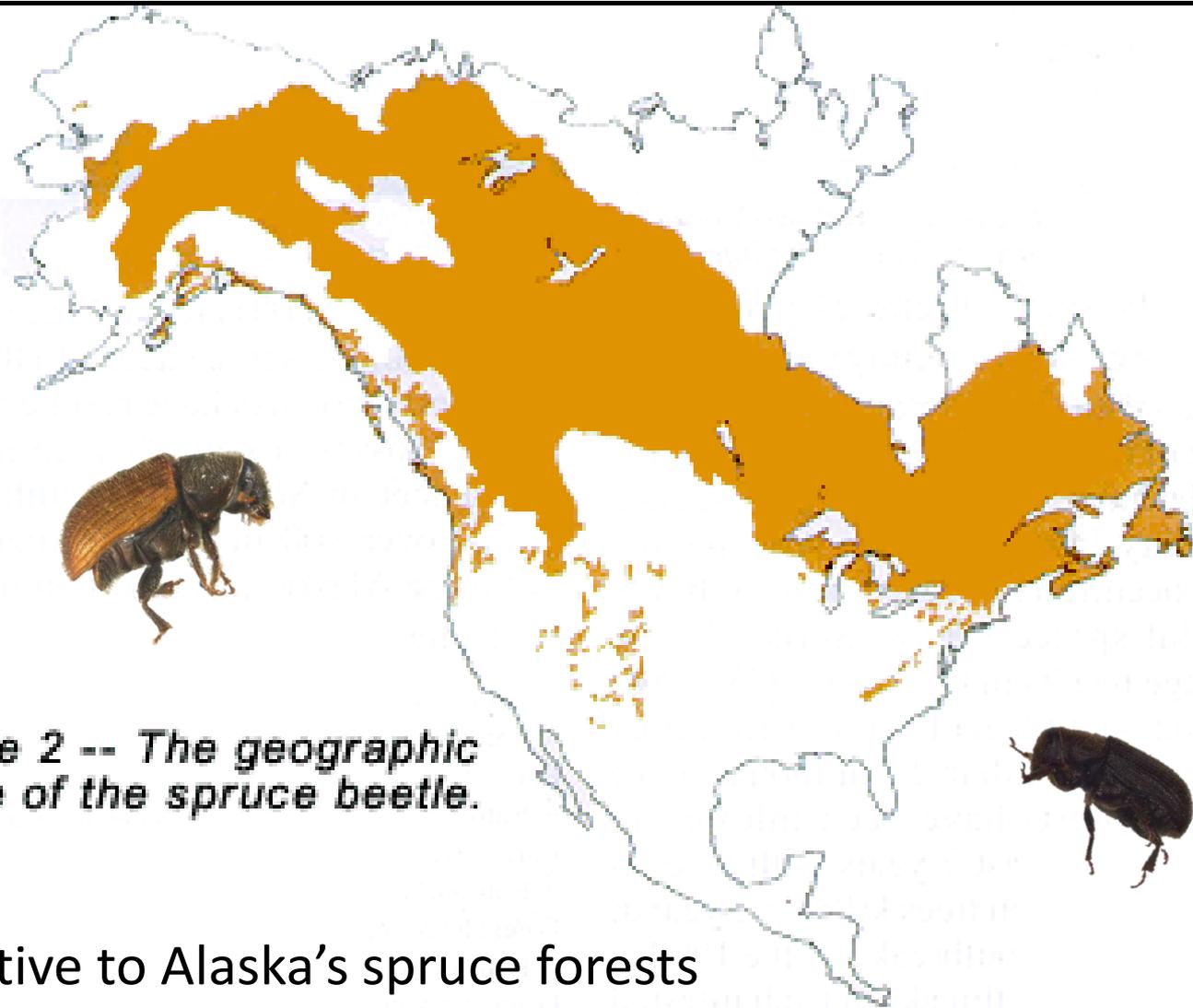


Figure 2 -- The geographic range of the spruce beetle.

Native to Alaska's spruce forests



Susceptible Host Species

Native

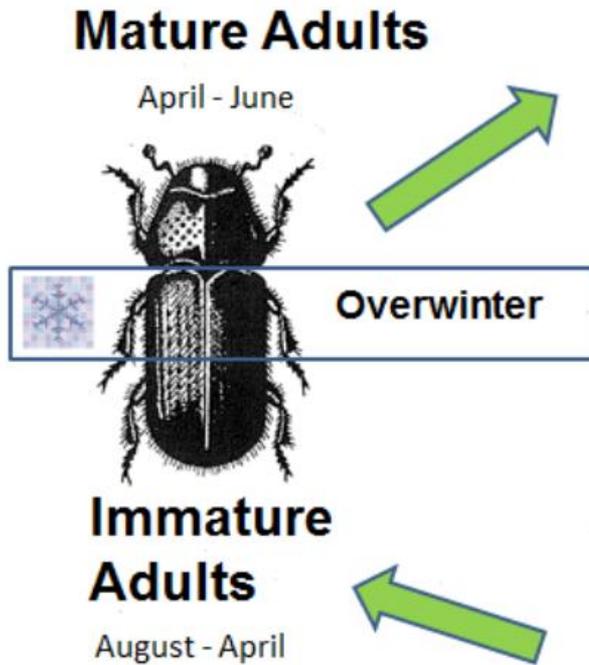
- White spruce
- Lutz spruce
- Sitka spruce
- Black spruce*

Ornamental

- Norway spruce
- Engelmann spruce
- Blue spruce*



Spruce Beetle Life Cycle



Eggs

June



Larvae

July - July



Overwinter

Pupae

July-August

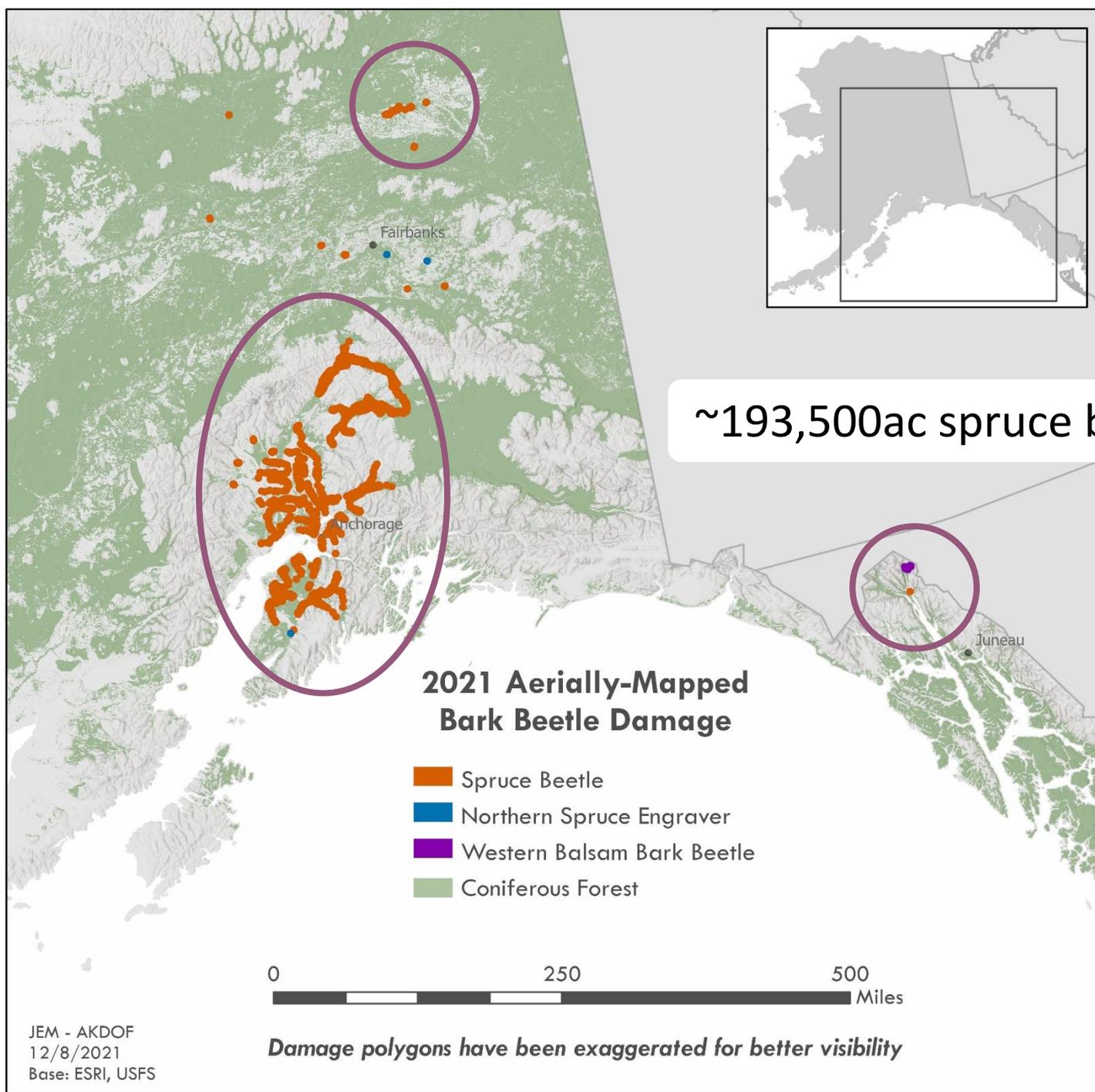


2-year life cycle

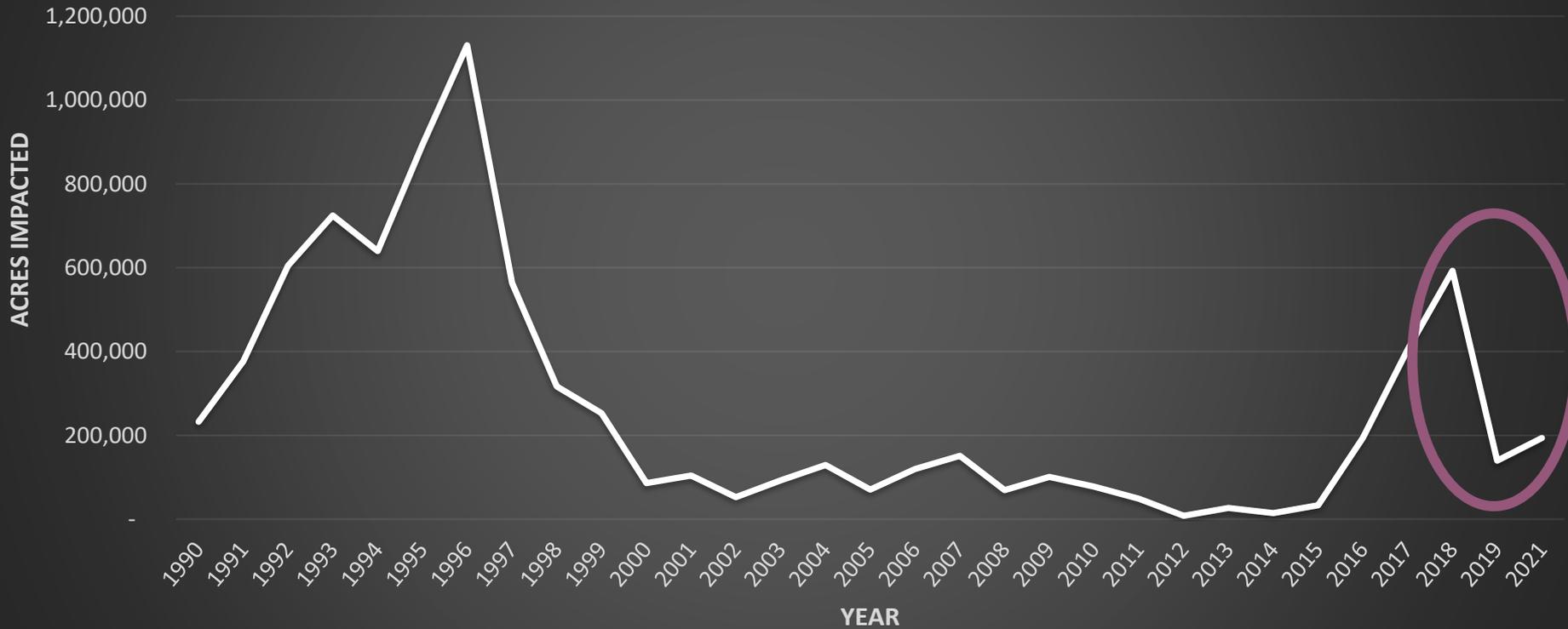
Timing is closely tied to temperature



2021 – Bark Beetle Damage



Spruce beetle - Acres of observed damage 1990-2021



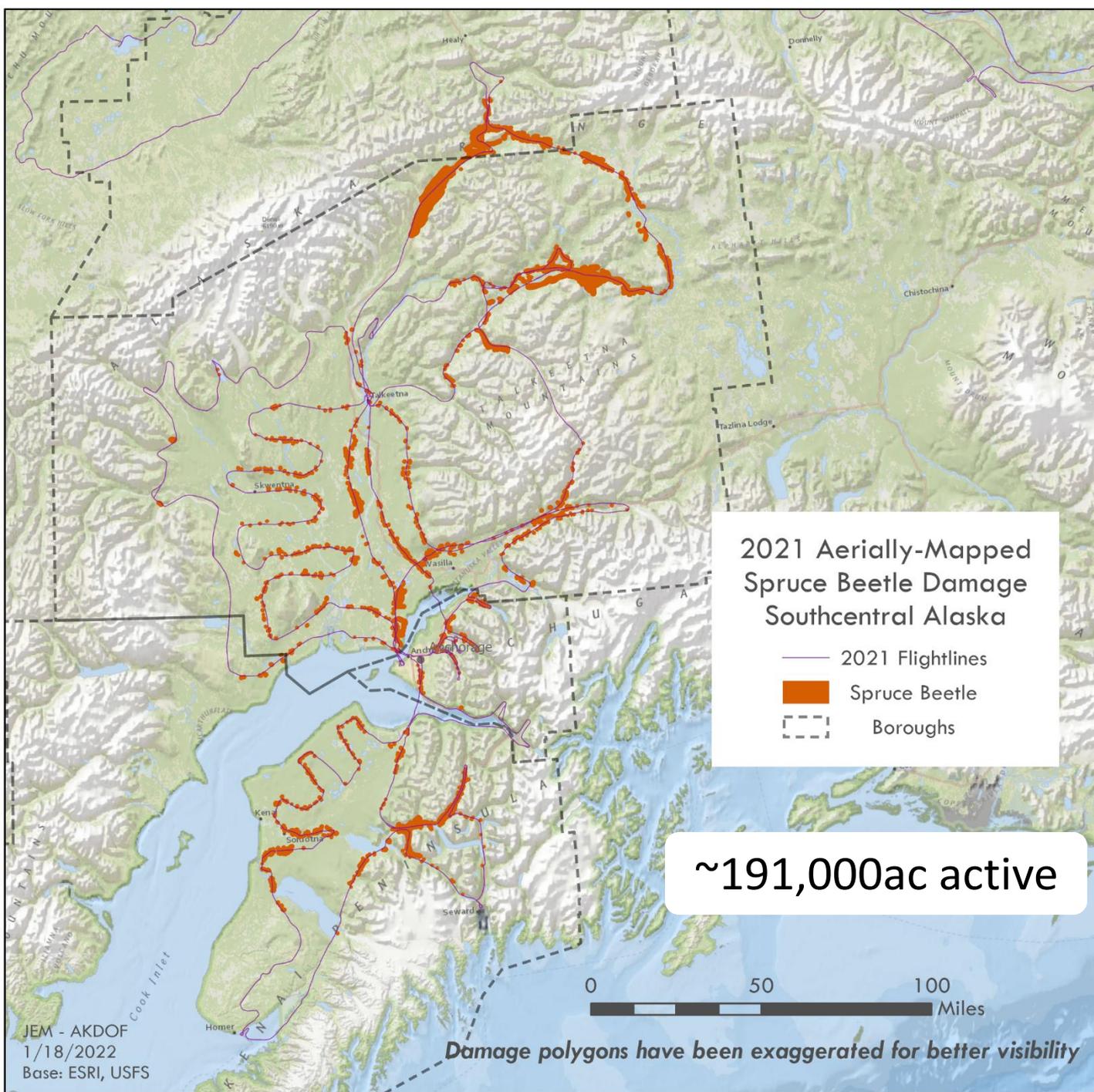
* 2020 excluded due to differing survey methodology;



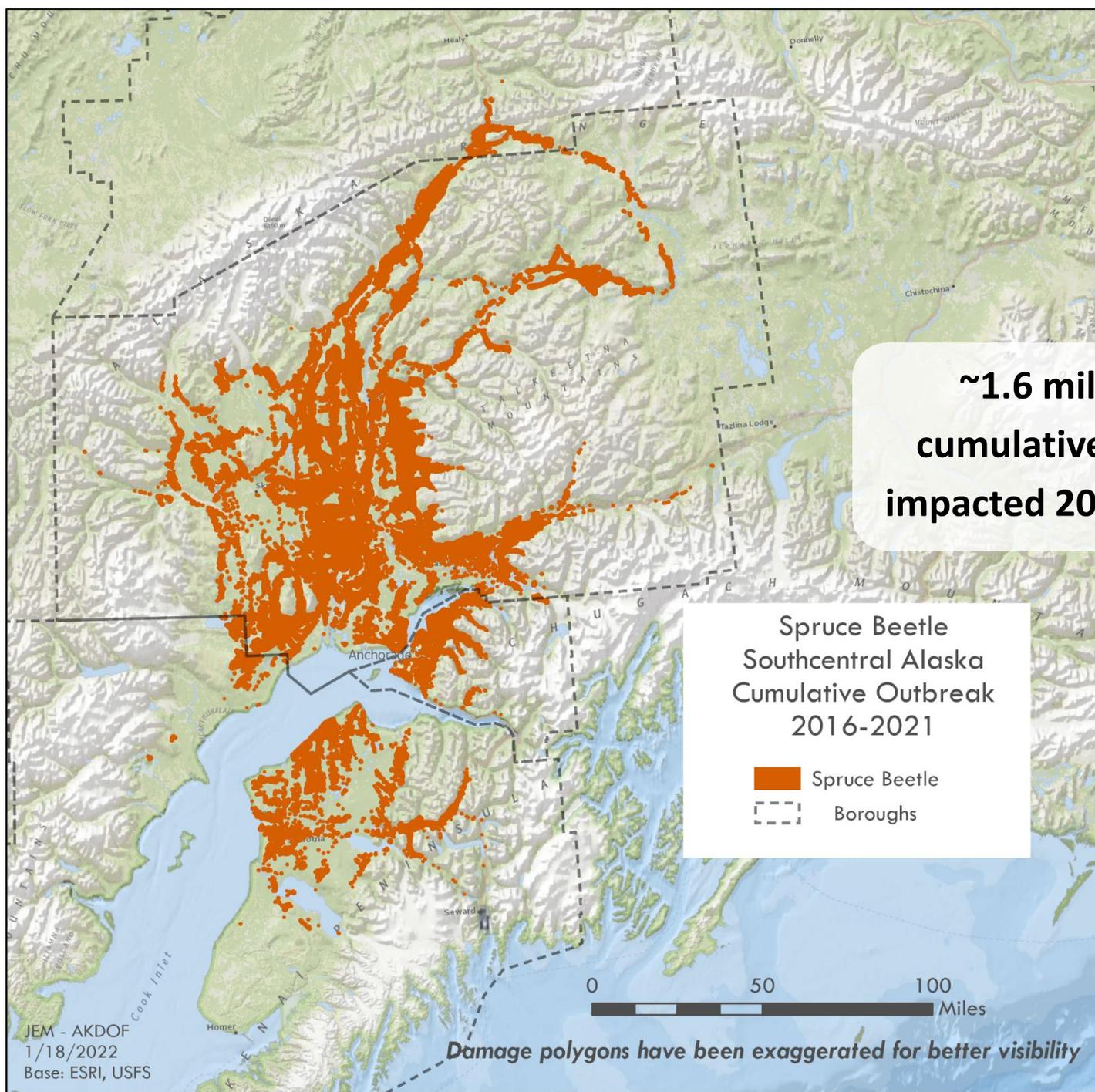
The outbreak



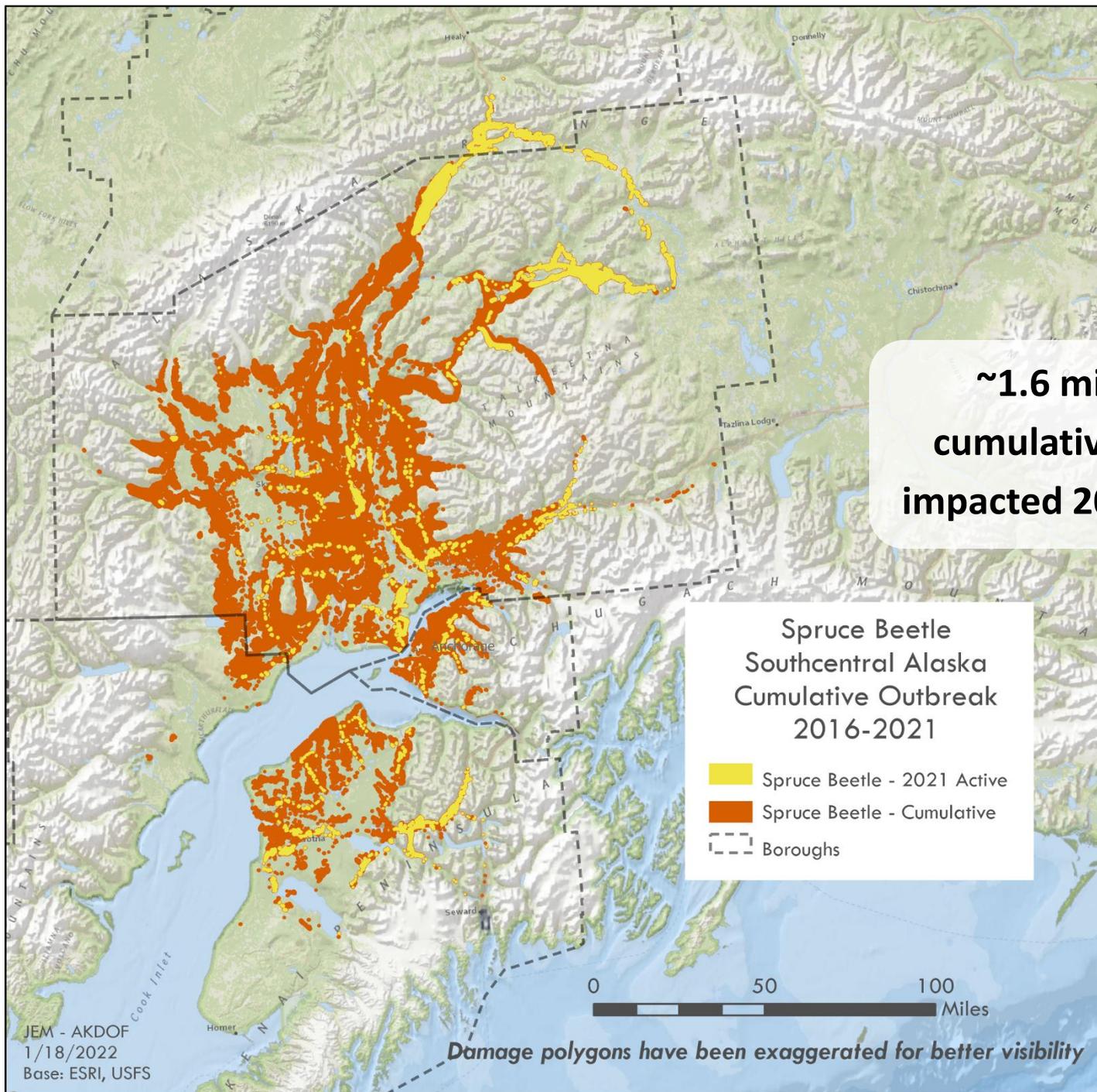
2021 – Spruce beetle Damage



Cumulative spruce beetle outbreak

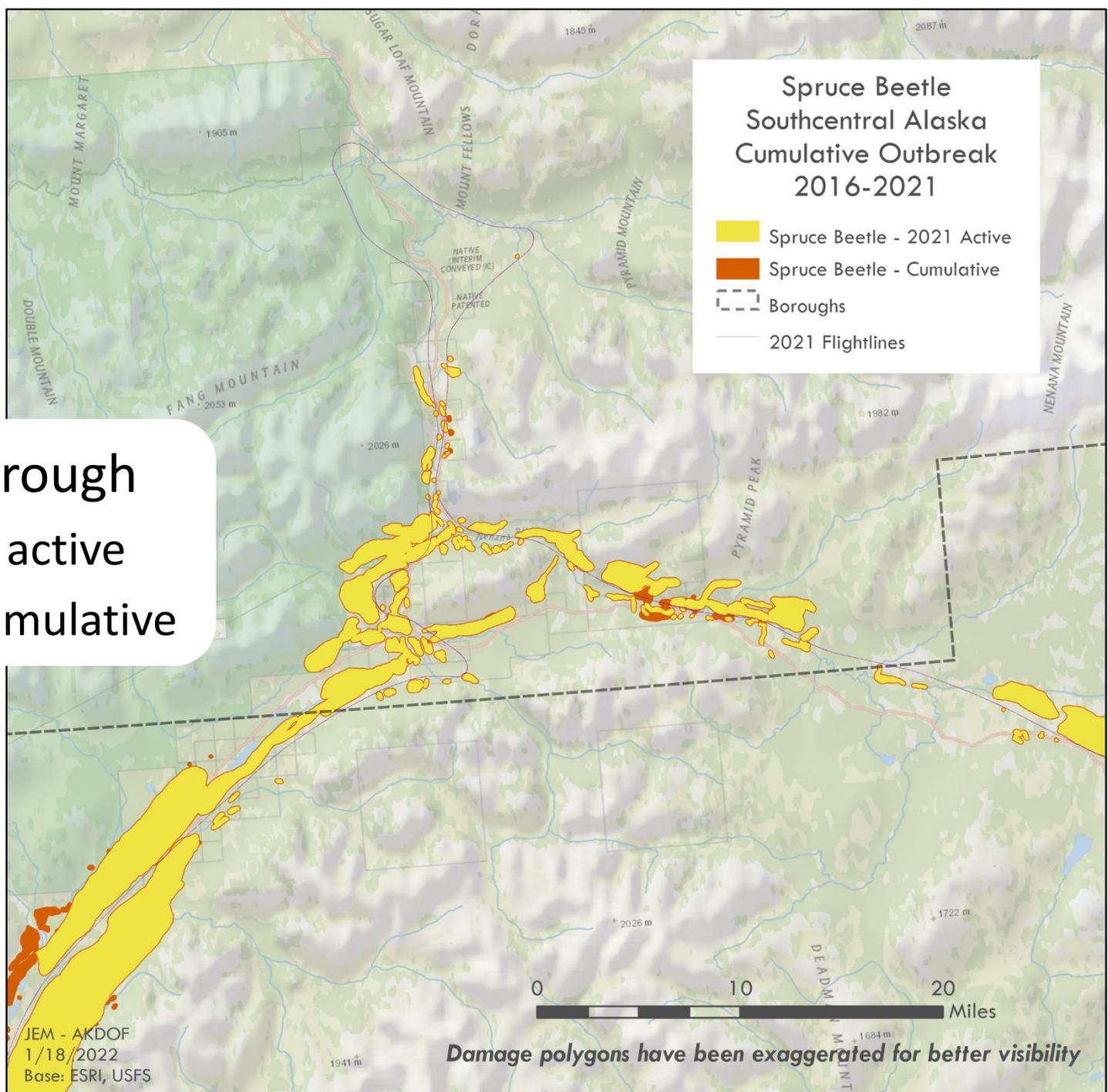


Cumulative spruce beetle outbreak



Spruce Beetle Southcentral Alaska Cumulative Outbreak 2016-2021

-  Spruce Beetle - 2021 Active
-  Spruce Beetle - Cumulative
-  Boroughs
-  2021 Flightlines



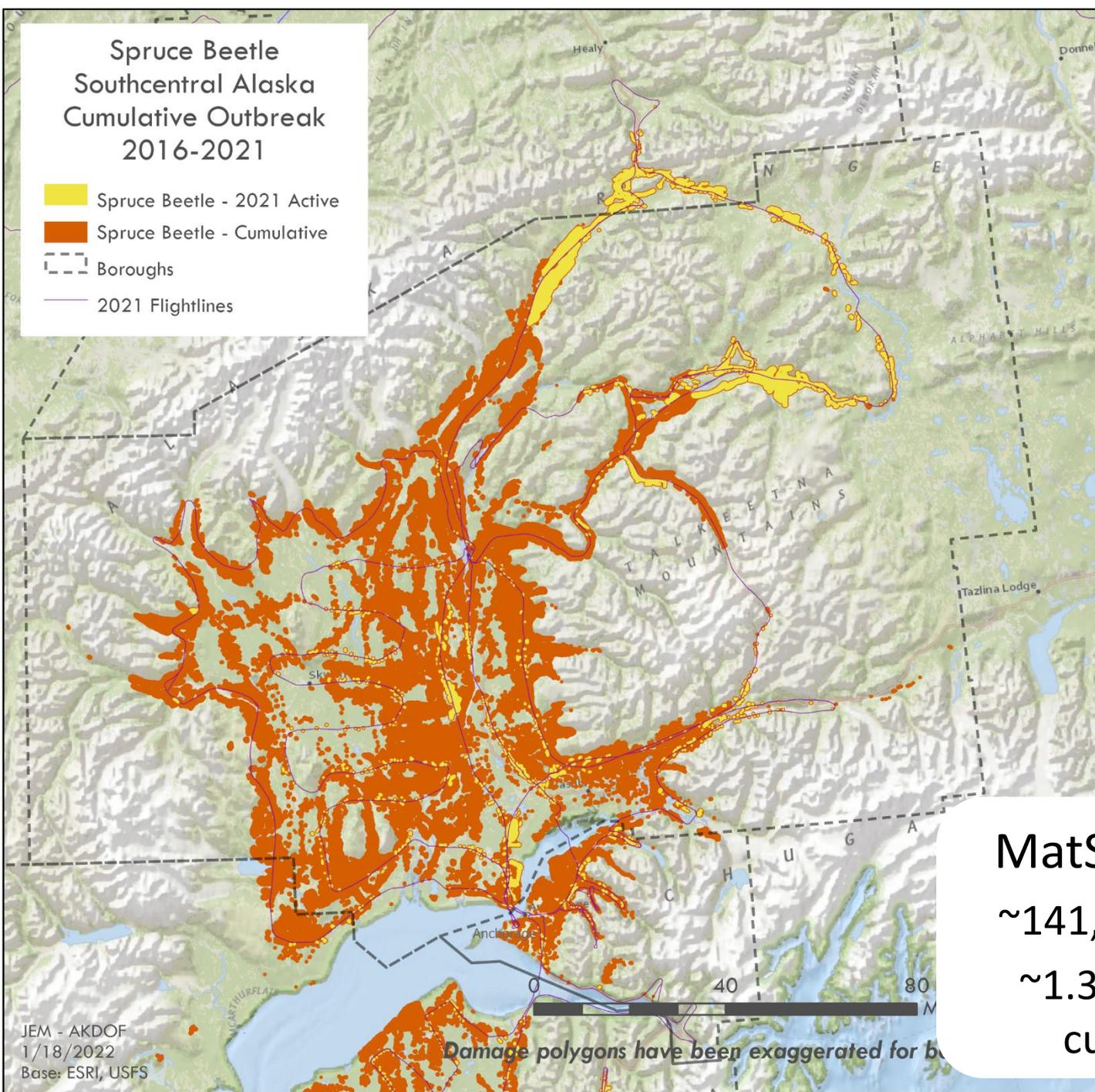
Denali Borough
~22,900ac active
~23,700ac cumulative

JEM - AKDOF
1/18/2022
Base: ESRI, USFS

Damage polygons have been exaggerated for better visibility

Spruce Beetle Southcentral Alaska Cumulative Outbreak 2016-2021

-  Spruce Beetle - 2021 Active
-  Spruce Beetle - Cumulative
-  Boroughs
-  2021 Flightlines



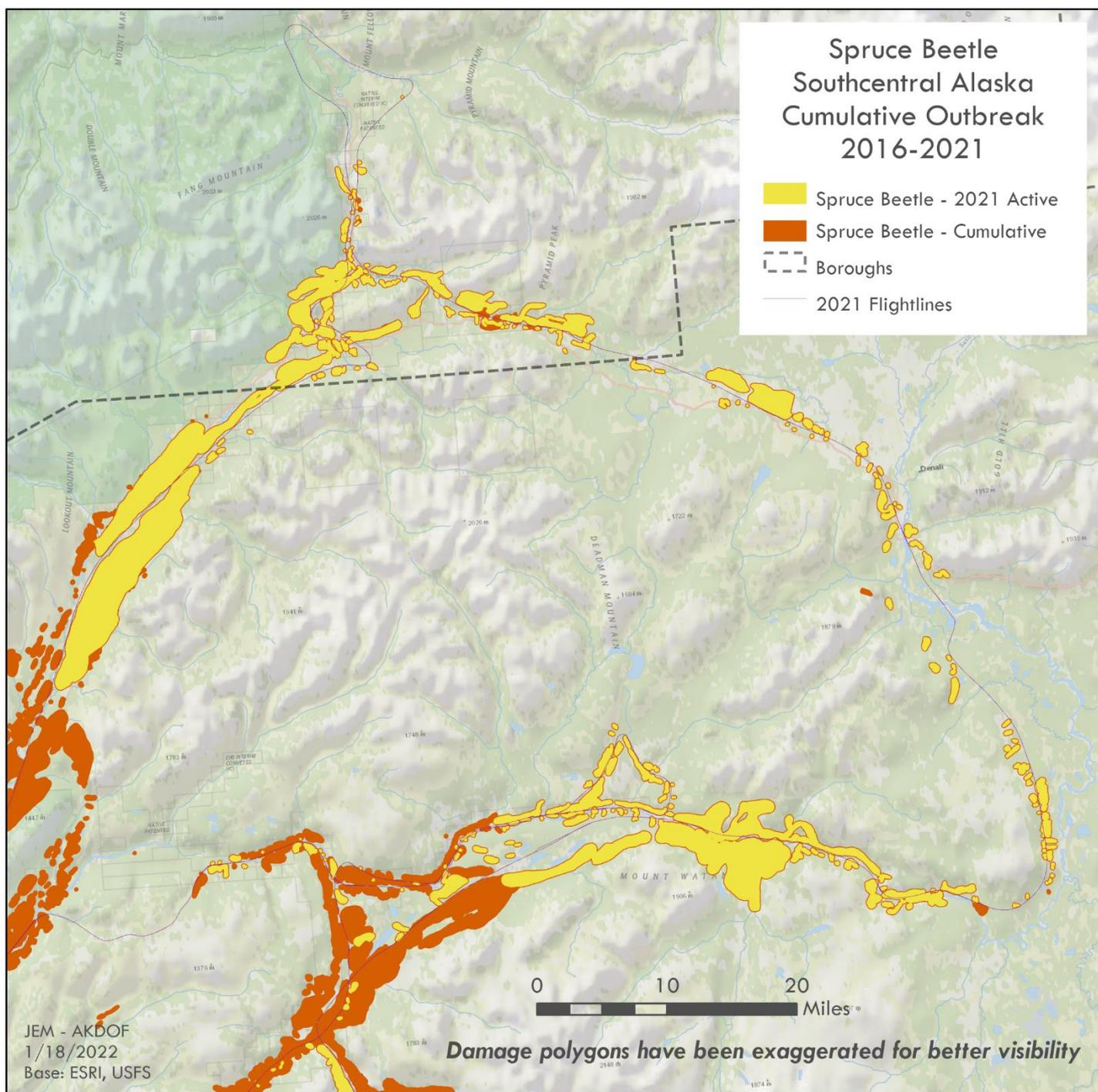
MatSu Borough
~141,300ac active
~1.36 million ac
cumulative

JEM - AKDOF
1/18/2022
Base: ESRI, USFS

Damage polygons have been exaggerated for better visibility

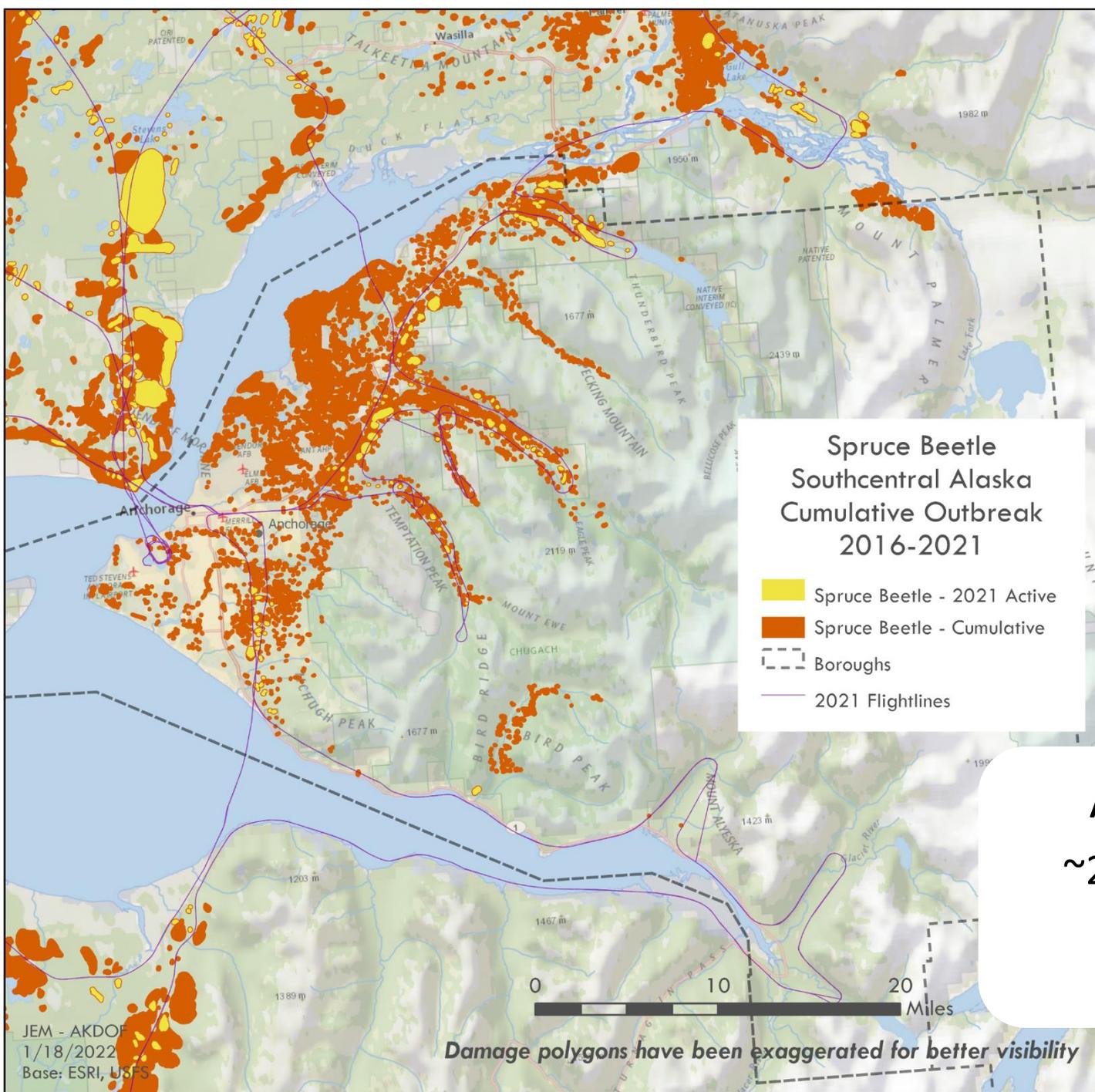
Spruce Beetle Southcentral Alaska Cumulative Outbreak 2016-2021

-  Spruce Beetle - 2021 Active
-  Spruce Beetle - Cumulative
-  Boroughs
-  2021 Flightlines

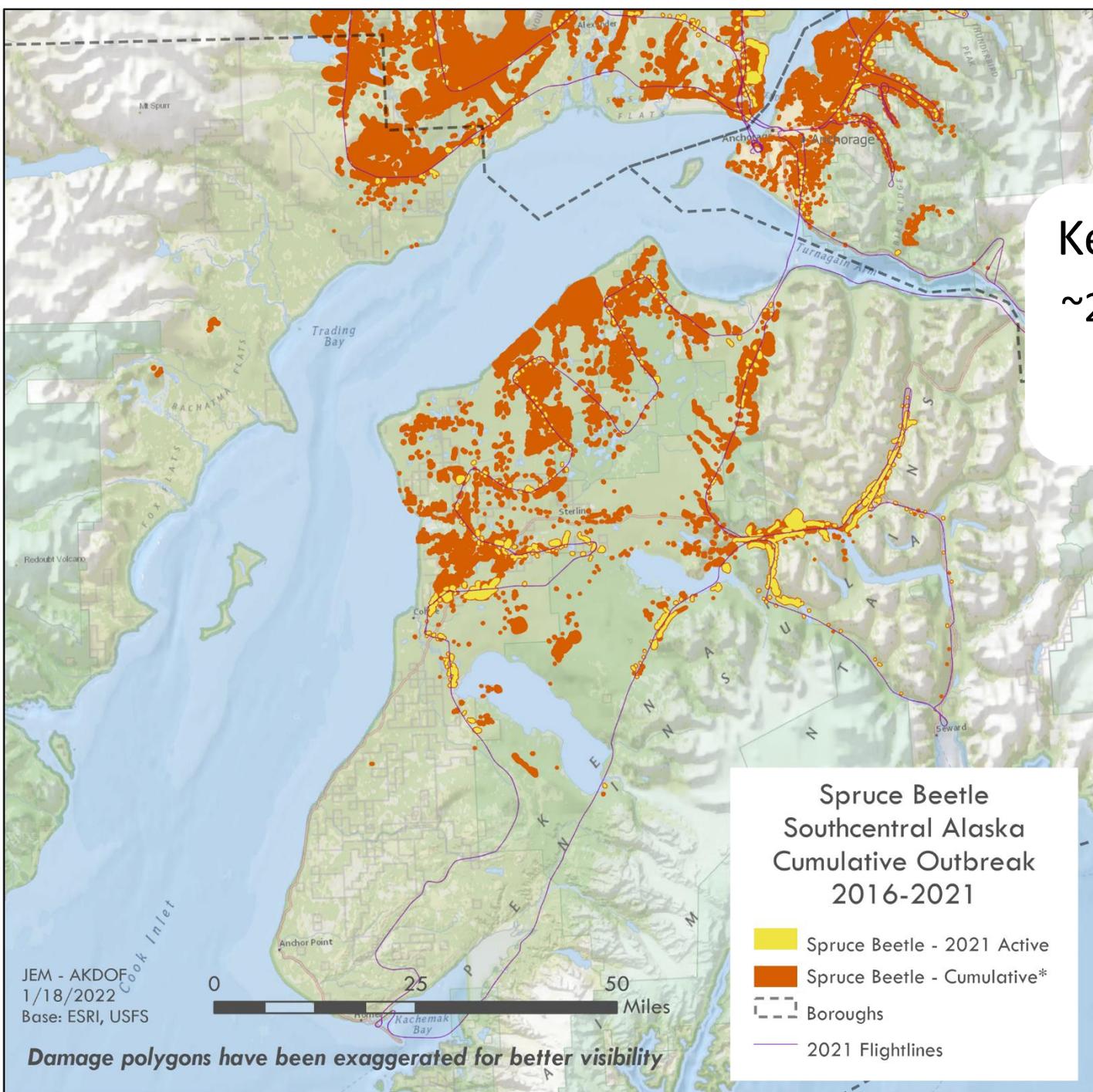


JEM - AKDOF
1/18/2022
Base: ESRI, USFS

Damage polygons have been exaggerated for better visibility



Anchorage
 ~2,300ac active
 ~31,000ac cumulative



Kenai Borough
 ~24,500ac active
 ~195,300ac cumulative*

**Spruce Beetle
 Southcentral Alaska
 Cumulative Outbreak
 2016-2021**

- Spruce Beetle - 2021 Active
- Spruce Beetle - Cumulative*
- Boroughs
- 2021 Flightlines

Spruce beetle management considerations

Challenges to large-scale management

- Accessibility
 - Limited road system
 - Mixed species forests
 - Geographic extent
 - Variable ownerships

Photo: J. Moan, AKDOF



Challenges to large-scale management

- Processing facilities
 - Limited
 - High costs to ship elsewhere
- Timber markets
 - Markets for harvested material



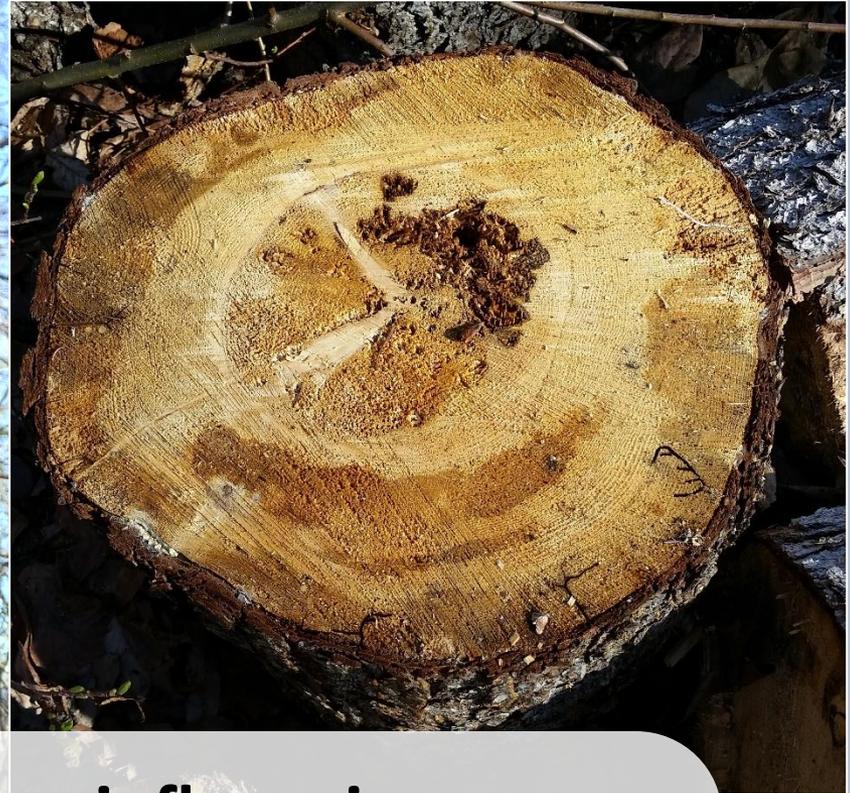
Beetle-killed trees

General considerations

- Spruce beetle-killed trees are suitable for a variety of wood products
- Timeframe of usefulness may vary depending on the product and location

Photo: J. Moan, AKDOF





Factors influencing use, value, and stability

- Moisture
- Existing defects
- Weather checking

Photos: J. Moan, AKDOF





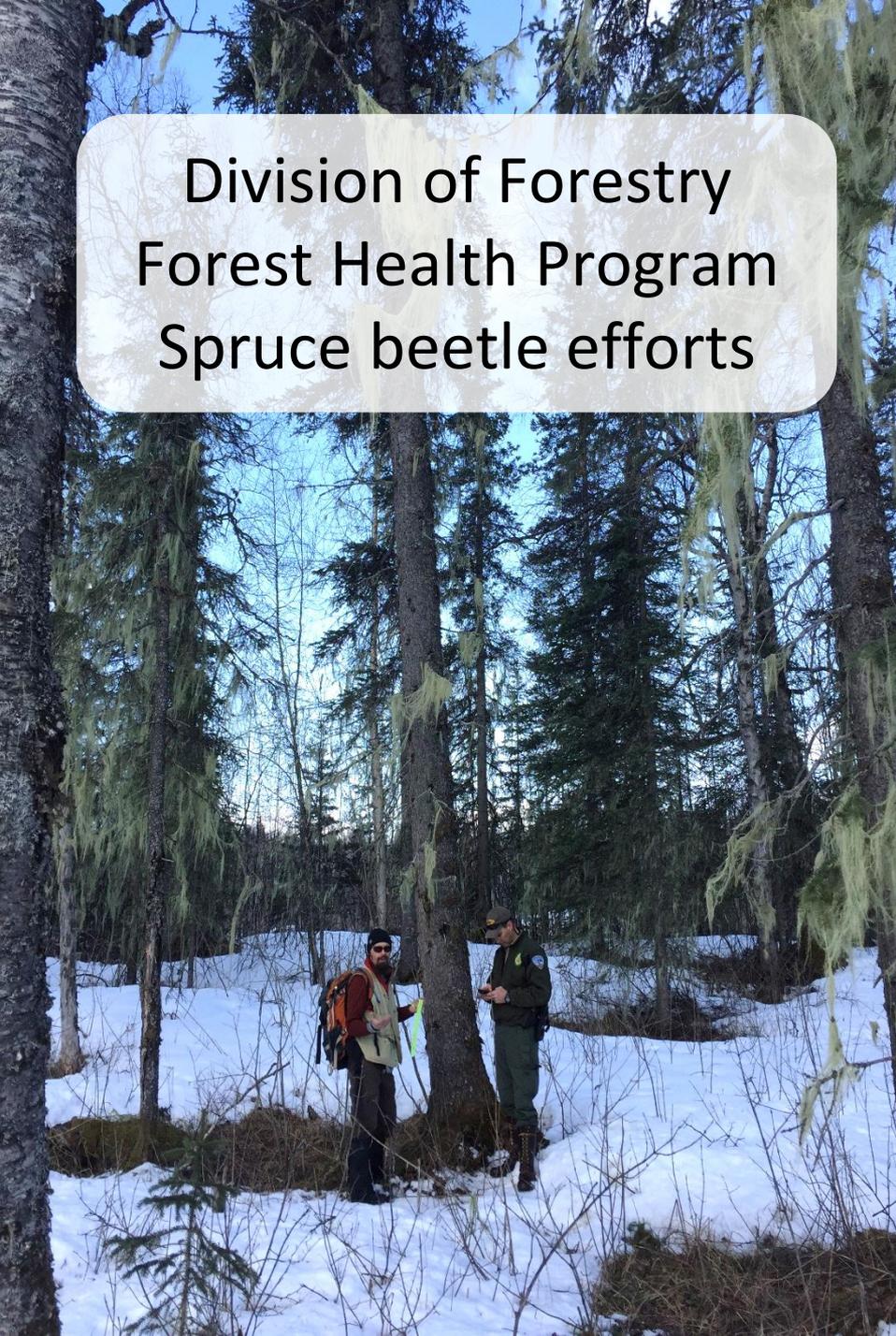
Factors influencing use, value, and stability

- Sap rots
- Blue-stains

Photos: J. Moan, AKDOF



Division of Forestry
Forest Health Program
Spruce beetle efforts



Study Tree



Forester



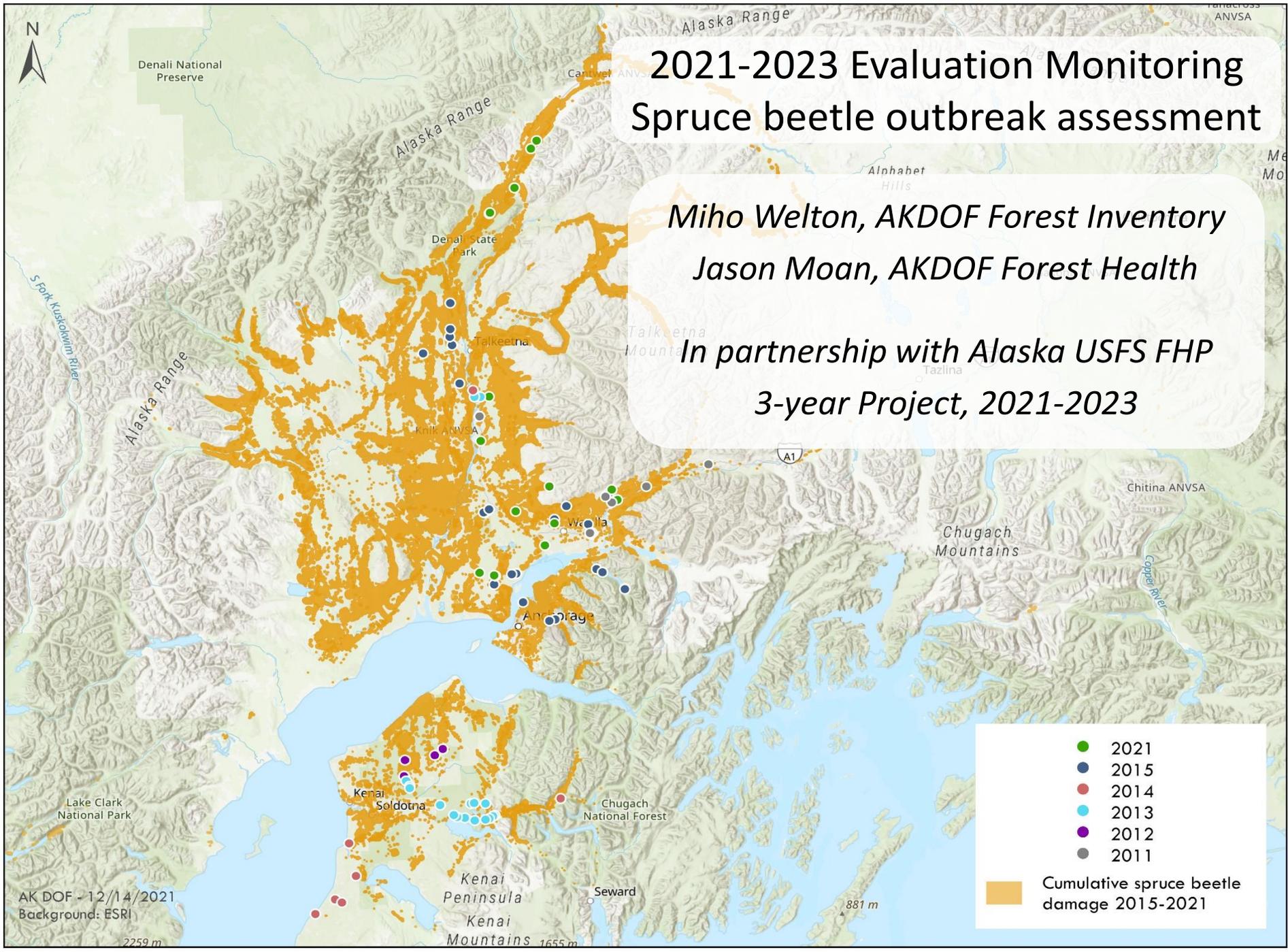
Photos: J. Moan, AKDOF



Spruce beetle tree protection trials

Year	Duration	PI(s)	Type	Result
2018	1yr	Matt Hansen, USFS RMRS	MCH/semiochemical	Unsuccessful*
2018	3yr	Chris Fettig, USFS PSWRS	Systemic Pesticide	Low success
2019	1yr	Chris Fettig, USFS PSWRS	MCH/semiochemical	Unsuccessful!
2021	2yr	Chris Fettig/Jackson Audley	MCH/semiochemical	<i>In progress</i>

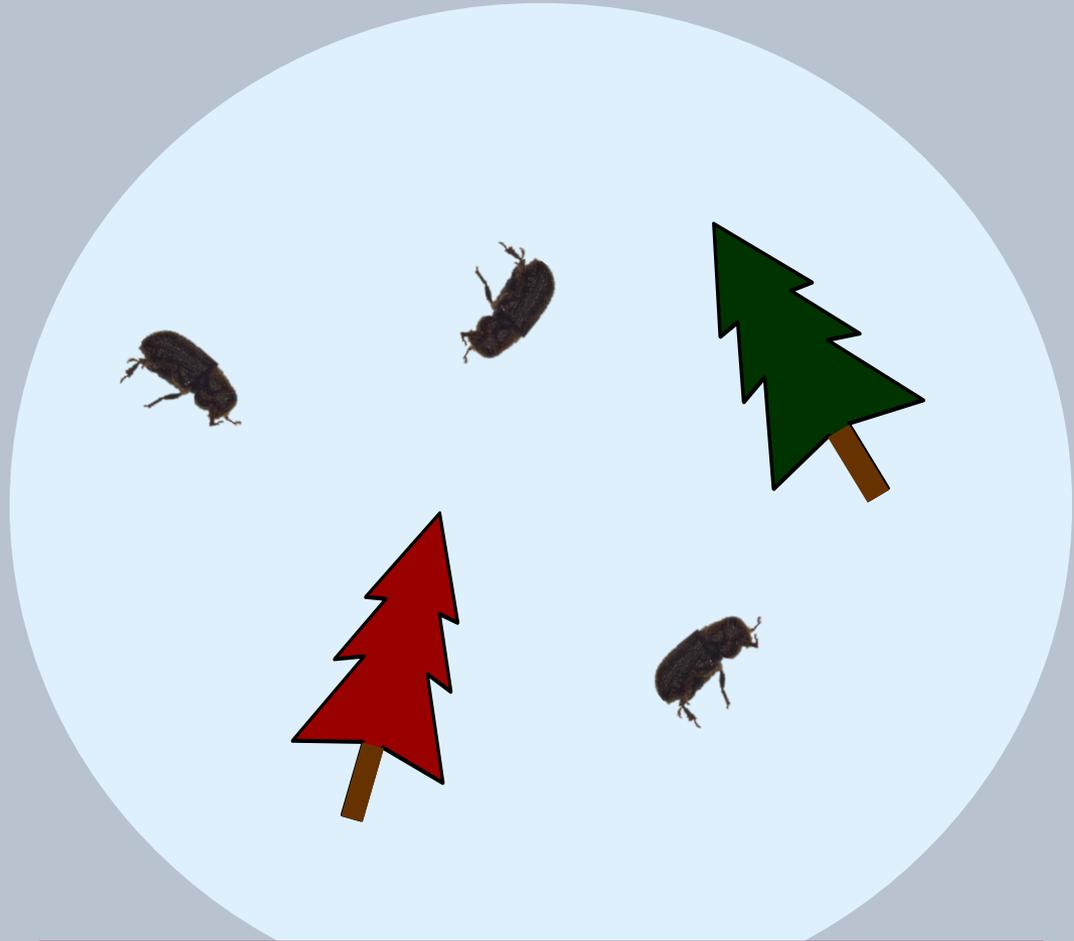
* Hansen, E.M., Munson, A.S., Wakarchuk, D., Blackford, D.C., Graves, A.D., Stephens, S.S. and Moan, J.E., 2019. Advances in semiochemical repellents to mitigate host mortality from the spruce beetle (Coleoptera: Curculionidae). *Journal of economic entomology*, 112(5), pp.2253-2261. <https://academic.oup.com/jee/article/112/5/2253/5523060>



2021-2023 Evaluation Monitoring Spruce beetle outbreak assessment

Miho Welton, AKDOF Forest Inventory
Jason Moan, AKDOF Forest Health
In partnership with Alaska USFS FHP
3-year Project, 2021-2023

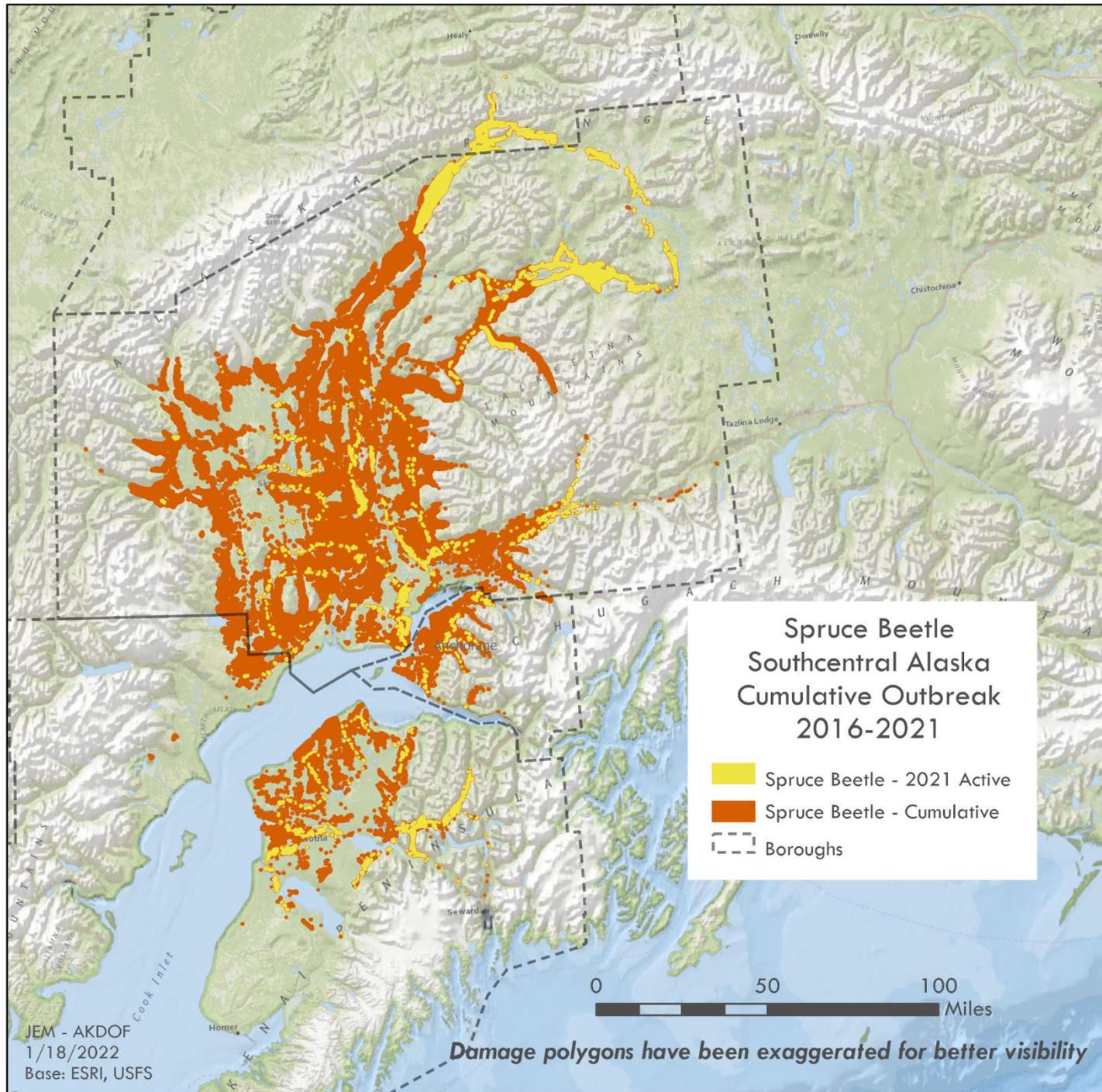
- 2021
- 2015
- 2014
- 2013
- 2012
- 2011
- Cumulative spruce beetle damage 2015-2021



What will happen next?



Cumulative spruce beetle outbreak



Dispersal factors

Temperature

Wind speed

Wind direction

Rain

Humidity

Host presence

Overwinter survival factors

Life stage

Location in the tree

Temperature

Snow depth

Predators

And others



Factors Influencing Outbreak Development

Unmitigated large-scale disturbance

Abundant susceptible host species

Suitable environmental conditions

Factors Influencing Outbreak Decline

Natural predators/disease

Exhaustion of susceptible host

Unfavorable environmental conditions



Jason Moan
Forest Health Program Manager
Alaska Division of Forestry
Jason.Moan@alaska.gov

**Program
funding
provided by**

