

# Spruce Beetle Status

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*Forest Health Program Manager  
Alaska Division of Forestry*

*Alaska Board of Forestry  
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# 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**  
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**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](mailto: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](http://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





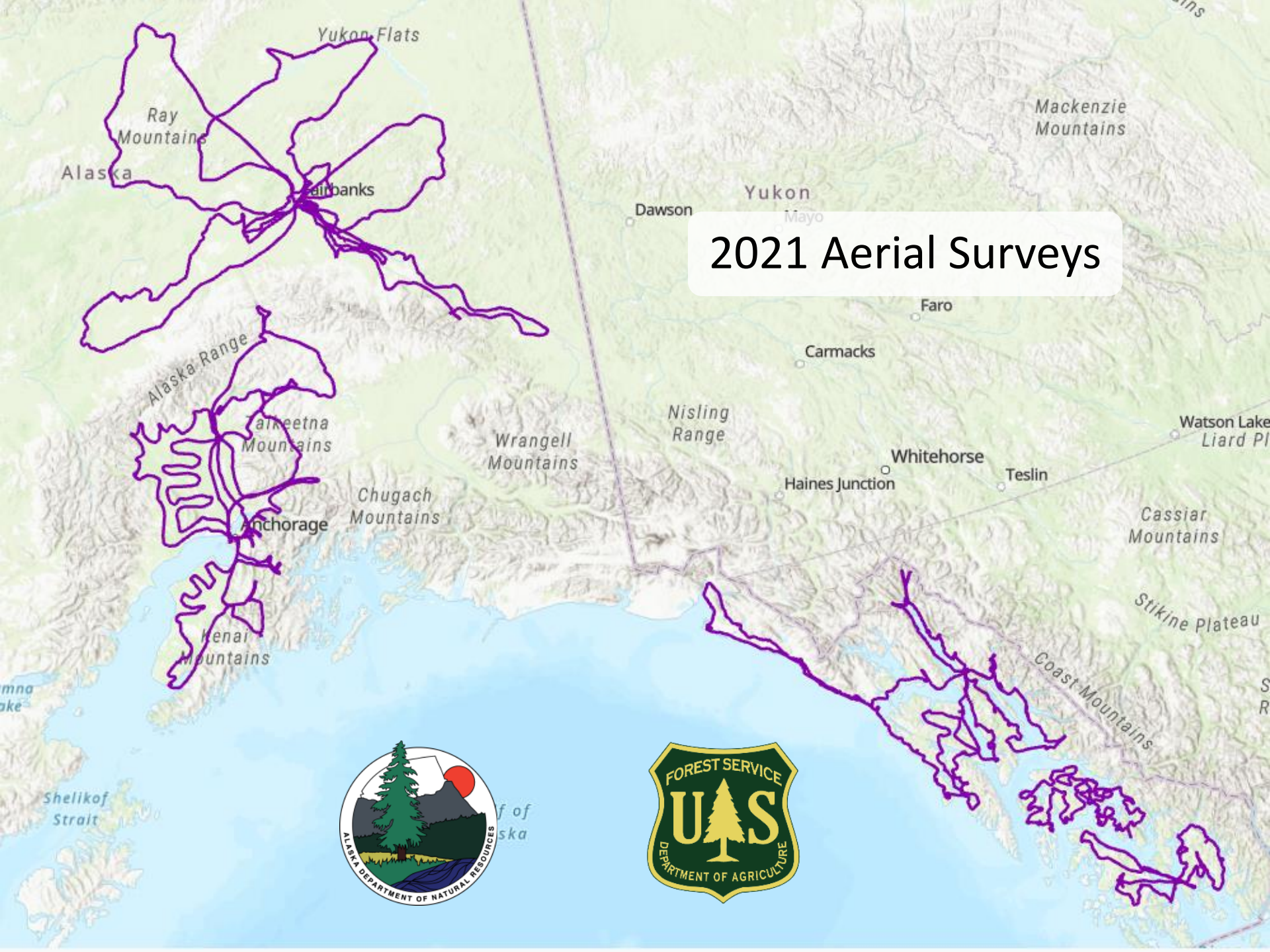
# Aerial Surveys

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





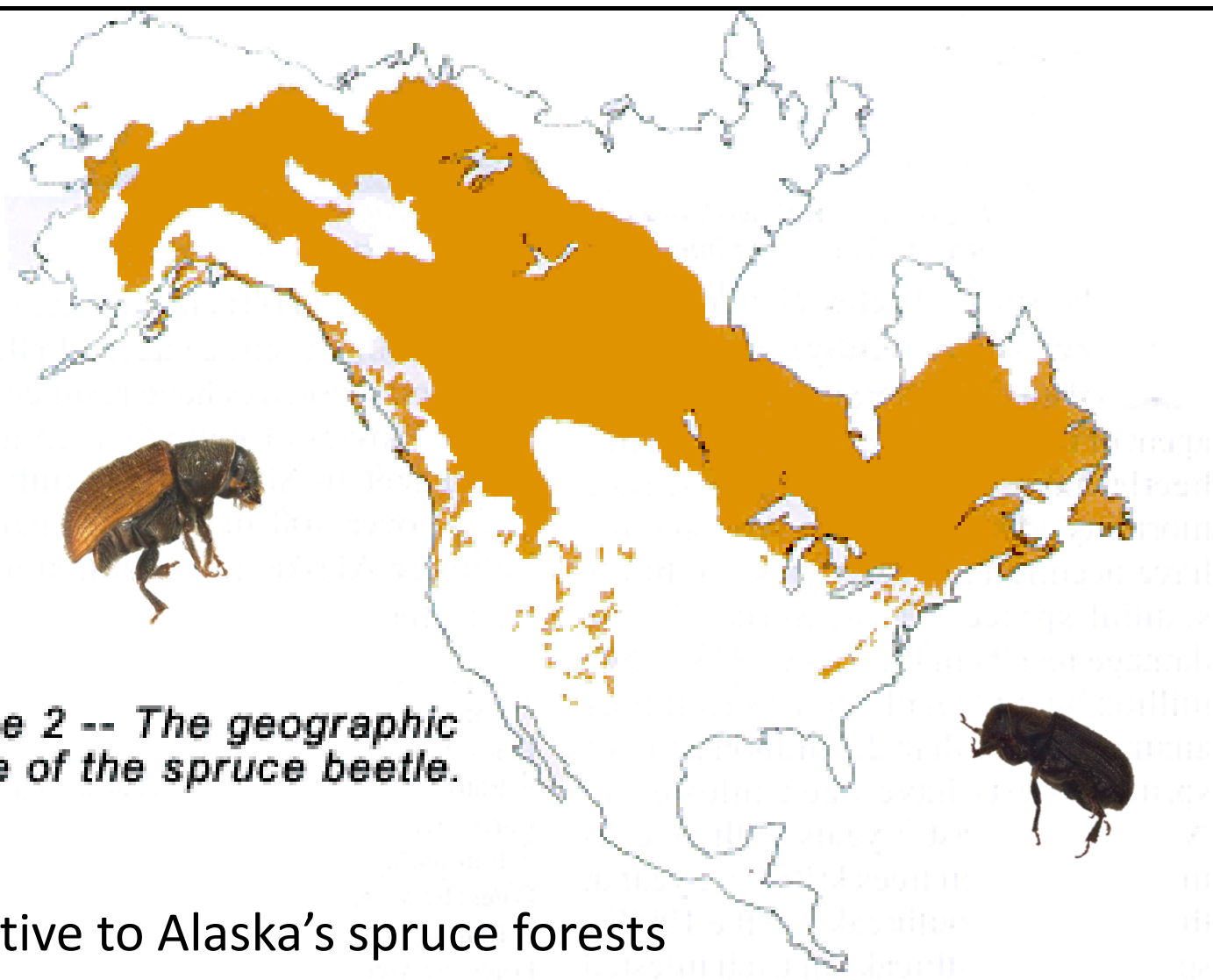
# Spruce Beetle



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***

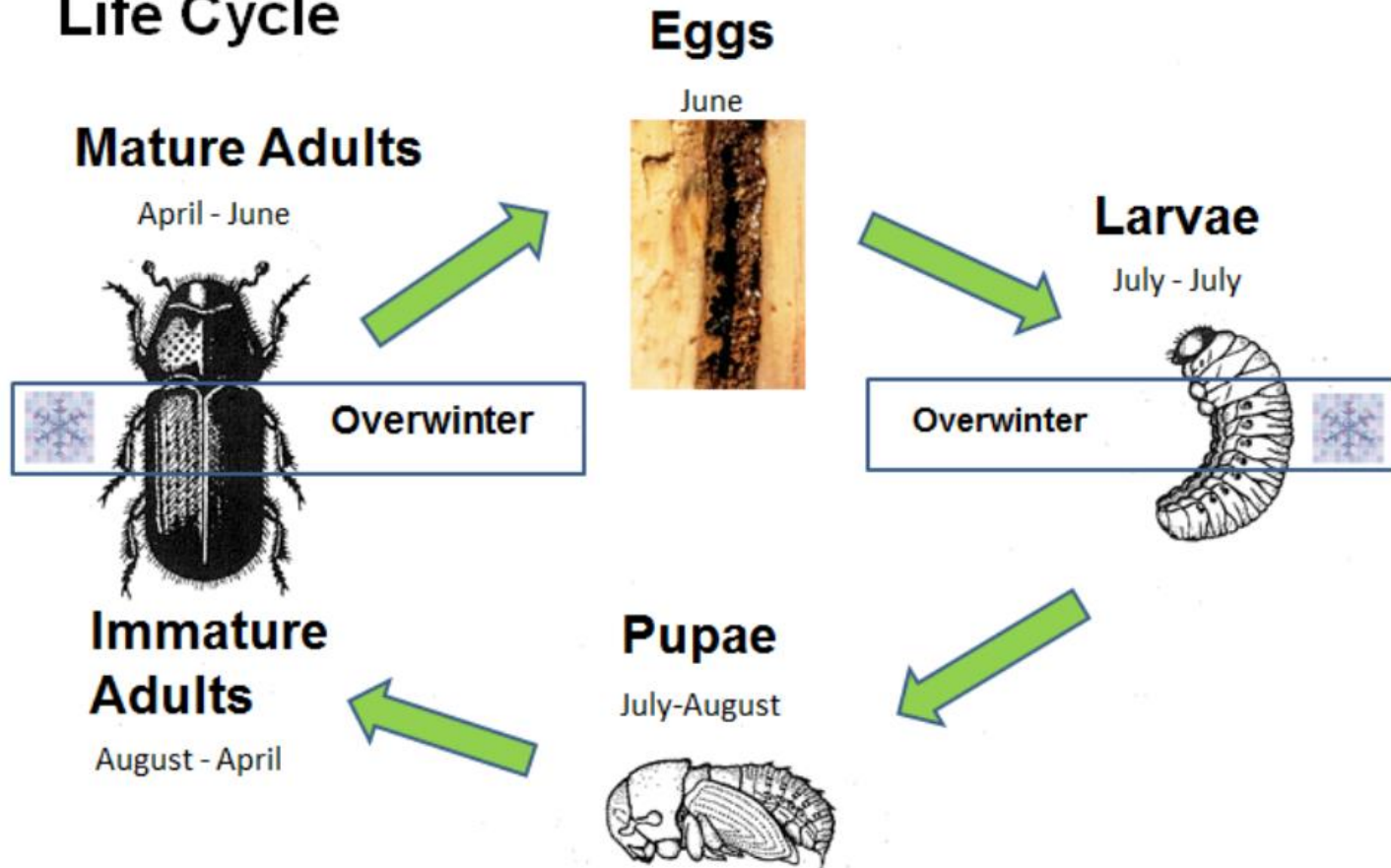
- Norway spruce
- Engelmann spruce
- Blue spruce\*





# Spruce Beetle Life Cycle

2-year life cycle

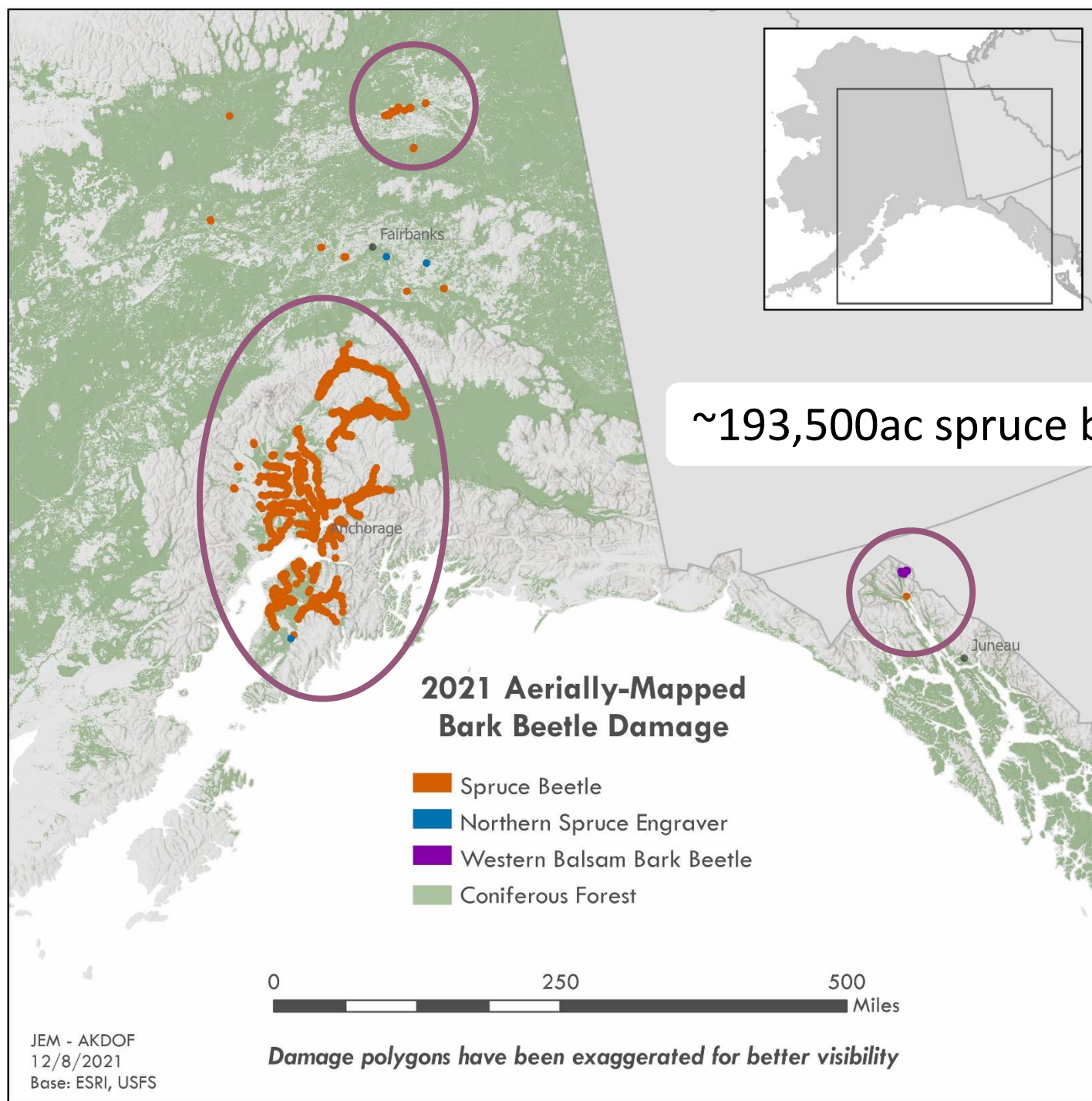


Timing is closely tied to temperature



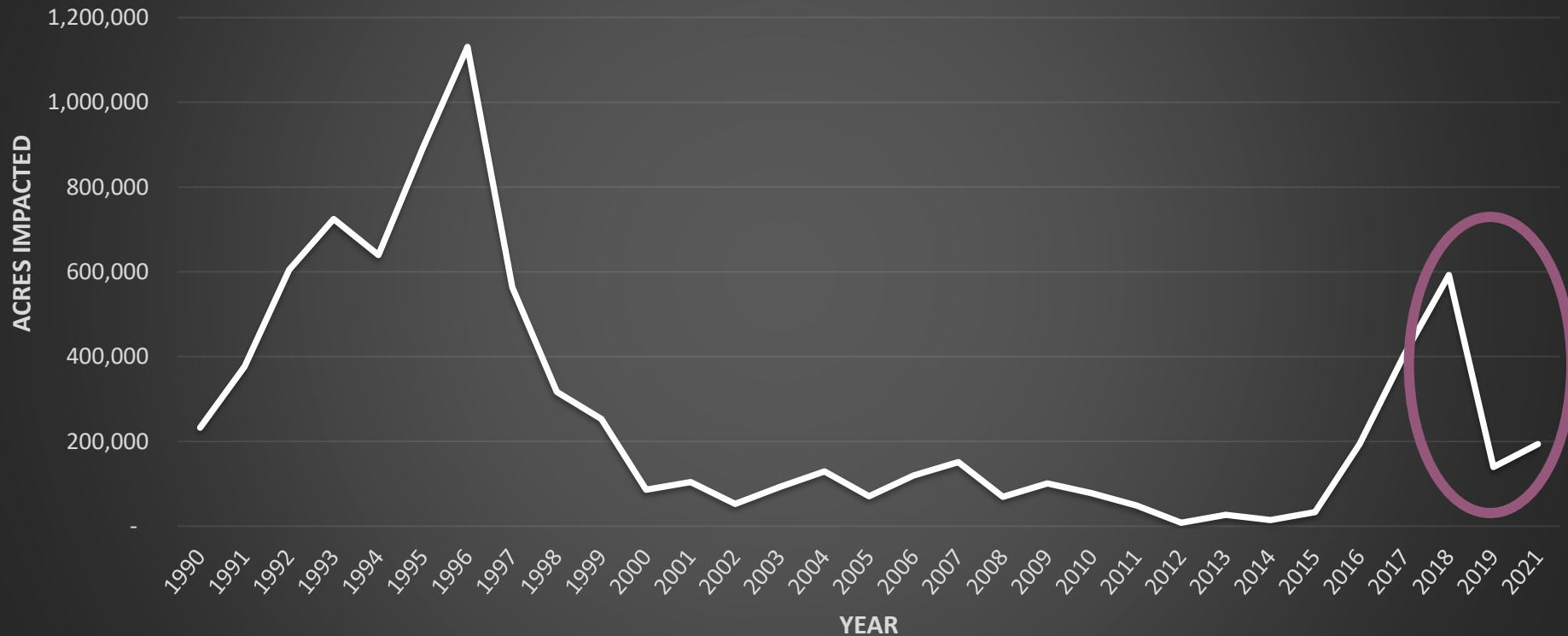


# 2021 – Bark Beetle Damage





## Spruce beetle - Acres of observed damage 1990-2021



\* 2020 excluded due to differing survey methodology;



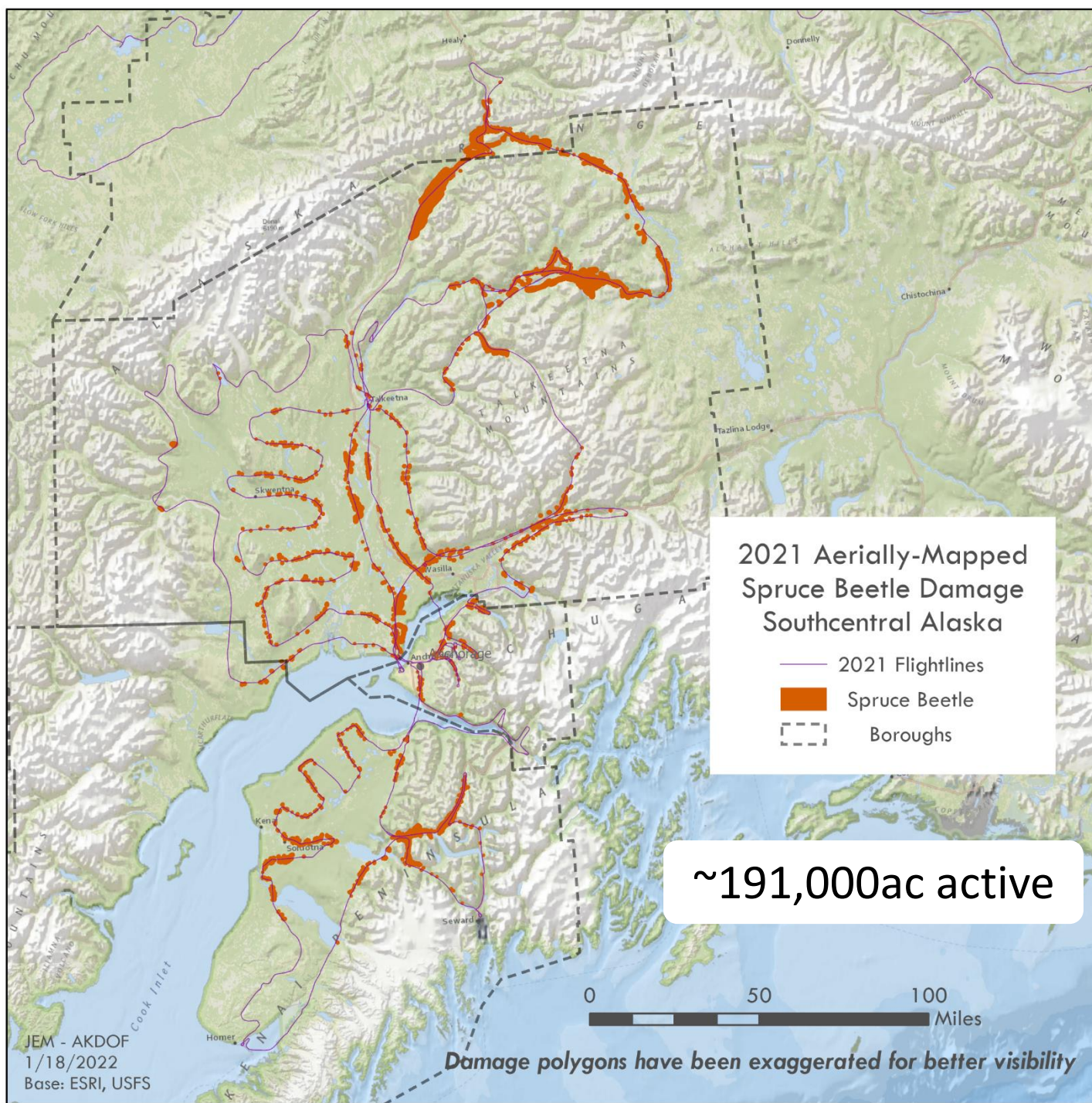


# The outbreak



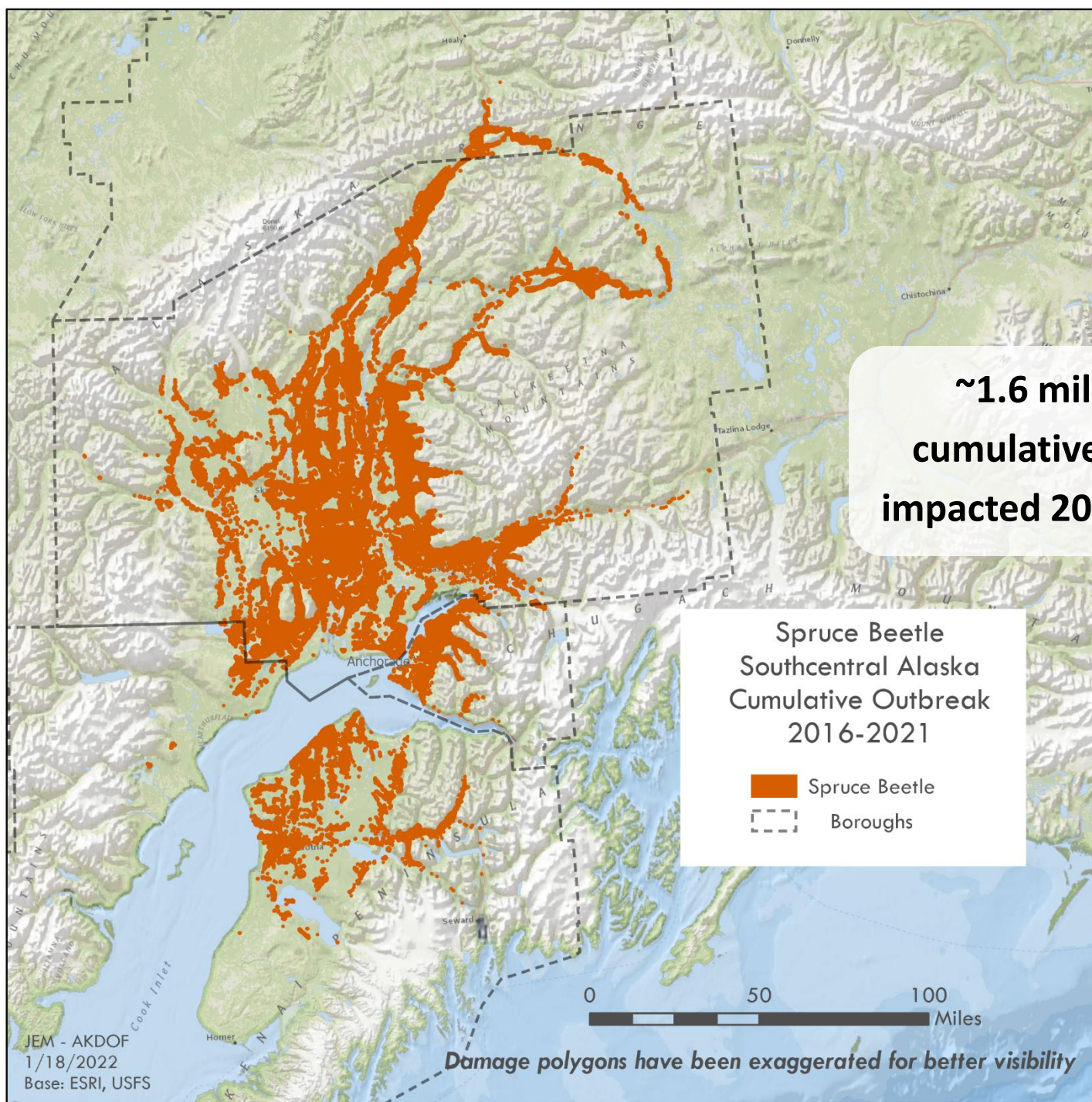


# 2021 – Spruce beetle Damage



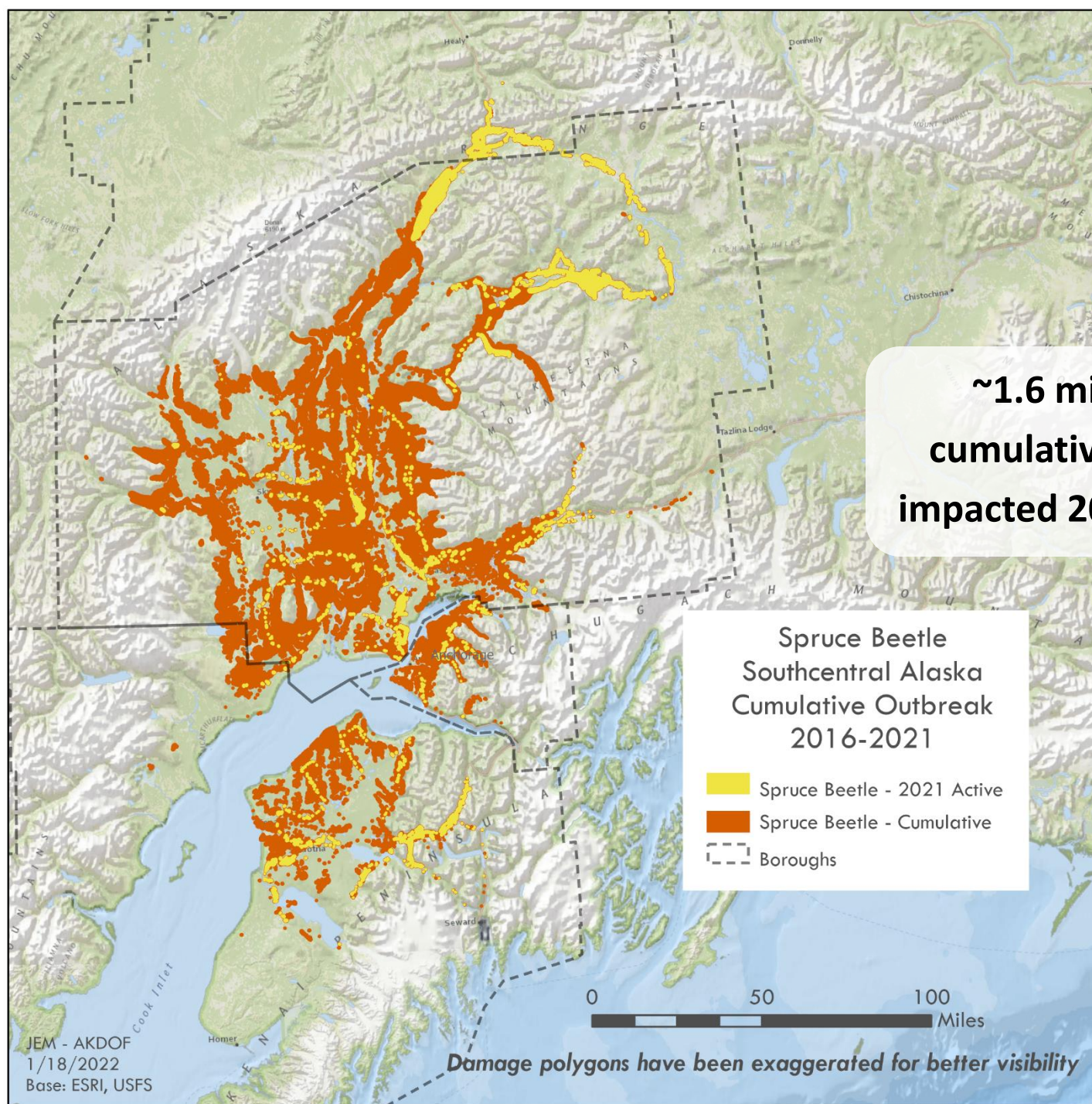


# Cumulative spruce beetle outbreak





# Cumulative spruce beetle outbreak





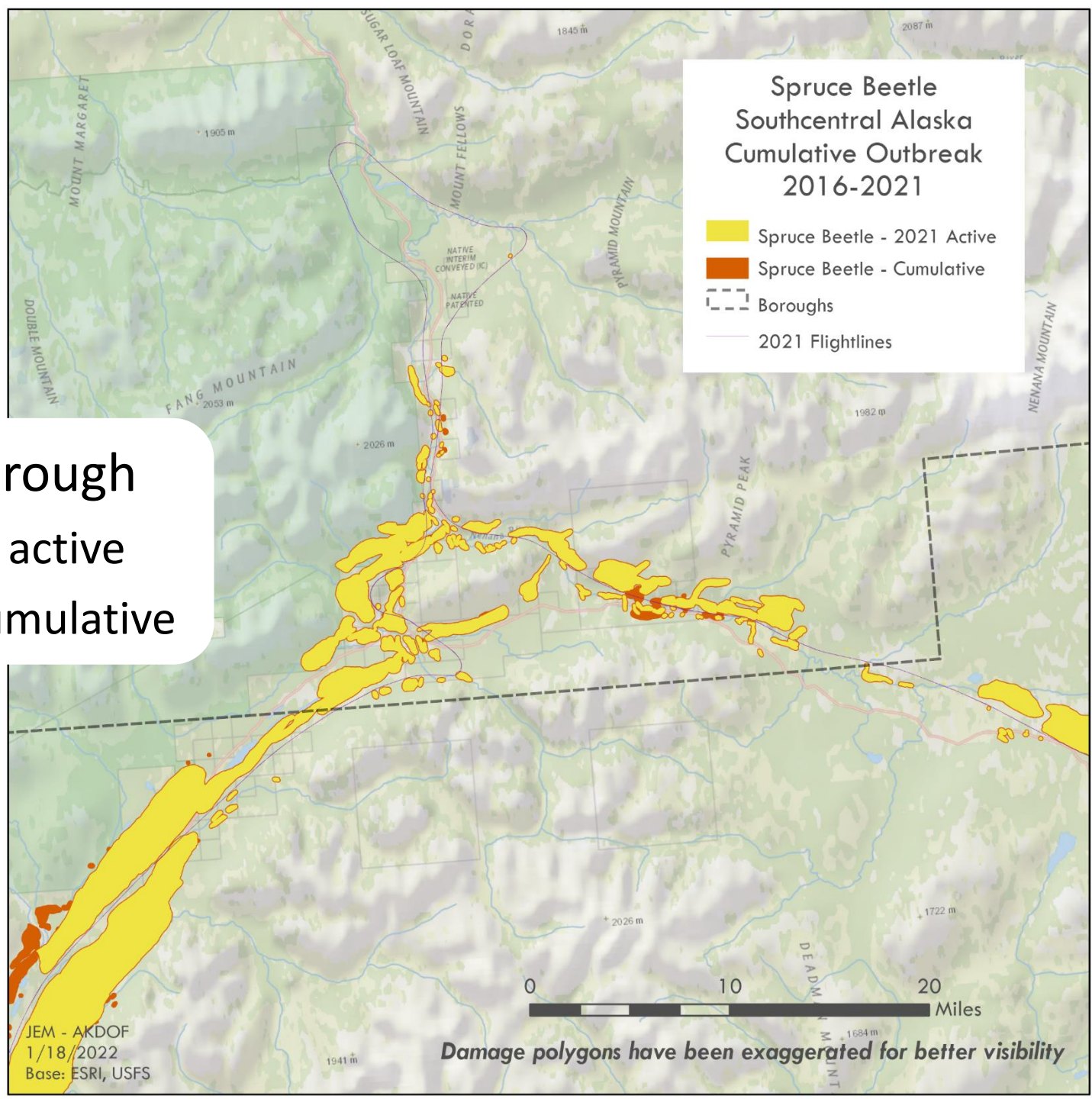
# Spruce Beetle Southcentral Alaska Cumulative Outbreak 2016-2021

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

Denali Borough

~22,900ac active

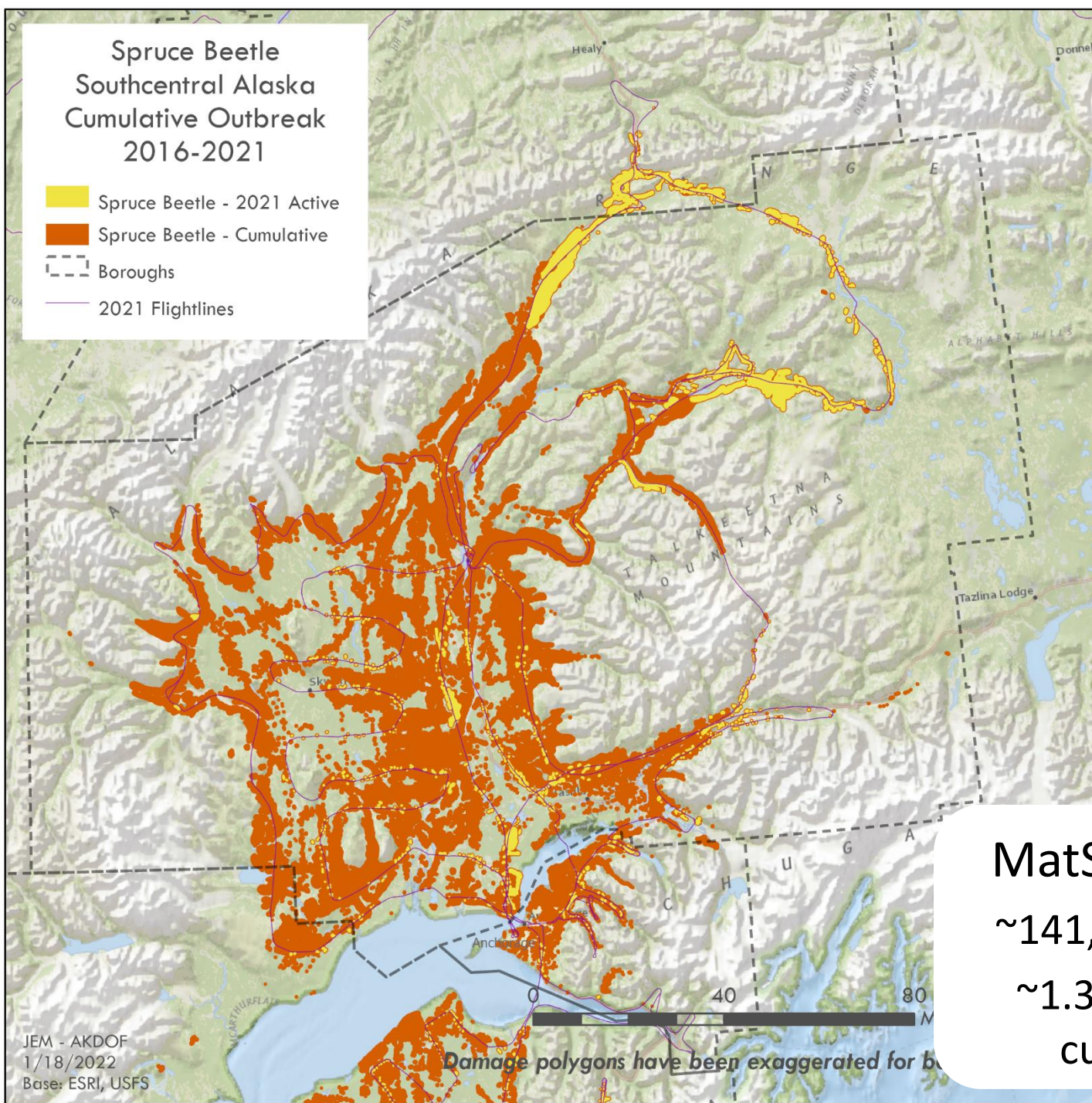
~23,700ac cumulative





# 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

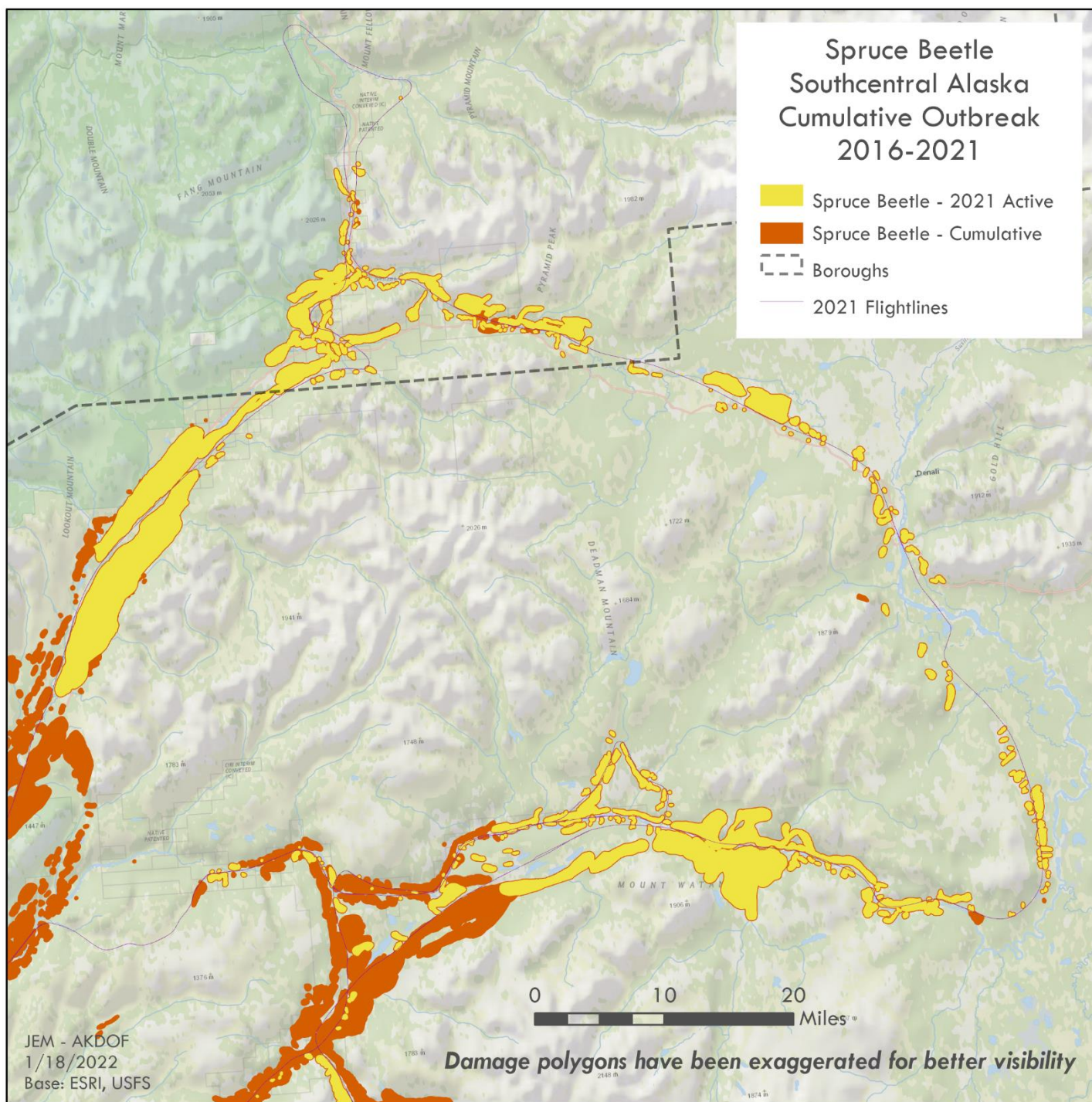
Damage polygons have been exaggerated for better visibility

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



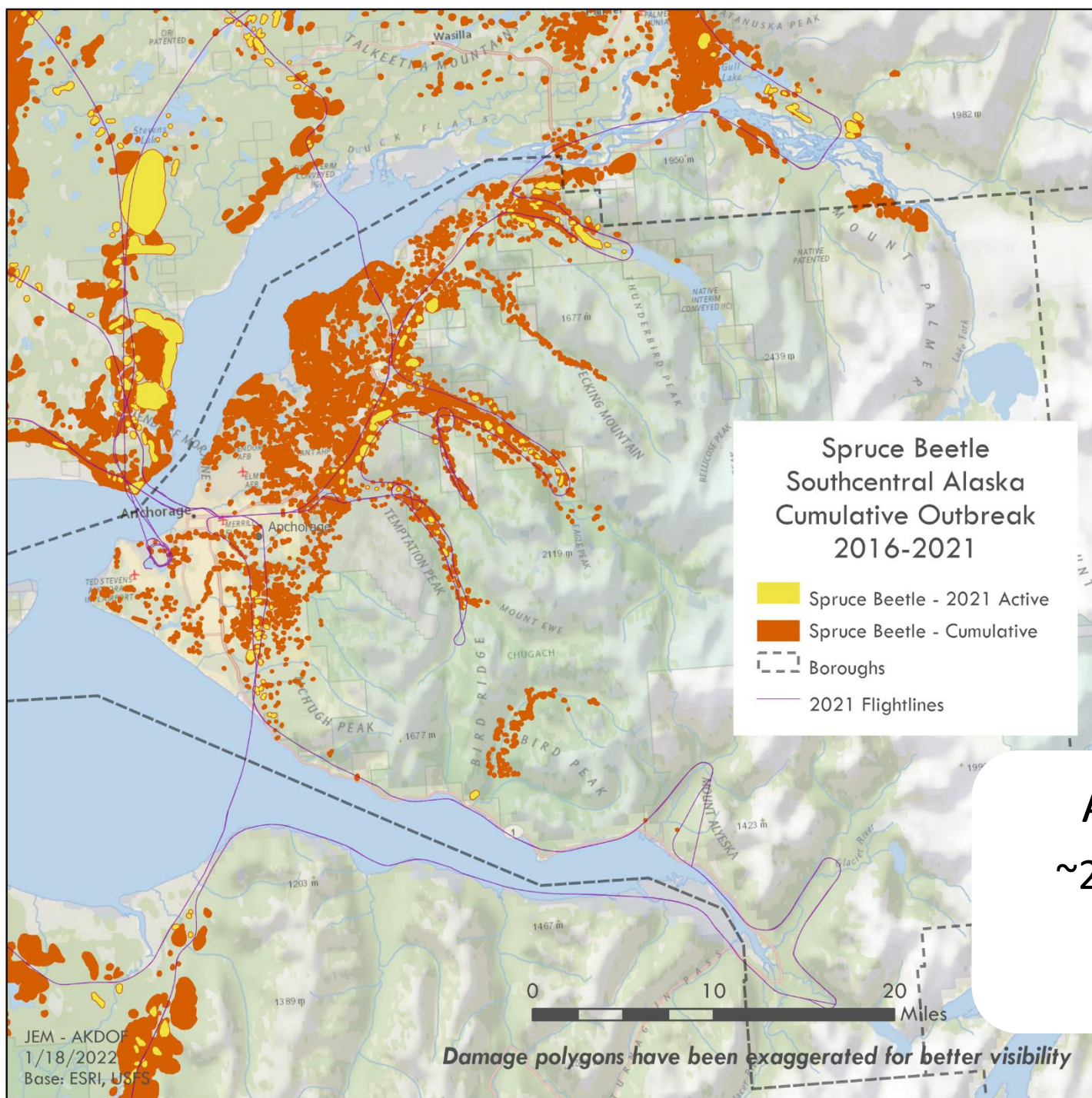
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-  Spruce Beetle - Cumulative
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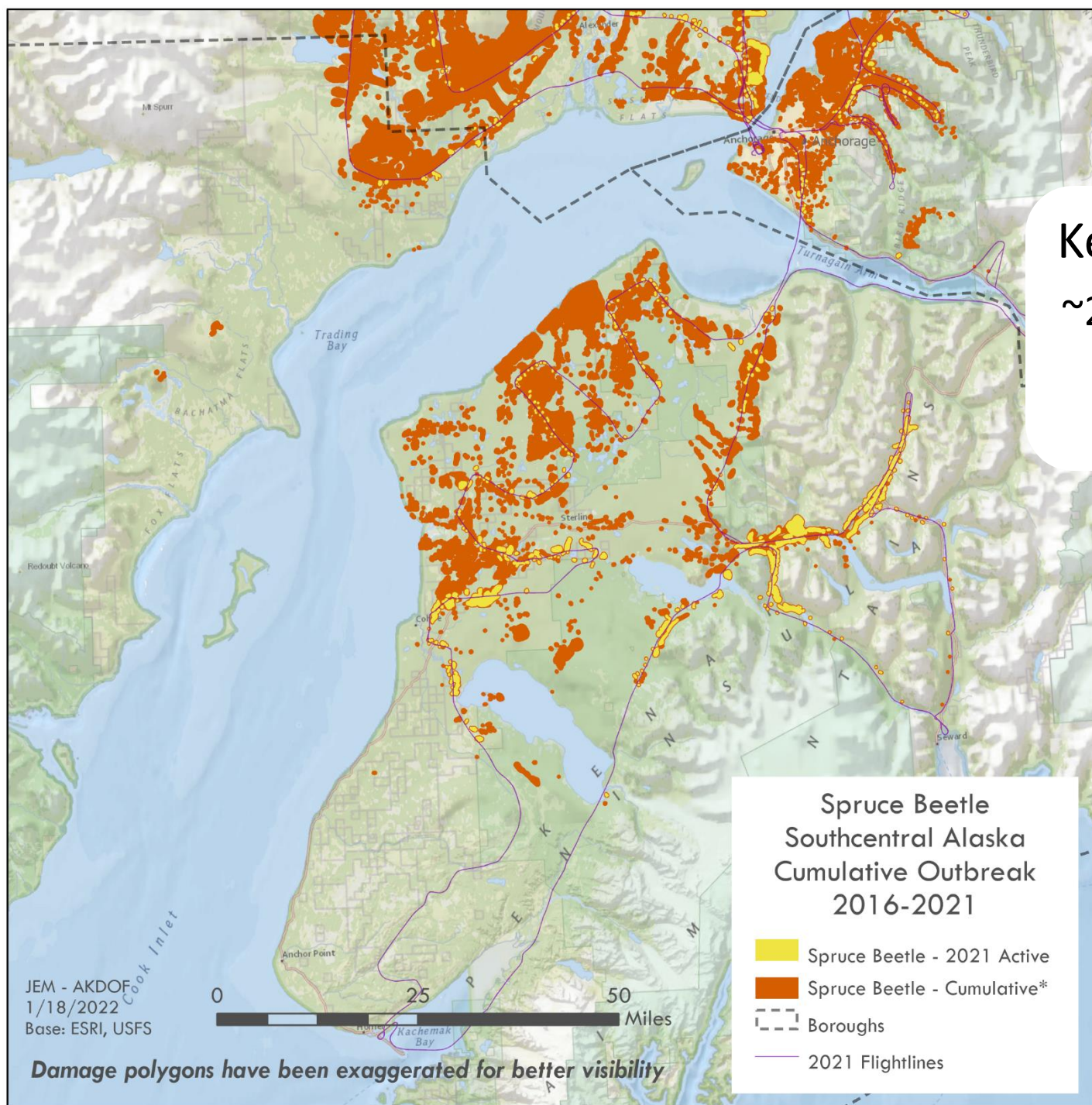
JEM - AKDOF  
1/18/2022  
Base: ESRI, USFS





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





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



# 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

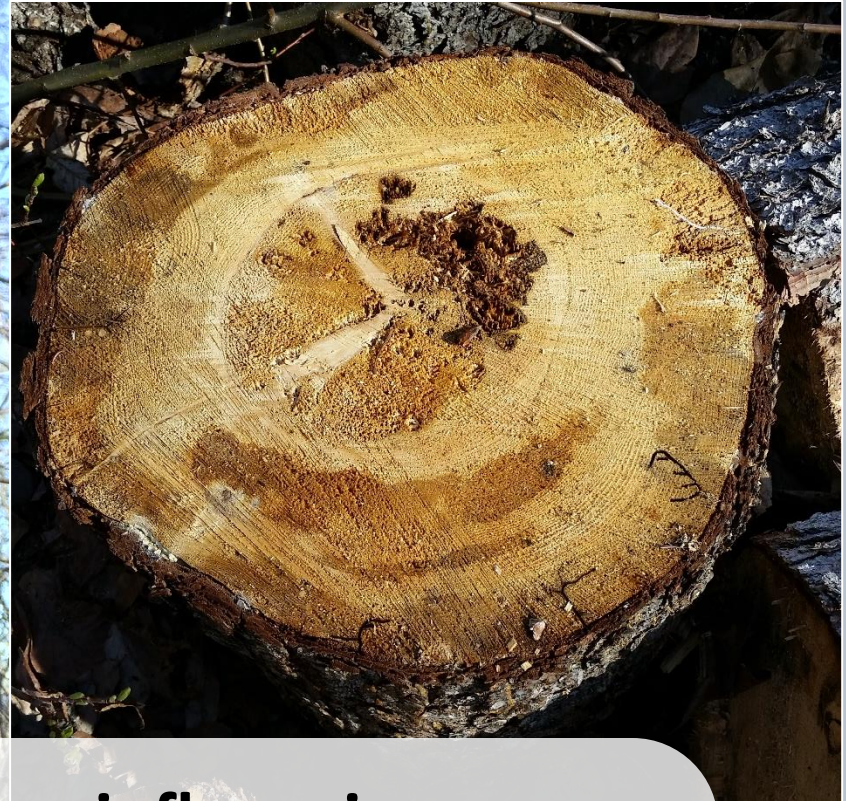
### General considerations

- 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

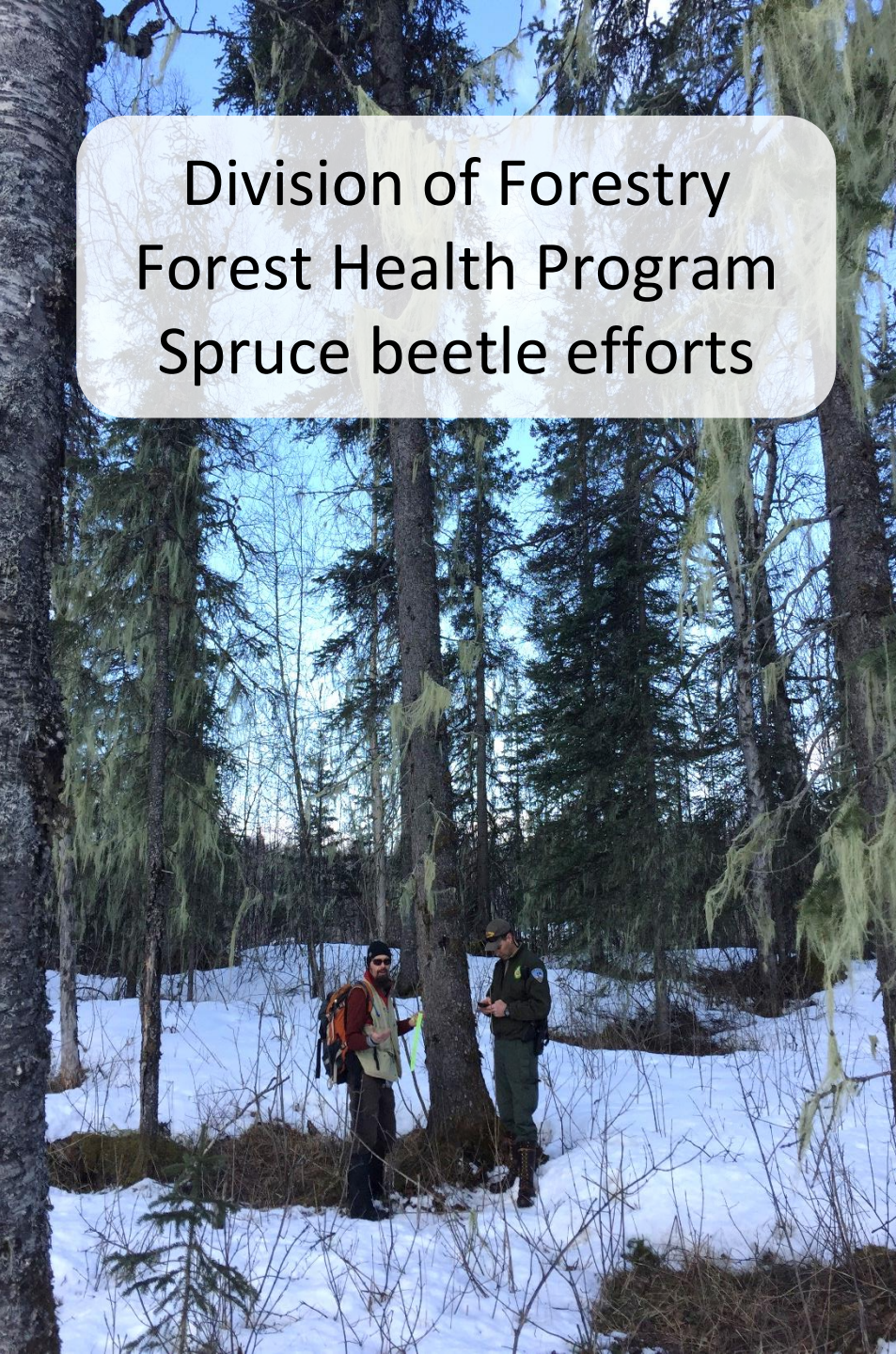
- Sap rots
- Blue-stains



Photos: J. Moan, AKDOF



Division of Forestry  
Forest Health Program  
Spruce beetle efforts



Study Tree



Forester



Photos: J. Moan, AKDOF



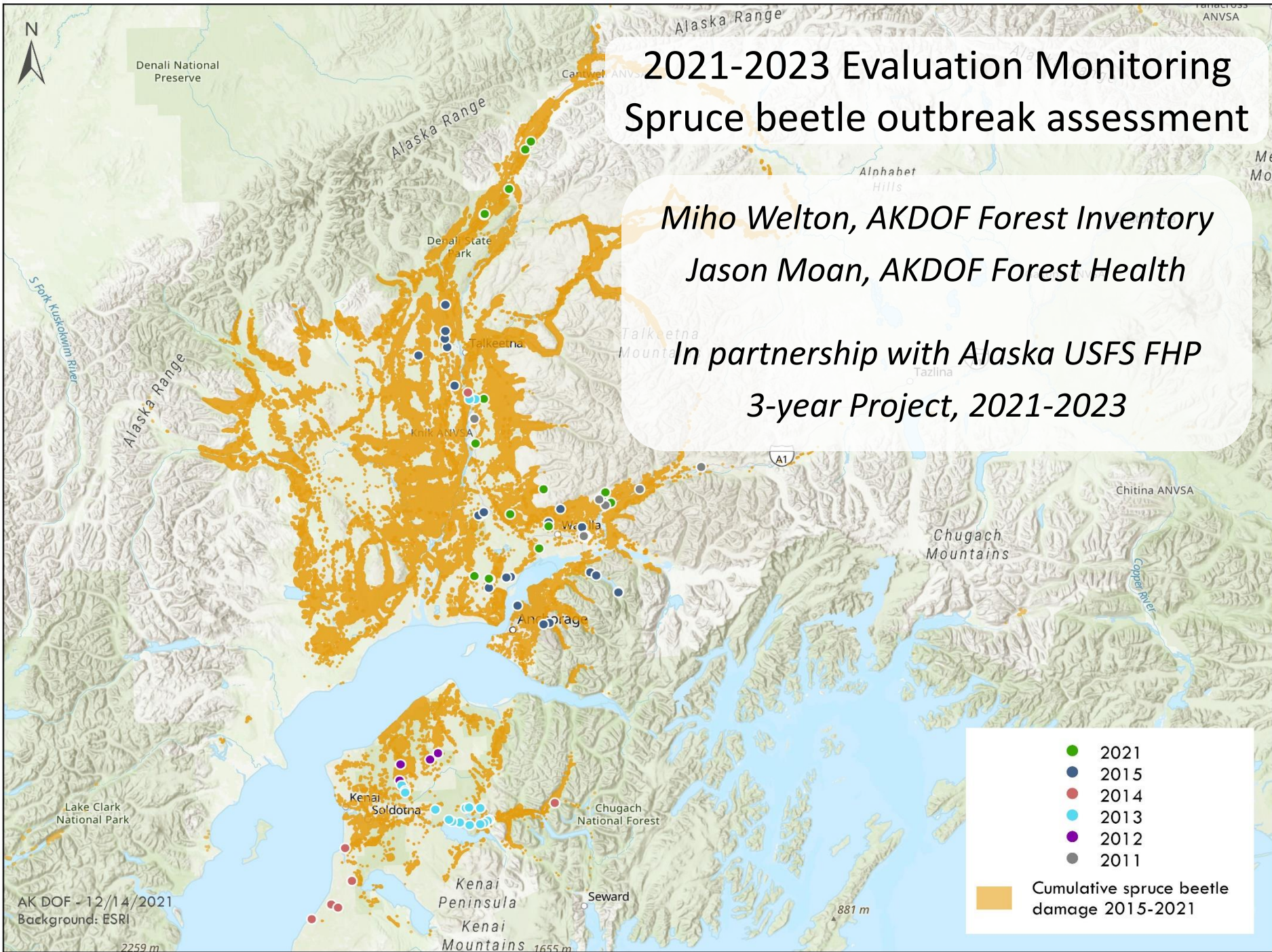


# Spruce beetle tree protection trials

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>







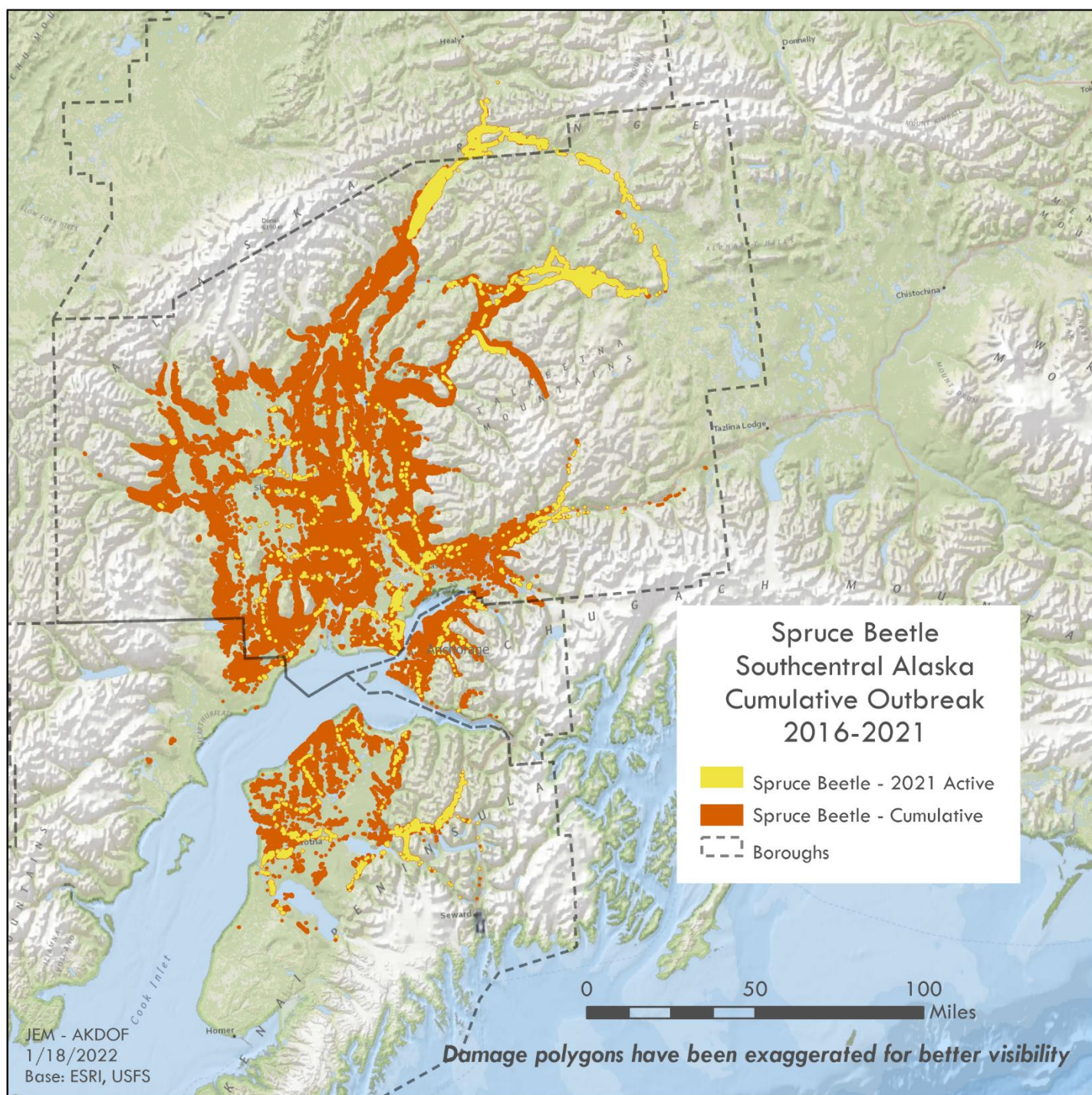


What will happen next?





# 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*





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**Program  
funding  
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