

Kenai Peninsula Forest Health Update

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Kenai Peninsula — All Lands All Hands bi-annual meeting

October 25, 2017 • Soldotna, Alaska



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Acknowledgments

- Tom Heutte (USFS) provided aerial survey data.
- John Lundquist and Bryan Box (both USFS) sent me summary data, graphics, and accounts.
- Scott Slavik (USFWS) gave me photos of USFWS personnel felling recently beetle-killed trees.



Climate: Recent Past

- PDO switched to positive in 2014.

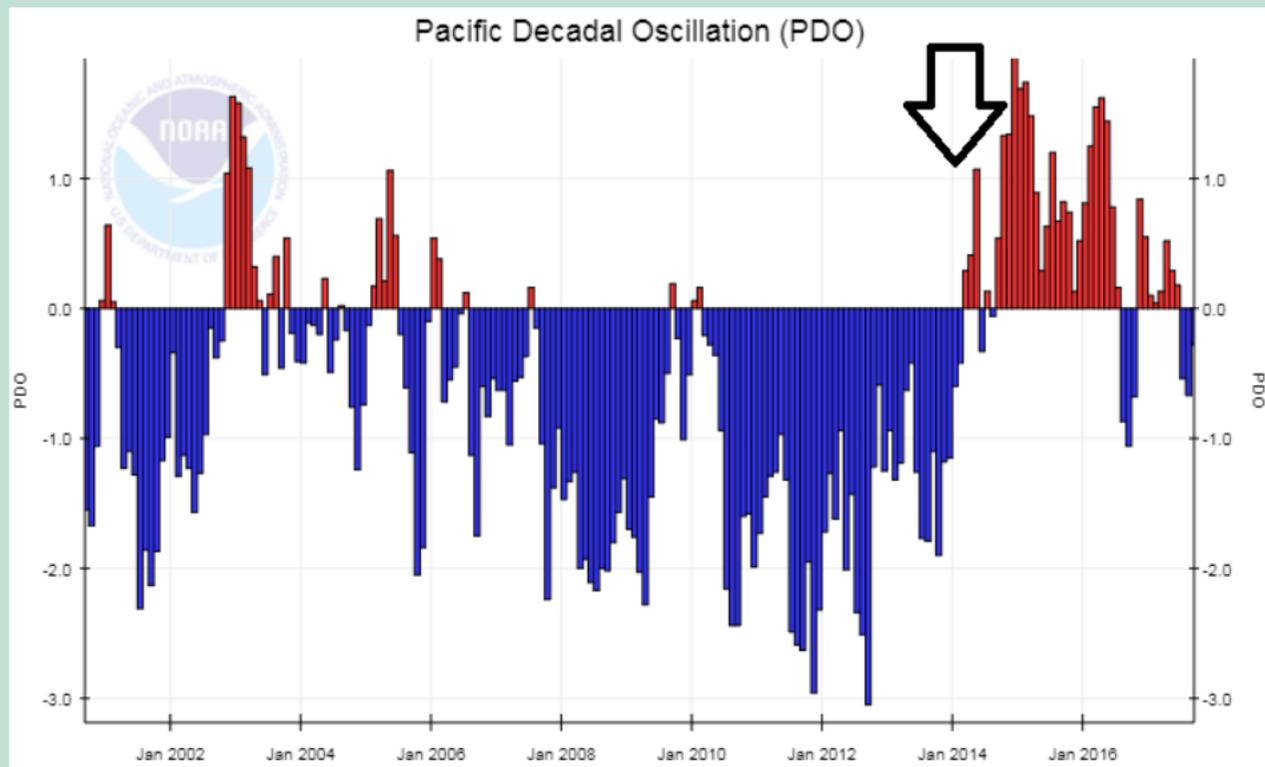


Image from <https://www.ncdc.noaa.gov/teleconnections/pdo/>

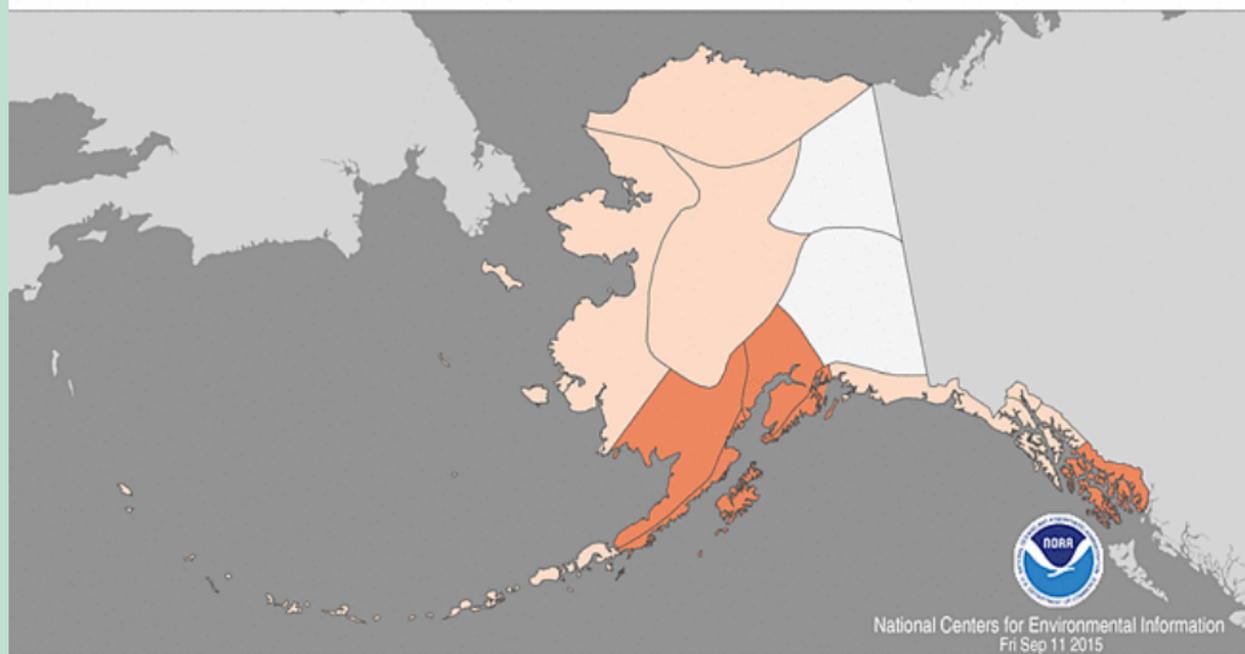
summer 2015

average temperatures

Alaska Divisional Average Temperature Ranks

June–August 2015

Period: 1925–2015



National Centers for Environmental Information
Fri Sep 11 2015



Record Coldest



Much Below Average



Below Average



Near Average



Above Average



Much Above Average



Record Warmest

summer 2016
average temperatures

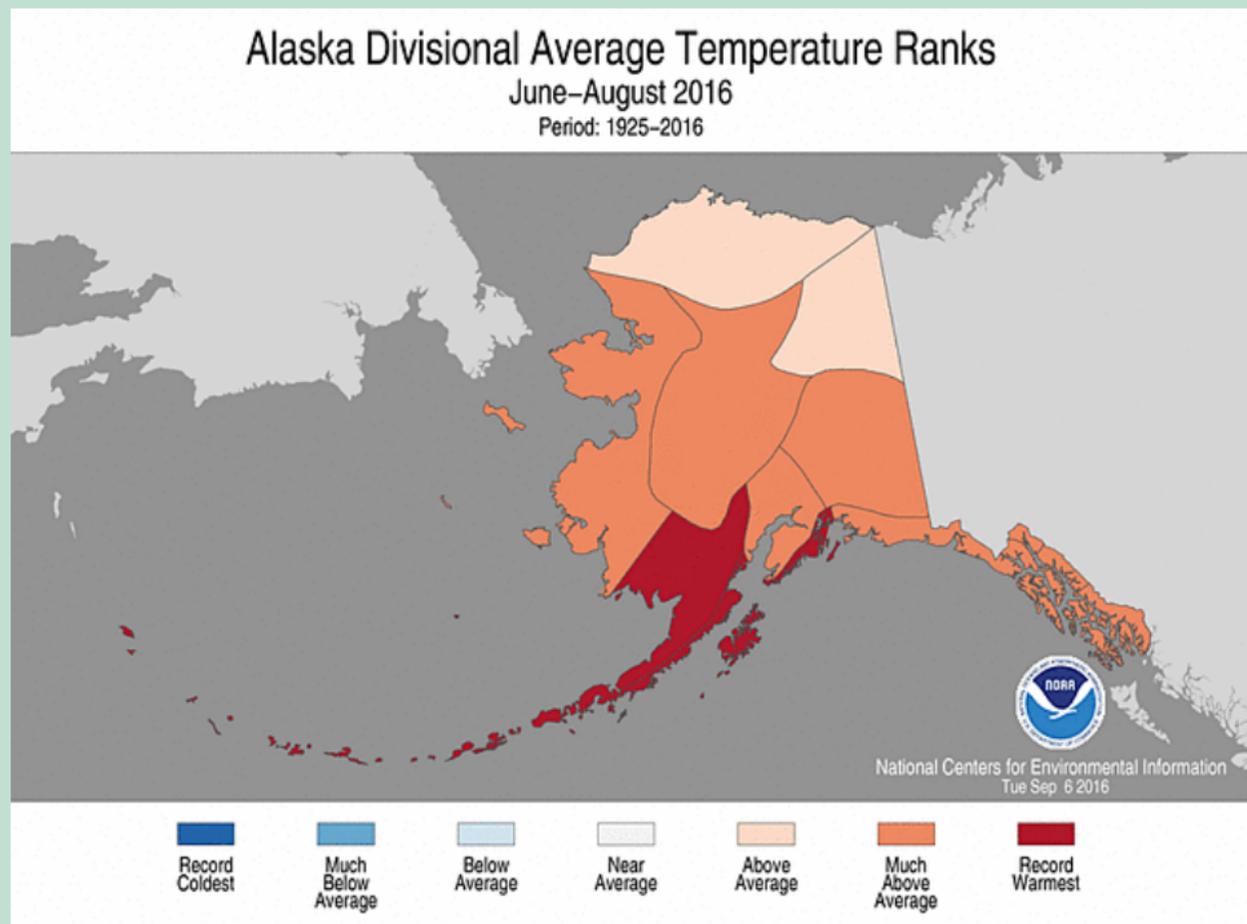
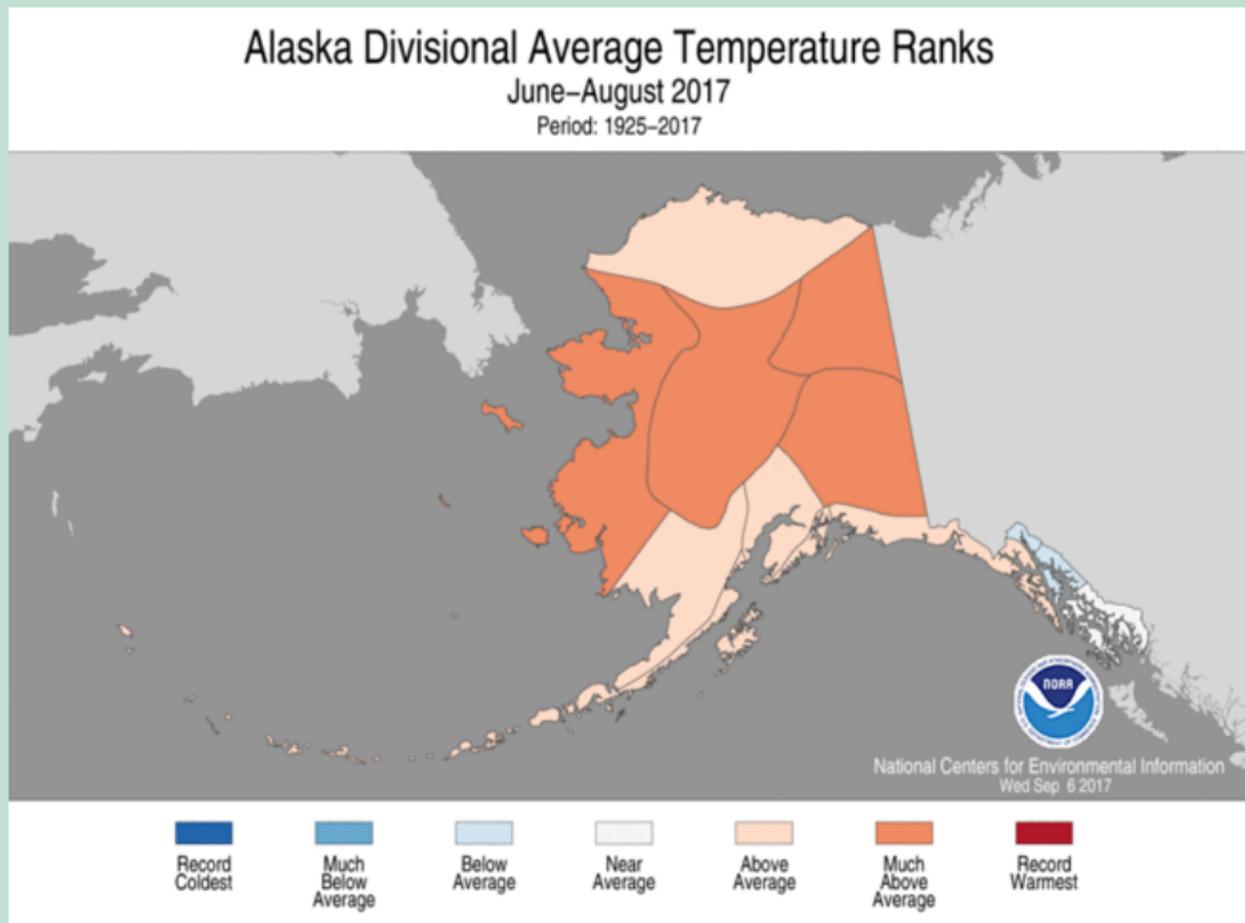


Image from <https://www.ncdc.noaa.gov/temp-and-precip/us-maps/>

summer 2017

average temperatures



Forest Insect Events 2015-2017



Spruce Aphid

Elatobium abietinum



Spruce aphids, Homer, March 29, 2016 (<https://www.inaturalist.org/observations/2852344>).



Spruce aphids, Homer, March 29, 2016.



Spruce aphid damage, Homer, March 29, 2016.



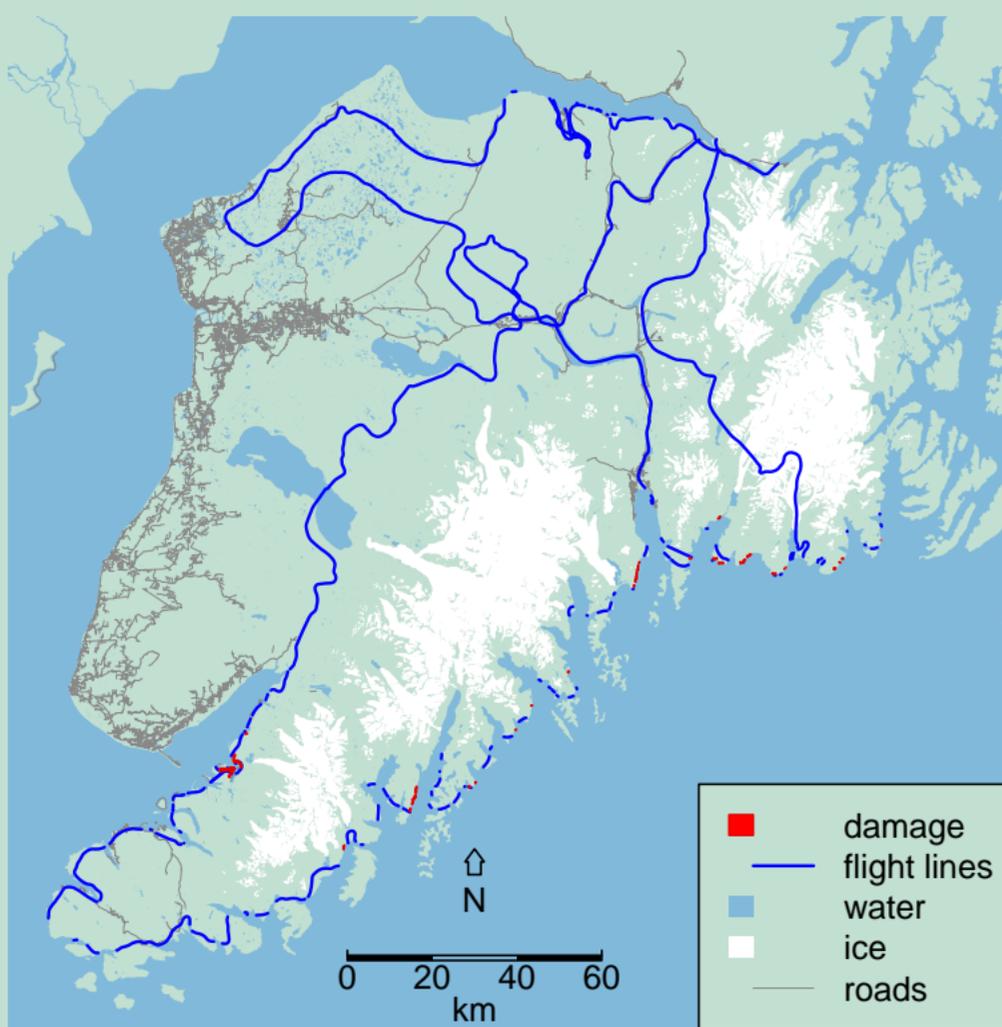
Spruce aphid damage, Homer, March 29, 2016.



Spruce aphid damage, Homer, March 29, 2016.

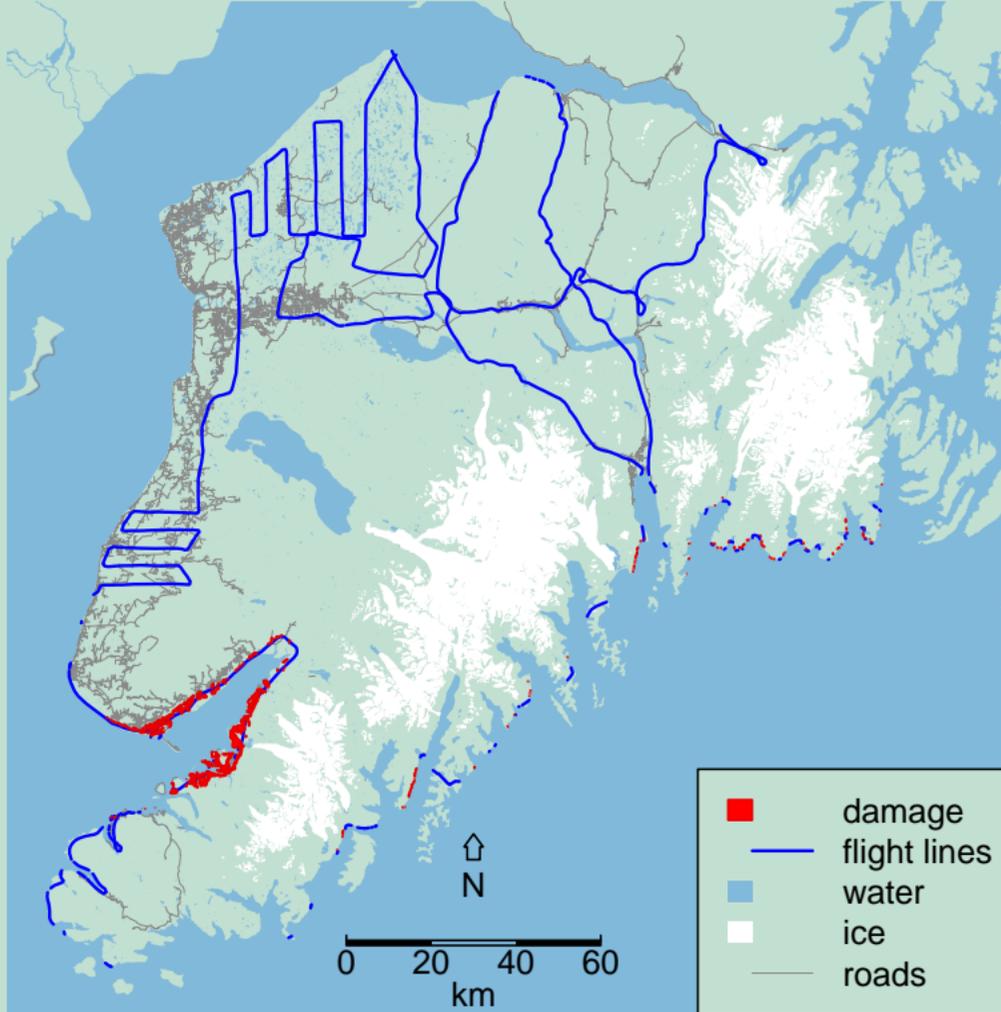
Forest Insect Events 2015-2017

1,400 acres affected by spruce aphid in 2015



Forest Insect Events 2015-2017

15,400 acres affected by spruce aphid in 2016

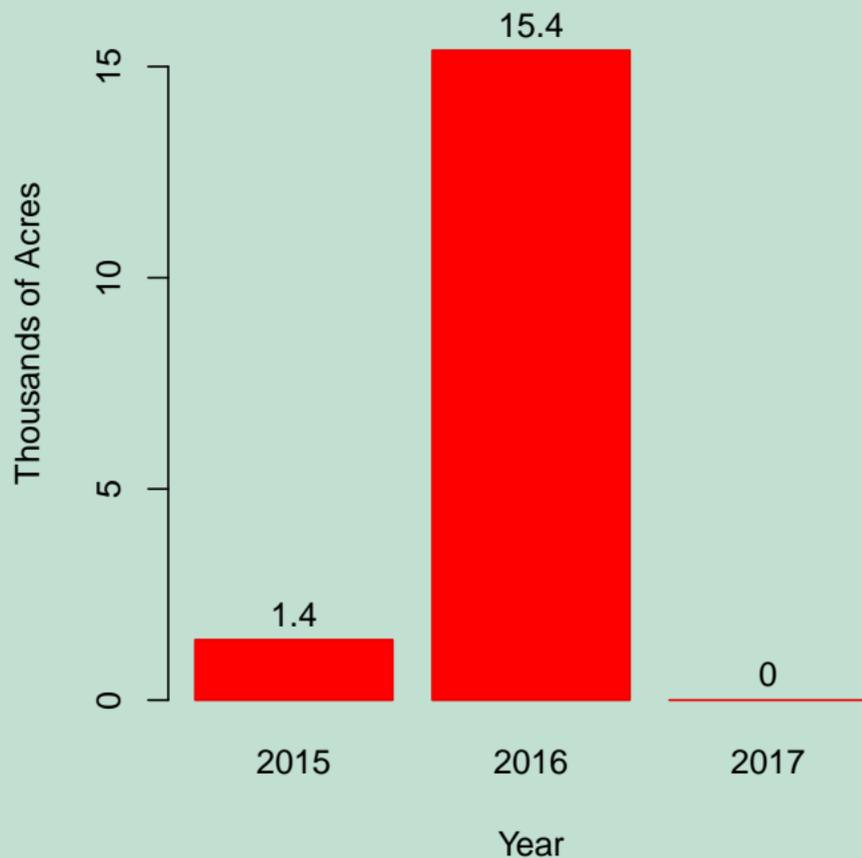


Forest Insect Events 2015-2017

- Infestation began in 2015 and persisted to 2016 [1, 2]
- 0 acres affected by spruce aphid in 2017
- Colder winter 2016–2017 appears to have drastically reduced spruce aphid populations on the southern Kenai Peninsula.
- Temperatures of -7°C (19°F) or lower have been shown to reduce spruce aphid populations [3].

Kenai Peninsula Spruce Aphid Damage

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- 0 spruce aphids collected in traps on the southern Kenai Peninsula in 2017.
- Most (~89%) of spruce trees affected in 2015–2017 are recovering.



New growth on Sitka spruce following spruce aphid infestation, summer 2017. Image provided by John Lundquist, USFS.

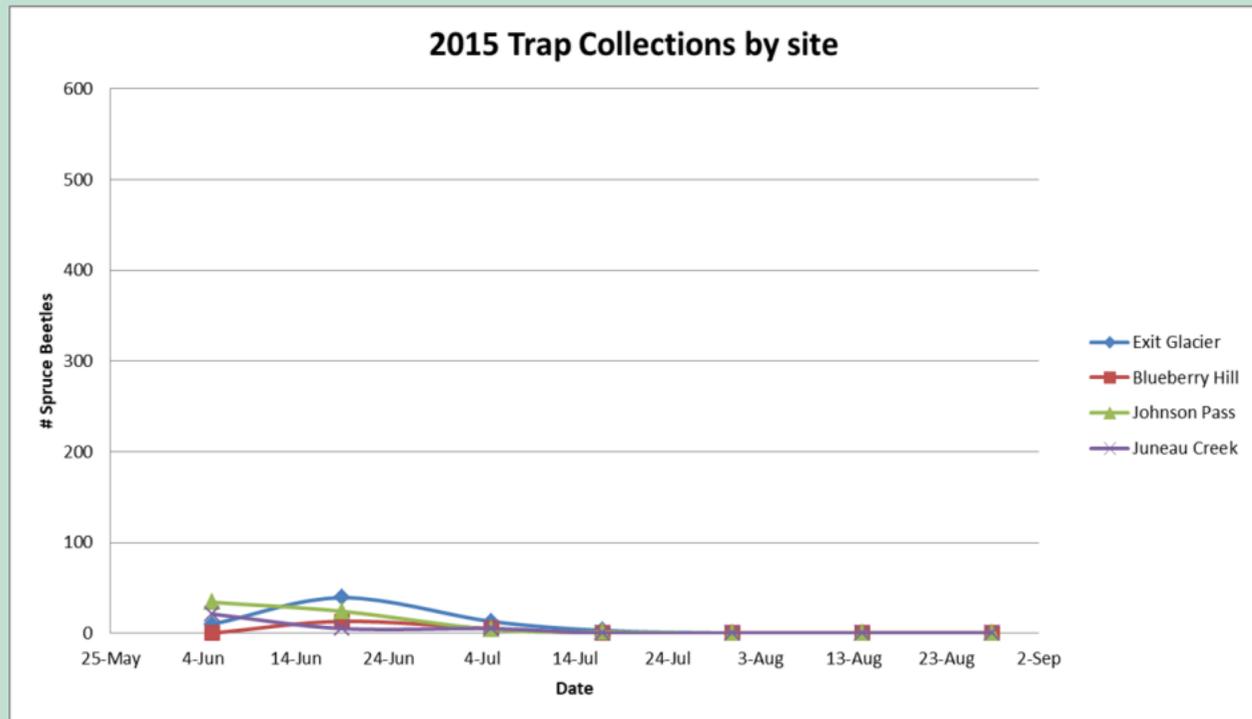
Spruce Bark Beetle

Dendroctonus rufipennis

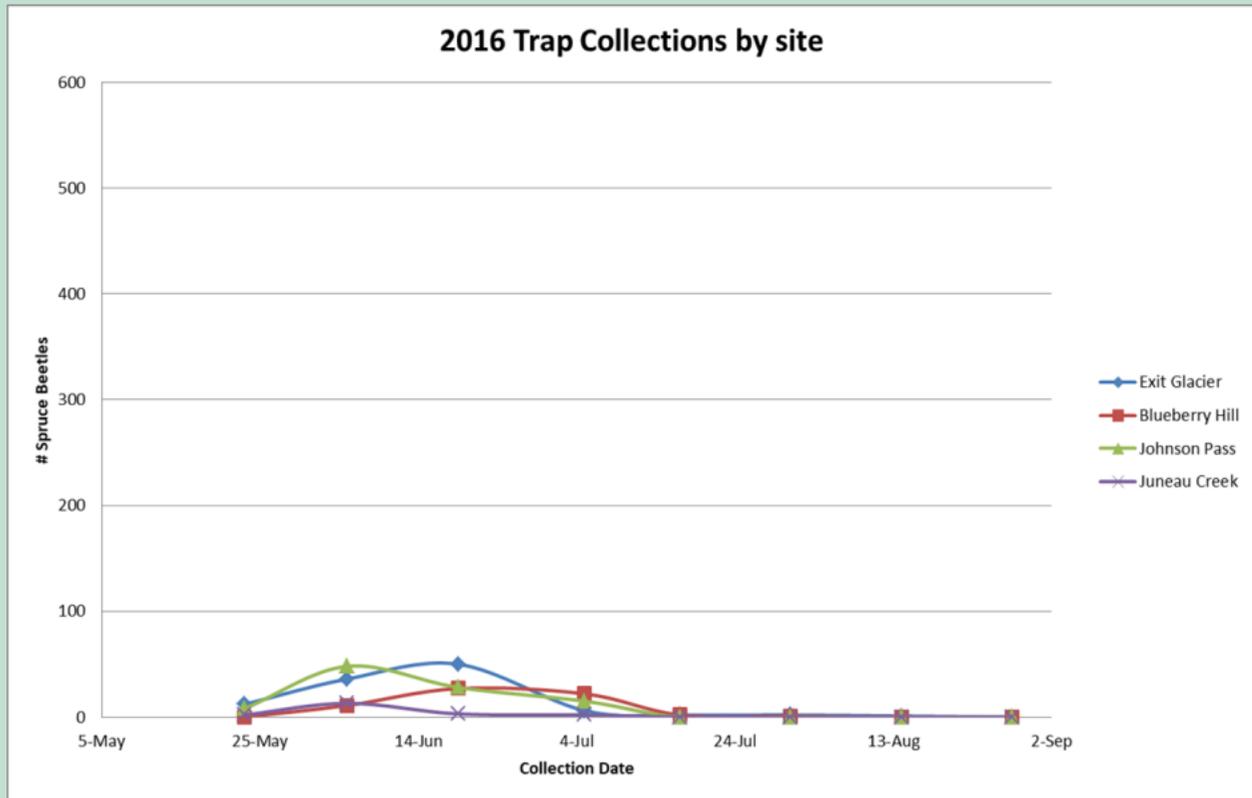


Spruce bark beetle, Swanson River Road, July 28, 2016 (<https://www.inaturalist.org/observations/3761945>).

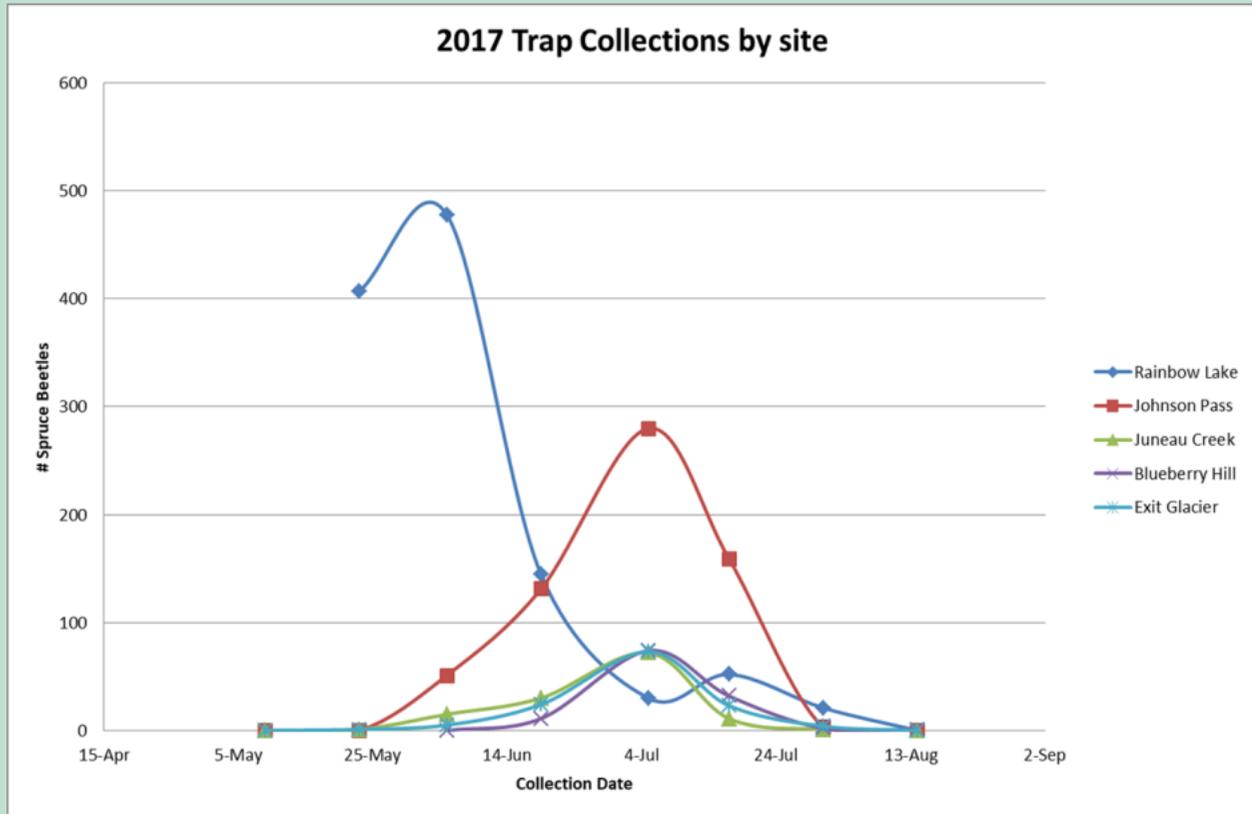
spruce beetle trap
catches
2015



spruce beetle trap catches 2016

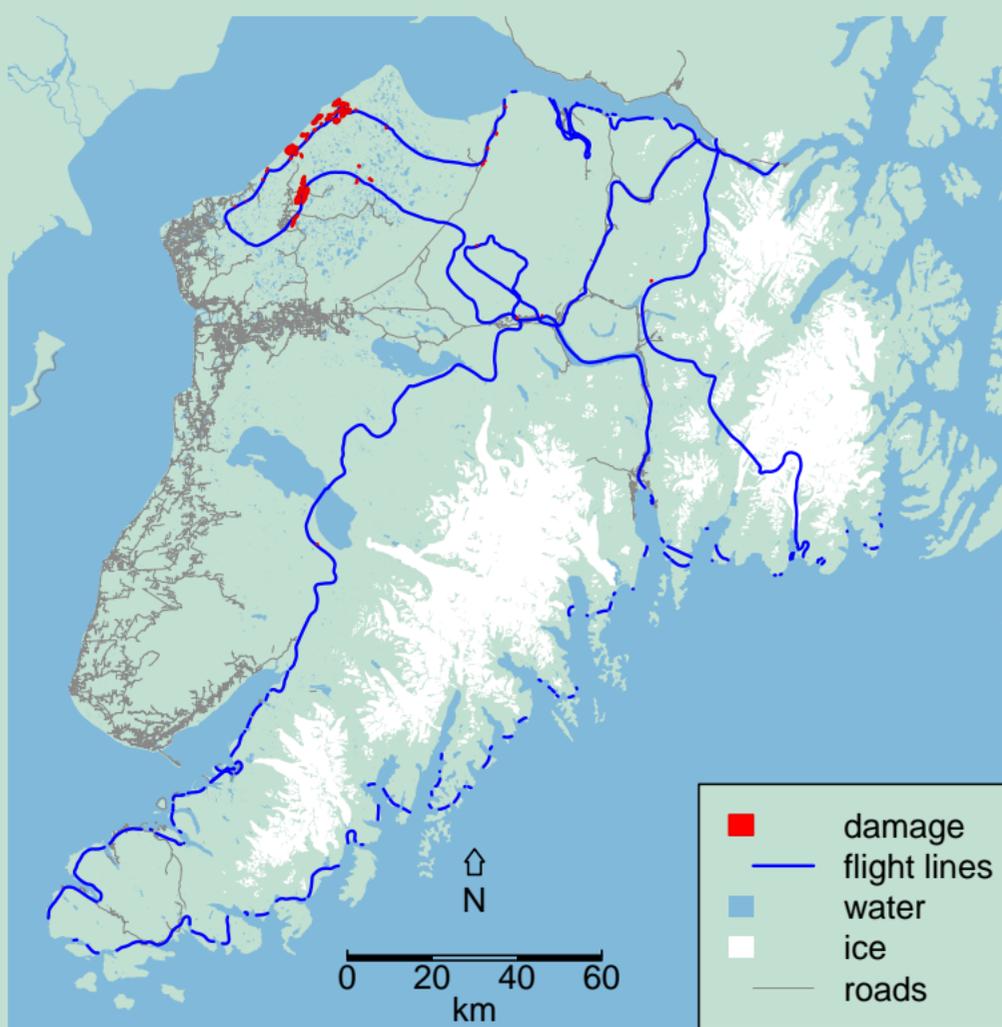


spruce beetle trap catches 2017



Forest Insect Events 2015-2017

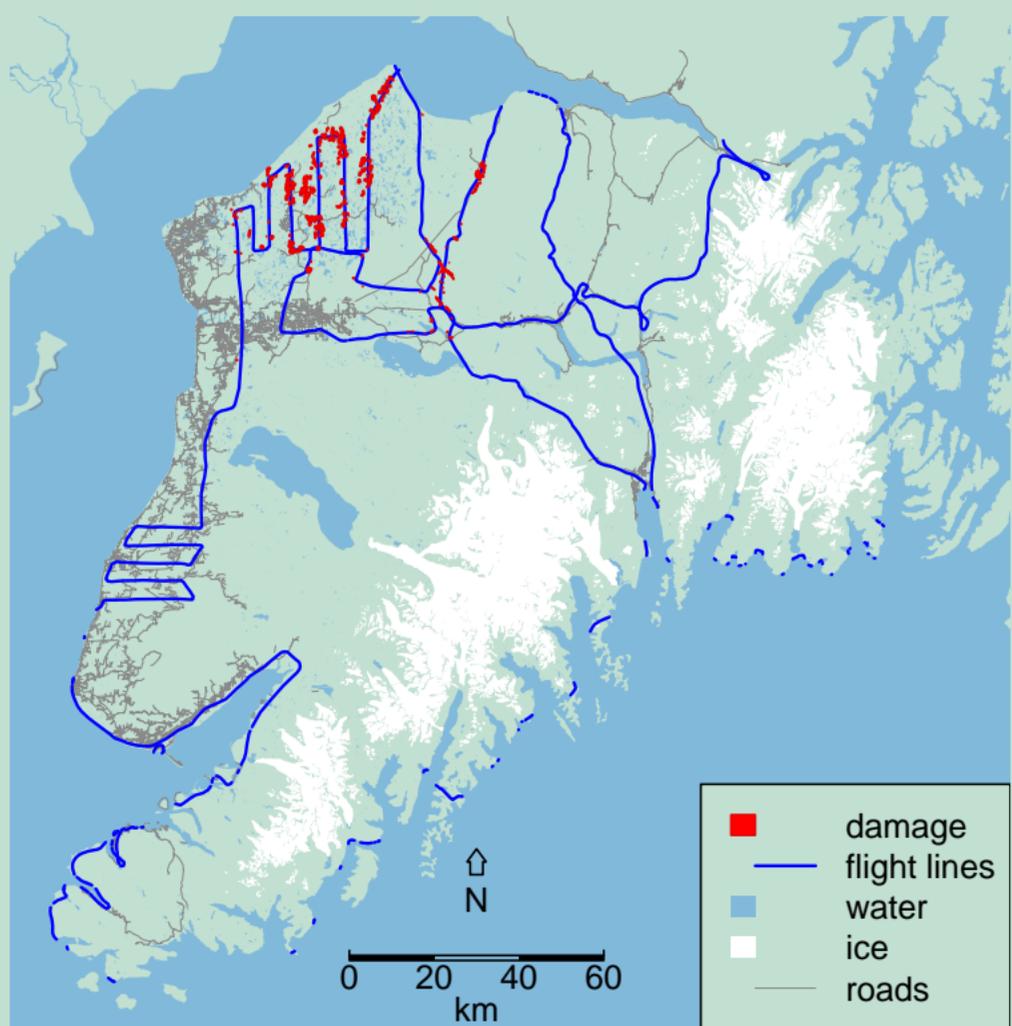
7,200 acres affected by spruce bark beetle in 2015



Forest Insect Events 2015-2017

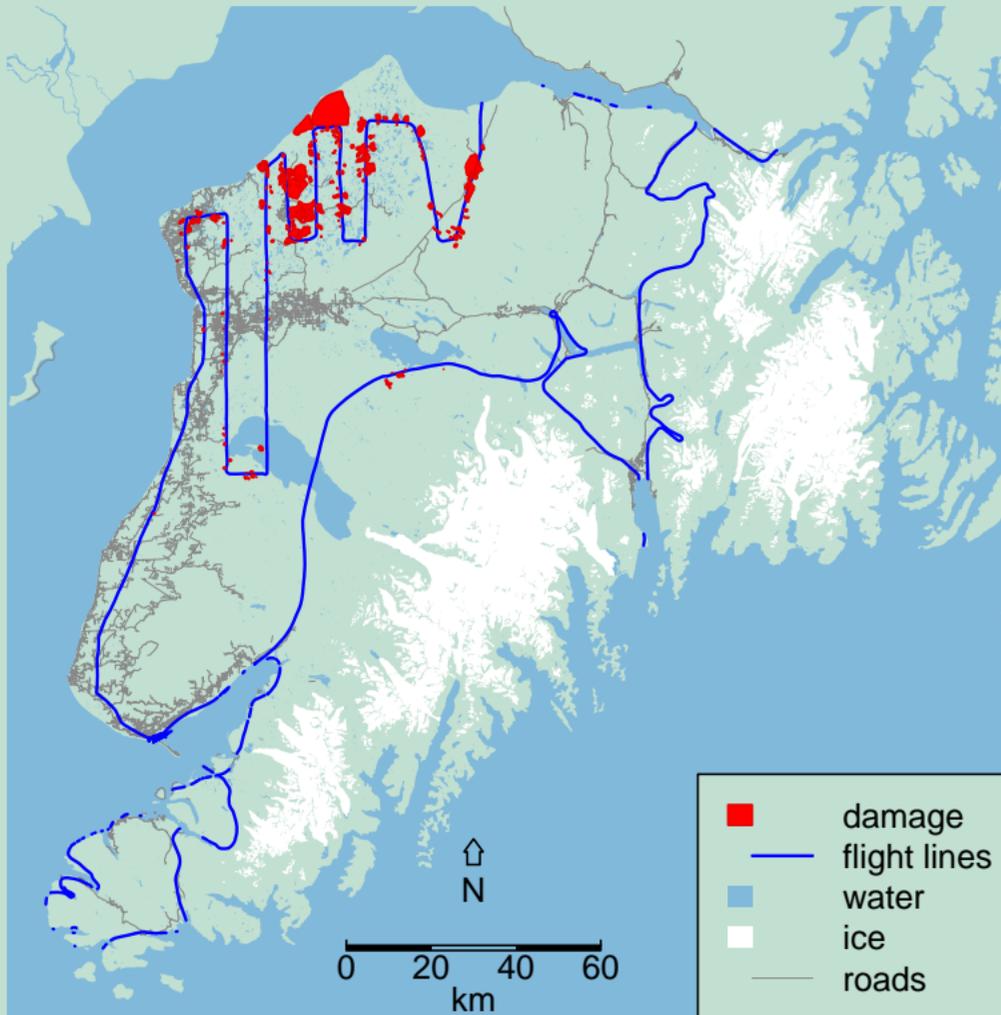
16,200 acres affected by
spruce bark beetle in
2016

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Forest Insect Events 2015-2017

50,200 acres affected
by spruce bark beetle in
2017

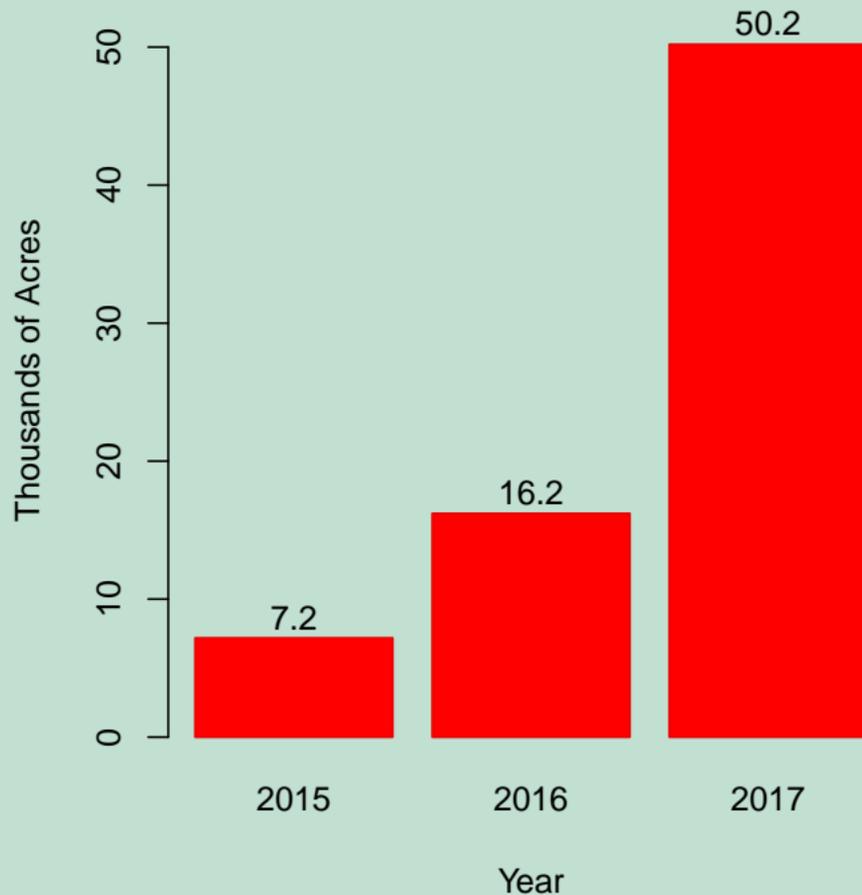


Forest Insect Events 2015-2017

- Historically, cool phase PDO preceded spruce bark beetle outbreaks [4]
- Possibility of outbreak had been predicted in 2015 due to warming summers [5]
- Cooler summer of 2017 may slow outbreak, but...

Kenai Peninsula Spruce Bark Beetle Damage

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Forest Insect Events 2015-2017

- At least some trees hit by spruce bark beetles recently have yet to show red needles.



Forest Insect Events 2015-2017

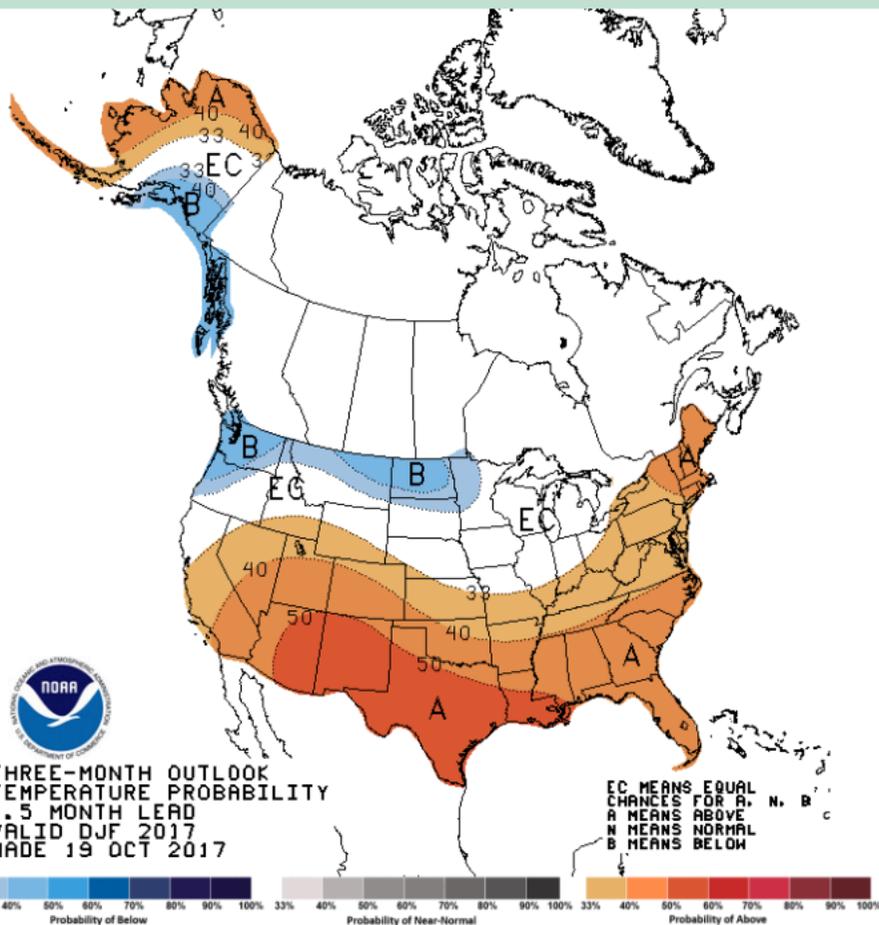
- There is overlap in the 1989–2000s outbreak and the current outbreak, at least on the northern Kenai Peninsula.



Image from [6]

Climate: Near Future

- Winter 2017–2018 temperatures predicted to be colder than average.



Climate: Near Future

- Late spring through early summer 2018 predicted to be warmer than average.

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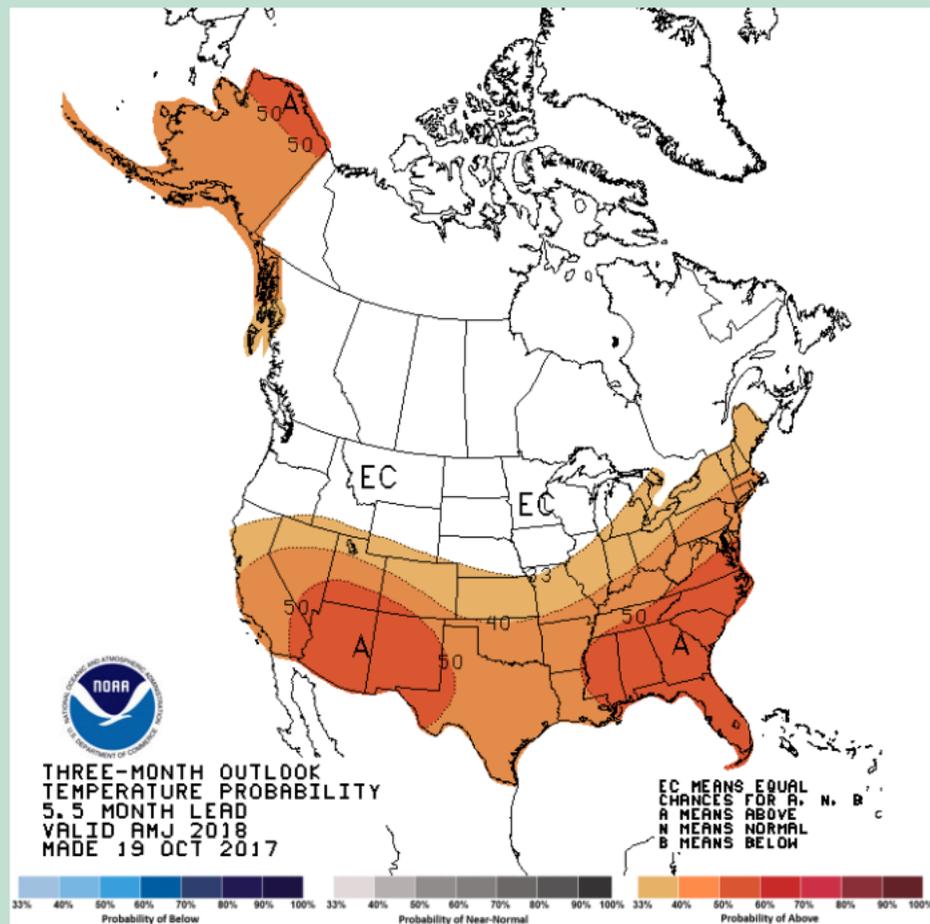
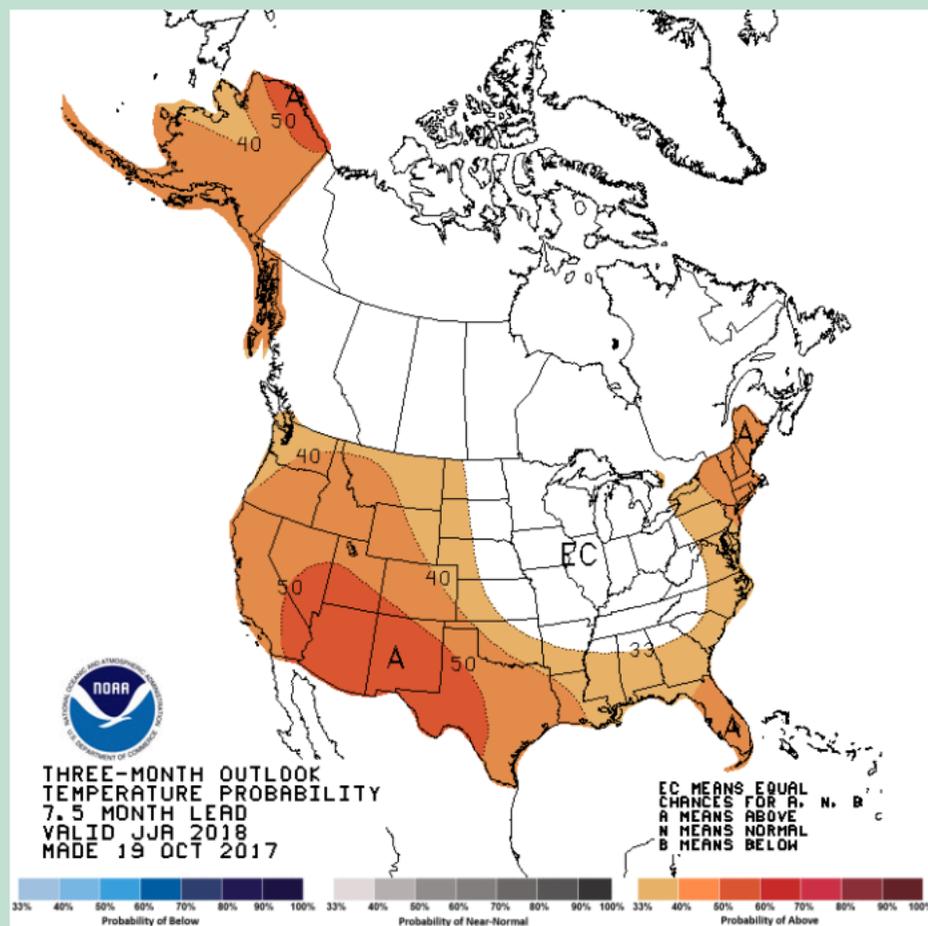


Image from http://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Climate: Near Future

- Summer 2018 predicted to be warmer than average.



Forest Pest Outlook

- Spruce aphid should not cause conspicuous damage on the Kenai Peninsula in 2018.
- Spruce bark beetle damage likely to continue.
- Over the long term, both of these species will be a part of forest dynamics on the Kenai Peninsula.



07/18/2015

Forest Pest Outlook

- Earthworms are beginning to change our forests [7].



Infestation of European nightcrawlers, Stormy Lake, Nikiski, fall 2016.

Forest Pest Outlook

- Additional tree species will become a part of Kenai Peninsula forests [8].



Bird cherries in a Kasilof wetland, June 9, 2017

(<https://www.inaturalist.org/observations/8543827>).

References

- [1] FS-R10-FHP. Forest Health Conditions in Alaska - 2015. Anchorage, Alaska: U.S. Forest Service, Alaska Region; 2016. R10-PR-038. Available from: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd491888.pdf.
- [2] FS-R10-FHP. Forest Health Conditions in Alaska - 2016. Anchorage, Alaska: U.S. Forest Service, Alaska Region; 2017. R10-PR-39. Available from: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd533099.pdf.
- [3] Powell W, Parry WH. Effects of temperature on overwintering populations of the green spruce aphid *Elatobium abietinum*. *Annals of Applied Biology*. 1976;82(2):209–219. doi:10.1111/j.1744-7348.1976.tb00555.x.
- [4] Sherriff RL, Berg EE, Miller AE. Climate variability and spruce beetle (*Dendroctonus rufipennis*) outbreaks in south-central and southwest Alaska. *Ecology*. 2011;92(7):1459–1470. doi:10.1890/10-1118.1.
- [5] Berg E. Warm summers prepare for spruce bark beetle return. In: *Refuge Notebook*. vol. 17. Soldotna, Alaska: USFWS Kenai National Wildlife Refuge; 2015. p. 75–76. Available from: http://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kenai/Sections/What_We_Do/In_The_Community/Refuge_Notebooks/2015_Articles/Refuge_Notebook_v17_n37.pdf.
- [6] Weed AS, Ayres MP, Hicke JA. Consequences of climate change for biotic disturbances in North American forests. *Ecological Monographs*. 2013;83(4):441–470. doi:10.1890/13-0160.1.
- [7] Bowser M. Yes, earthworms are changing the Kenai. In: *Refuge Notebook*. vol. 18. Soldotna, Alaska: USFWS Kenai National Wildlife Refuge; 2016. p. 83–85. Available from: https://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kenai/Sections/What_We_Do/In_The_Community/Refuge_Notebooks/2016_Articles/Refuge_Notebook_v18_n42.pdf.
- [8] Bowser M. Bird cherries on the Kenai: a preview. In: *Refuge Notebook*. vol. 17. Soldotna, Alaska: USFWS Kenai National Wildlife Refuge; 2015. p. 58–59. Available from: http://www.fws.gov/uploadedFiles/Region_7/NWRS/Zone_2/Kenai/Sections/What_We_Do/In_The_Community/Refuge_Notebooks/2015_Articles/Refuge_Notebook_v17_n28.pdf.