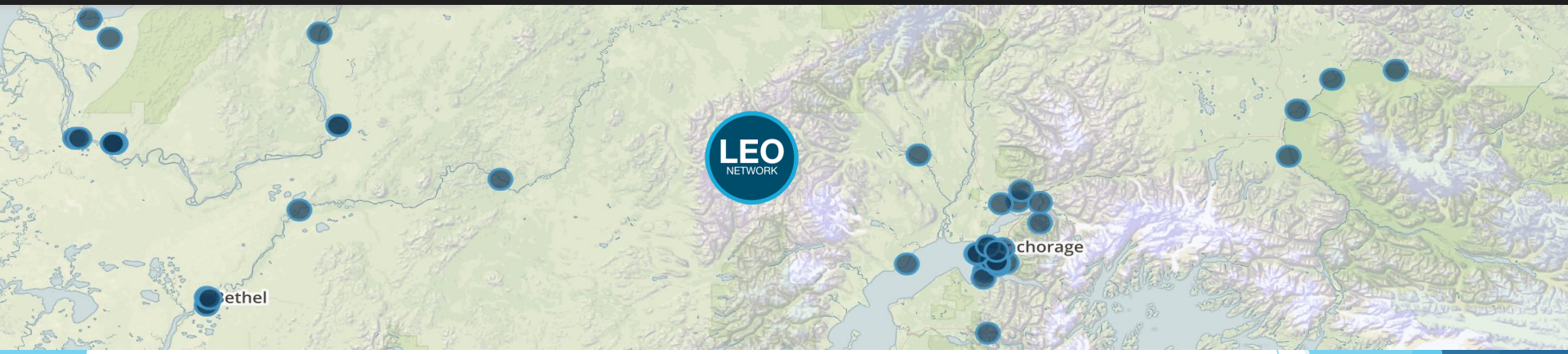

Understanding The Risk of Ticks and Tick-Borne Diseases in Alaska

Local Environmental Observer (LEO) Webinar - 16 April 2019

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Project Team

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  - Gale Disler, UAA, MPH Candidate
  - William George, UAA, MS Biological Sciences Candidate
- Frank Witmer, Ph.D., M.A. – UAA, College of Engineering and Computer Science + student team!
- Bob Gerlach, DVM – Office of the State Veterinarian
- Kimberlee Beckman, DVM – Alaska Department of Fish and Game
- Molly Murphy, DVM, Ph.D. – UAF, Department of Veterinary Medicine

Why do we care about ticks?

Tick-borne diseases

Rocky Mountain spotted fever is classically characterized by an multiple spots around the location of the tick bite.

Tularemia is characterized by an 'orange' appearance around the location of the tick bite.

Lyme disease is classically characterized by a 'bull's-eye' type rash.

From "Name that Disease #22", Musing of a Biologist and Dog Lover, 2012. (http://musingsofabiologistanddoglover.blogspot.com/2012/05/name-that-disease-22.html) in the public domain

Dermacentor albipictus (Winter tick or Moose tick)

From "Tick Species of Maine", The University of Maine, n.d. (https://extension.umaine.edu/ipm/tickid/maine-tick-species/winter-tick-or-moose-tick/) In the public domain.

Adult Female

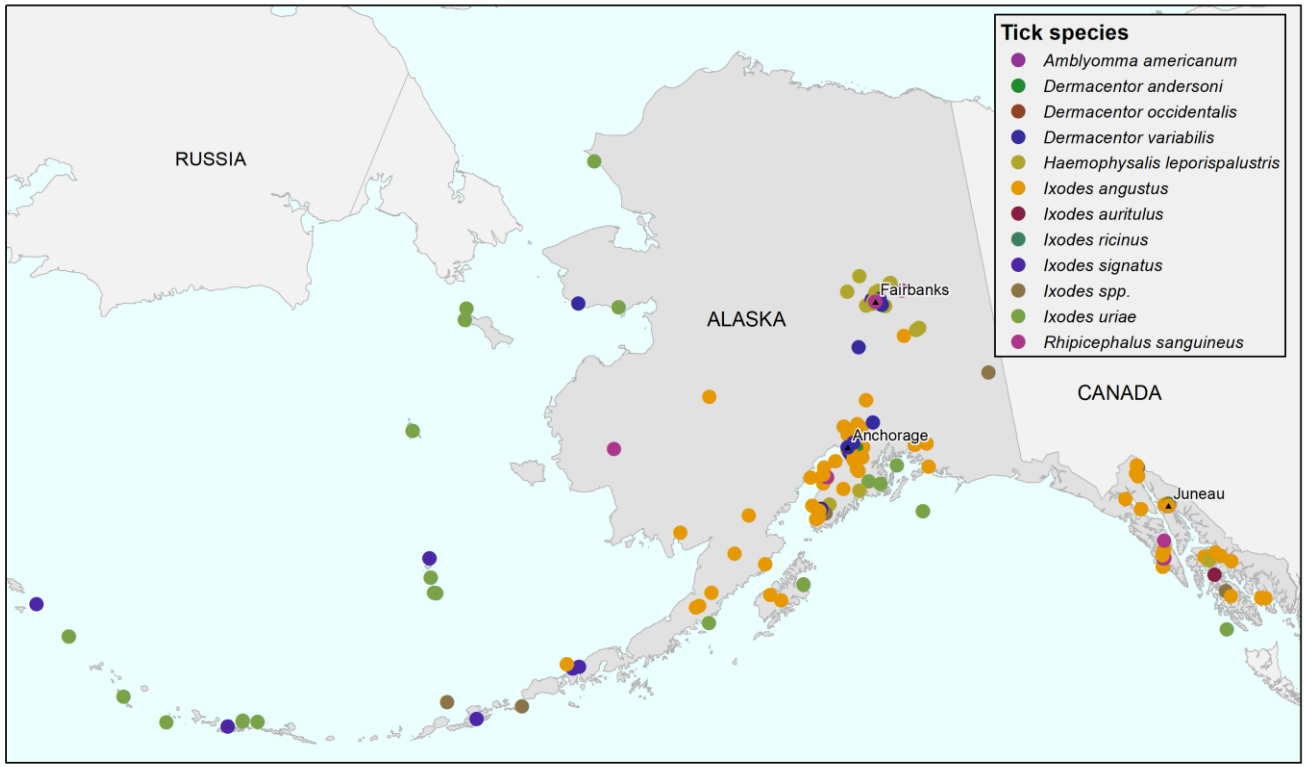
Adult Male

6 Native tick species in Alaska

- *Haemaphysalis leporispalustris* (Hare/Rabbit Tick) - Lagomorphs
- *Ixodes angustus* (Squirrel/Vole Tick) - Small/medium-sized mammals
- *Ixodes auritulus* and *I. howelli* - Birds
- *Ixodes signatus* and *I. uriae* - Seabirds

The prevalence and medical importance of native tick species in Alaska is not well understood.

Where have ticks been reported in Alaska?



Sources: Arctos historical database from early 1900s;
ADFG and OSV since 2010

Non-Native Ticks in Alaska

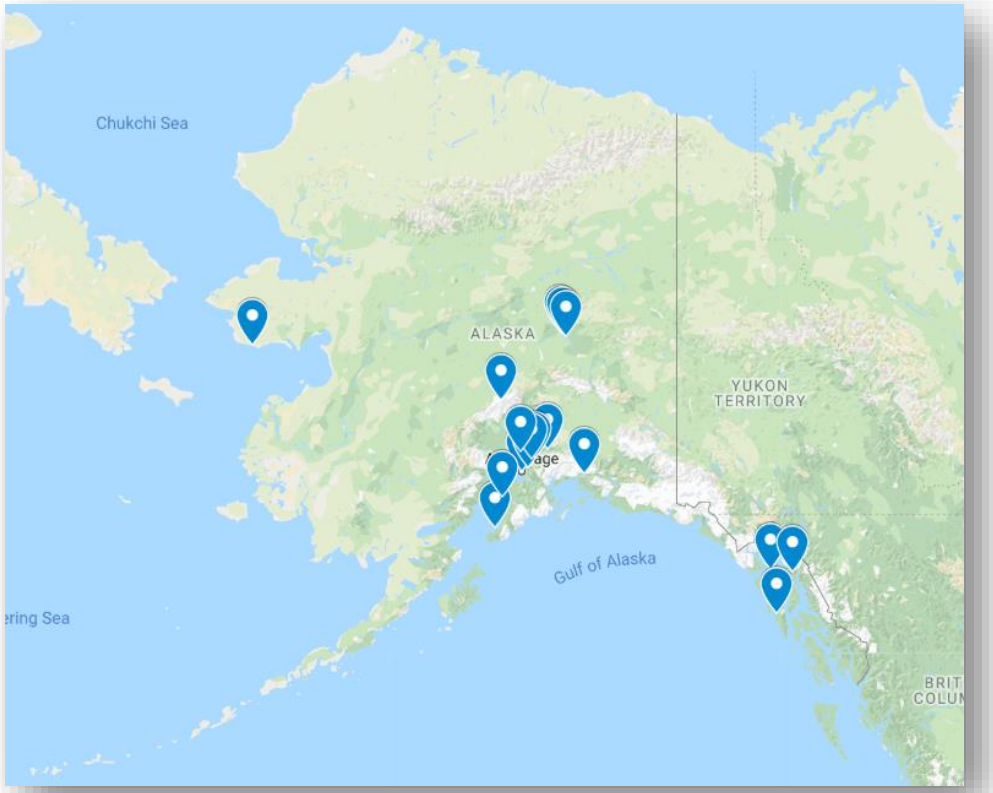
2010-2016 Tick Surveillance (Durden et al., 2016)

8 Non-native tick species identified in Alaska

- *Dermacentor variabilis* (American Dog tick)
- *Rhipicephalus sanguineus* (Brown Dog tick)
- *Dermacentor andersoni (*Rocky Mountain wood tick)
- *Amblyomma americanum* (Lone Star tick)
- *Ixodes scapularis* (Black-legged tick)
- *Ixodes pacificus (*Western black-legged tick)
- *Ixodes ricinus* (Sheep/deer tick)
- *Ixodes texanus*

Hosts of **American dog ticks** had **no** travel history outside of the state.

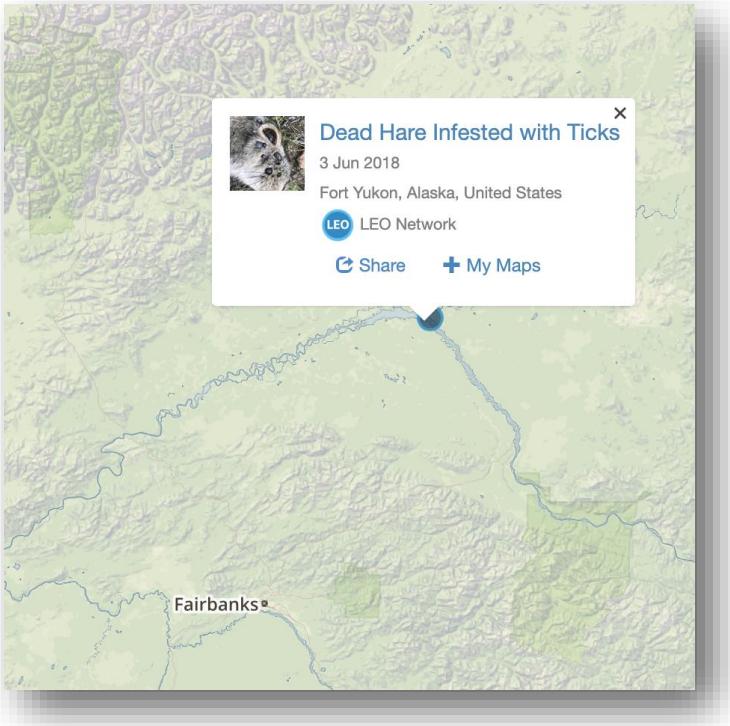
Where have non-native ticks been reported in Alaska?



2010-2018 passive surveillance

Many of these ticks are associated with recent travel outside of Alaska.

Important to observe and report



- Most tick observations are from individuals that submit them.
- How to get involved:
  - Alaska Submit-A-Tick

2010-2016 Tick Surveillance (Durden et al., 2016)

Potential for establishment of non-native ticks – some with significant medical and veterinary importance

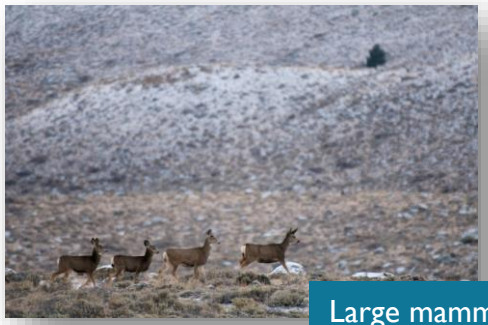
There hasn't been:

- environmental tick sampling
- pathogen testing
- no centralized tick surveillance system

Potential sources of non-native tick importation

Bird migration

Mammal movement



Large mammal

Small mammal

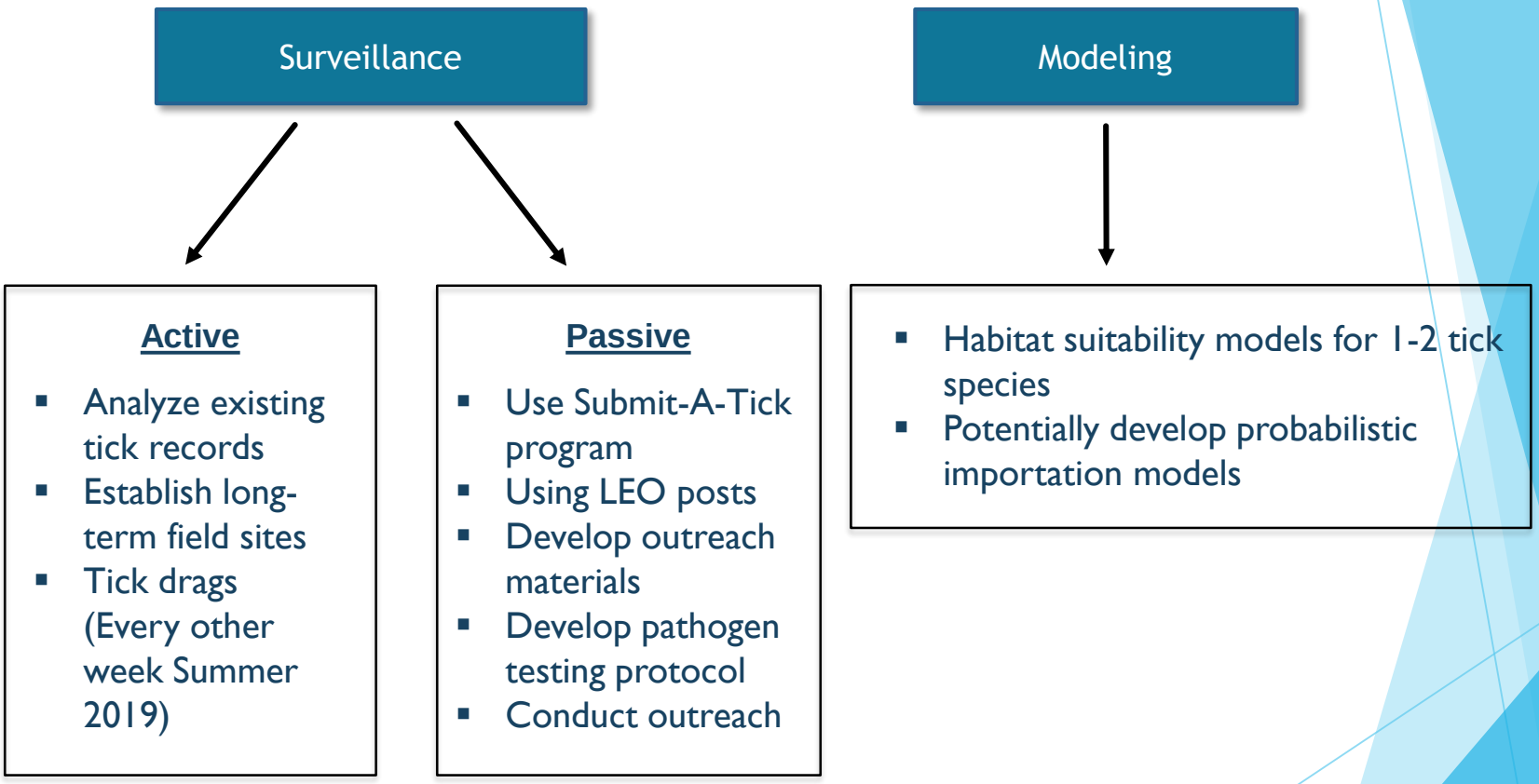
Changing distribution of ticks in Alaska

A projected decline of below freezing frost days

Shorter and warmer winters would be conducive to several tick species

To understand tick-borne disease emergence in Alaska in order to:

- Better estimate human and wildlife health risk
- Develop vector and pathogen control measures
- Provide current risk information to medical and veterinary professionals


Surveillance
Modeling
Active
Analyze existing tick records
Establish long-term field sites
Tick drags (Every other week Summer 2019)
Passive
Use Submit-A-Tick program
Using LEO posts
Develop outreach materials
Develop pathogen testing protocol
Conduct outreach
Habitat suitability models for 1-2 tick species
Potentially develop probabilistic importation models

Surveillance

Active Surveillance

Sampling techniques // Tick dragging

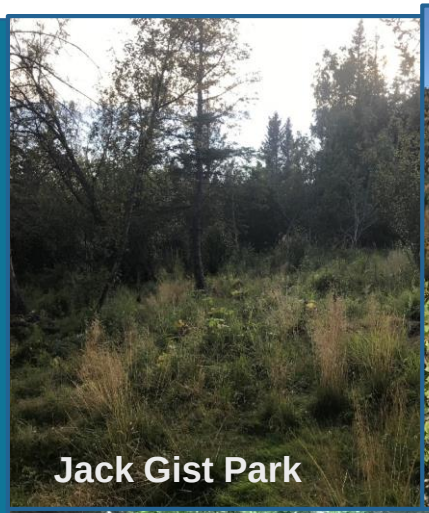
- Every two weeks between mid-May and July 2019
- 6-7 sampling sessions at each site
- Timed to overlap with tick seasonal activity

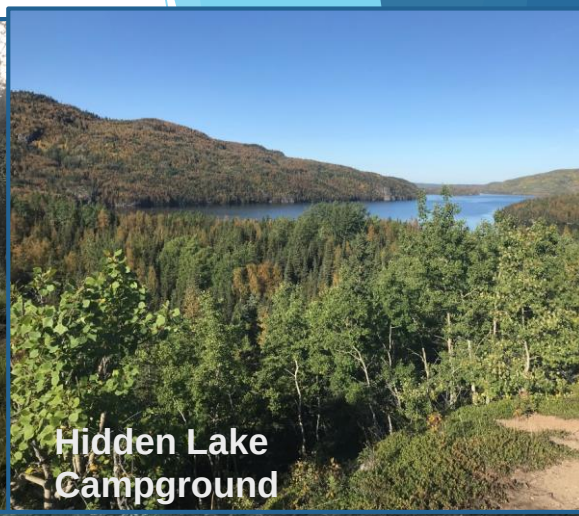
Field Site Locations

- Map ticks that have been previously submitted
- Public recreational locations
- Migratory bird sites
- Climatically diverse

Potential field sites

- Five recreational areas in Anchorage
- Centennial Park in Soldotna
- Hidden Lake Campground (Kenai Peninsula)
- Pratt Museum in Homer
- Kachemak Bay in Homer


Jack Gist Park


Hidden Lake Campground


Pratt Museum Trail

Passive Surveillance

- Development and implementation of the Alaska Submit-A-Tick program
- Outreach materials: Webpage, rack cards, biologists one-pagers
- Outreach to public, ADFG biologists, bird and mammal researchers, veterinarians
  - LEO, ADN, OSV newsletter, Facebook, Posters, Public talks…

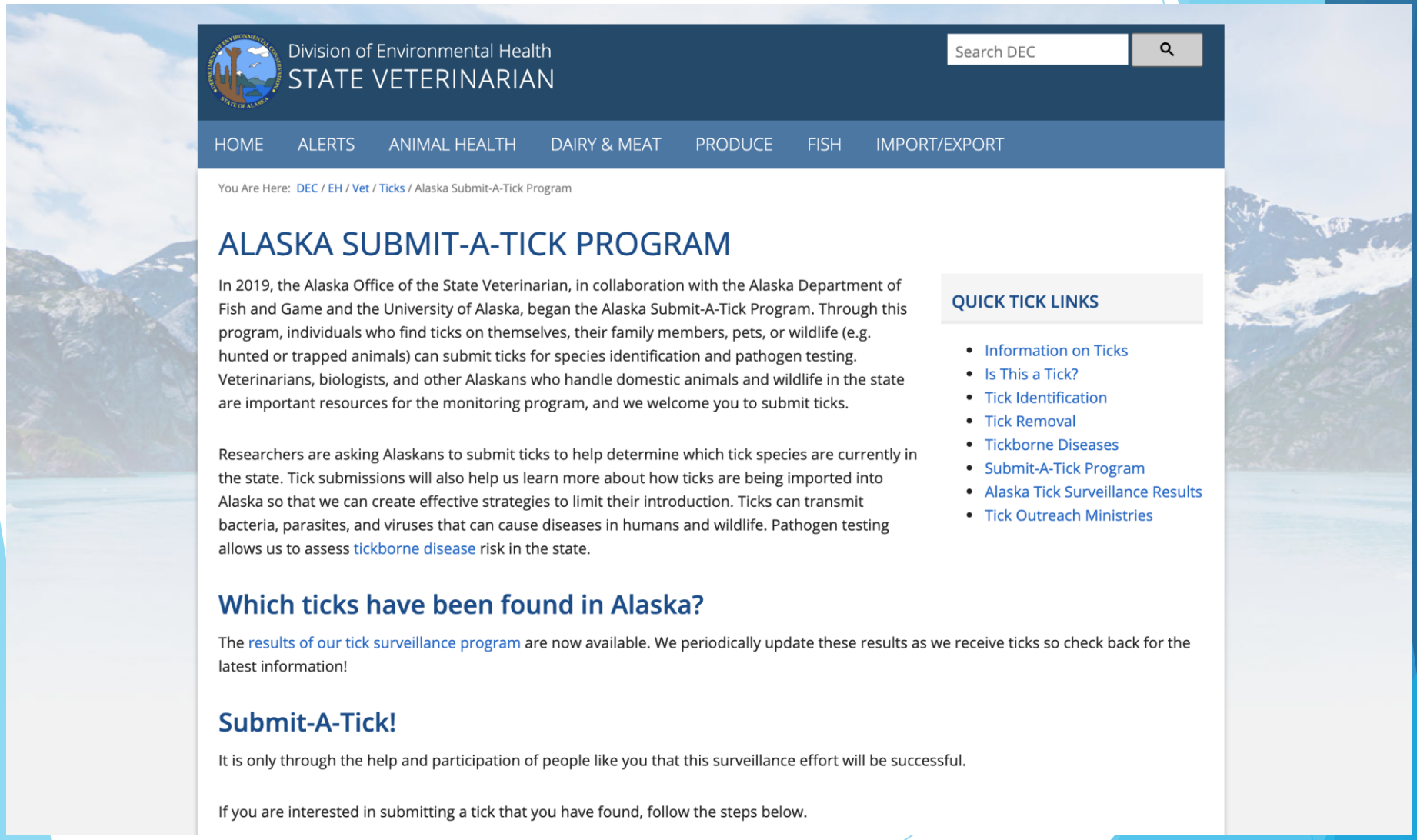
Alaska Submit-A-Tick

- The public may contribute to this project by submitting ticks found on themselves, their pets, or in their personal effects
- **Potential tick submission locations:** *Office of the State Veterinarian*, veterinarian, local ADFG office, local public health clinic
- Option for submitter to receive identification and testing results

Dermacentor andersoni

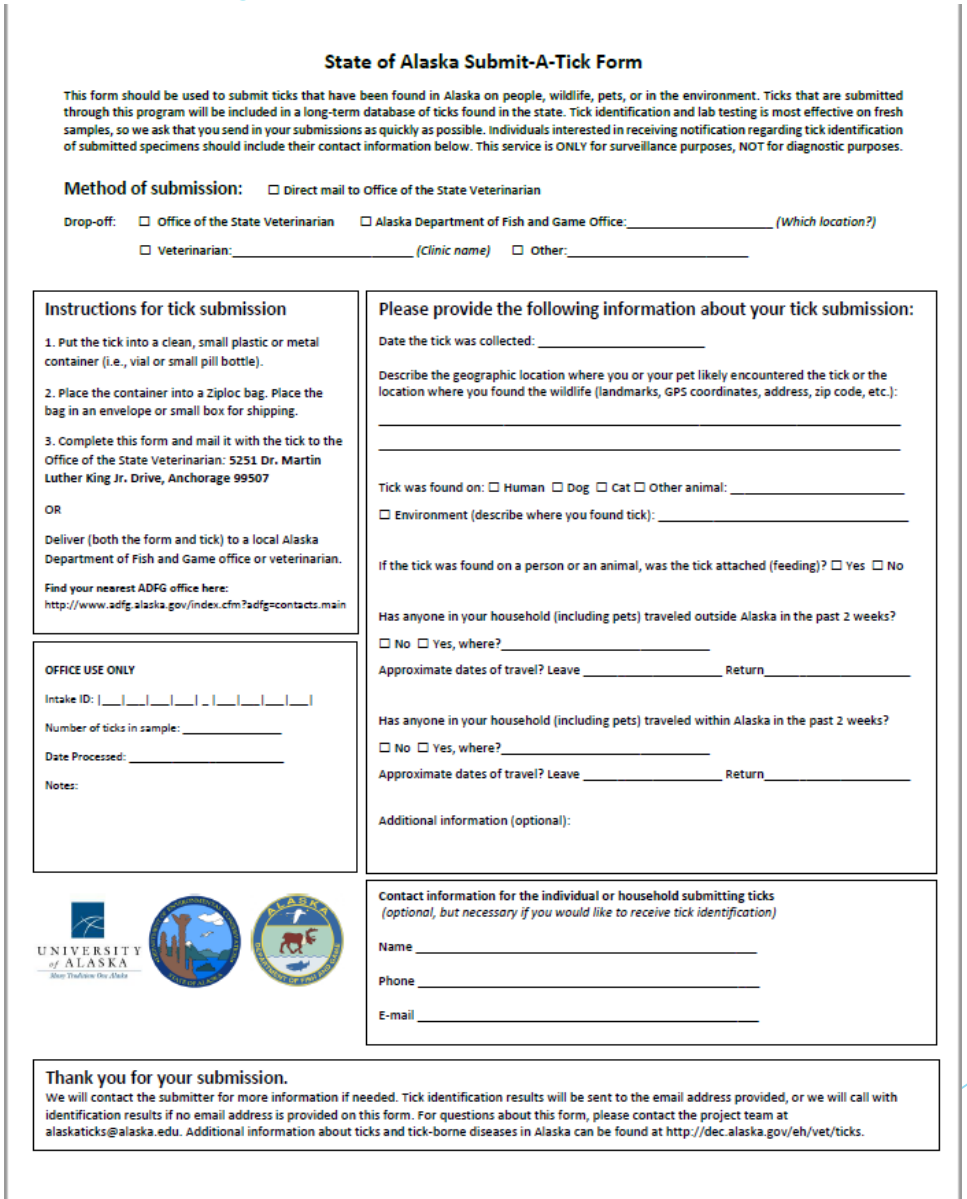
Alaska tick website

http://dec.alaska.gov/eh/vet/ticks



Alaska Submit-A-Tick Form

http://dec.alaska.gov/eh/vet/ticks/submit-a-tick/



State of Alaska Submit-A-Tick Form

This form should be used to submit ticks that have been found in Alaska on people, wildlife, pets, or in the environment. Ticks that are submitted through this program will be included in a long-term database of ticks found in the state. Tick identification and lab testing is most effective on fresh samples, so we ask that you send in your submissions as quickly as possible. Individuals interested in receiving notification regarding tick identification of submitted specimens should include their contact information below. This service is ONLY for surveillance purposes, NOT for diagnostic purposes.

Method of submission: ☐ Direct mail to Office of the State Veterinarian

Drop-off: ☐ Office of the State Veterinarian ☐ Alaska Department of Fish and Game Office:_____ *(Which location?)*

☐ Veterinarian:_____ *(Clinic name)* ☐ Other:_____

Instructions for tick submission

1. Put the tick into a clean, small plastic or metal container (i.e., vial or small pill bottle).
2. Place the container into a Ziploc bag. Place the bag in an envelope or small box for shipping.
3. Complete this form and mail it with the tick to the Office of the State Veterinarian: **5251 Dr. Martin Luther King Jr. Drive, Anchorage 99507**

OR

Deliver (both the form and tick) to a local Alaska Department of Fish and Game office or veterinarian.

Find your nearest ADFG office here:
http://www.adfg.alaska.gov/index.cfm?adfg=contacts.main

OFFICE USE ONLY

Intake ID: |___|___|___|___| _ |___|___|___|___|

Number of ticks in sample: _____

Date Processed: _____

Notes:

Please provide the following information about your tick submission:

Date the tick was collected: _____

Describe the geographic location where you or your pet likely encountered the tick or the location where you found the wildlife (landmarks, GPS coordinates, address, zip code, etc.):

_____

_____

Tick was found on: ☐ Human ☐ Dog ☐ Cat ☐ Other animal: _____

☐ Environment (describe where you found tick): _____

If the tick was found on a person or an animal, was the tick attached (feeding)? ☐ Yes ☐ No

Has anyone in your household (including pets) traveled outside Alaska in the past 2 weeks?

☐ No ☐ Yes, where?_____

Approximate dates of travel? Leave _____ Return_____

Has anyone in your household (including pets) traveled within Alaska in the past 2 weeks?

☐ No ☐ Yes, where?_____

Approximate dates of travel? Leave _____ Return_____

Additional information (optional):

UNIVERSITY of ALASKA

Contact information for the individual or household submitting ticks
(optional, but necessary if you would like to receive tick identification)

Name _____

Phone _____

E-mail _____

Thank you for your submission.
We will contact the submitter for more information if needed. Tick identification results will be sent to the email address provided, or we will call with identification results if no email address is provided on this form. For questions about this form, please contact the project team at alaskaticks@alaska.edu. Additional information about ticks and tick-borne diseases in Alaska can be found at http://dec.alaska.gov/eh/vet/ticks.

Materials for targeted outreach

Pet owners

General Public

General Public

SUBMITTING A TICK

1. Put the tick in a clean, small container (e.g. vial or small pill bottle).

2. Download and fill out the Submit-A-Tick form from *http://dec.alaska.gov/eh/vet/ticks*

3. Place the container and completed form in an envelope or small box for mailing.

4. Mail to the Office of the State Veterinarian:

5251 Dr. Martin Luther King Jr. Drive, Anchorage, AK 99507

Or drop off tick and submission form at your local ADFG office

How else can you contribute?

Local observations can help track environmental factors that influence tick and tick-borne pathogens. The Local Environmental Observer (LEO) Network is an organization of local observers and topic experts who share information about unusual animal, environment, and weather events. Participants can share observations and raise awareness about environmental changes.

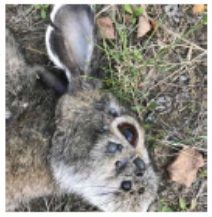
Ticks and their hosts are greatly influenced by climate and other drivers of change. Timely reporting of environmental events, such as spotting a mule deer in the Interior (which can host ticks) or a moose with hair loss, can help support ongoing research.

How to submit an observation to the LEO Network

- Go to leonetwork.org *or* download the LEO Reporter App (available for iPhone)
- Join the LEO Network and set up a personal profile
- Click the 'Submit Observation' button

Left photo: Dead hare infested with ticks found in Fort Yukon, Alaska

Right photo: Moose with hair loss, which could be a result of an infestation of ticks.



LEO Observations

Submitting tick observations and even non-tick observations can help out tremendously!

With observation submissions + pictures, professionals can respond accordingly

Calling all biologists!

Going out into the field? Want to help with active sampling?

When you submit ticks, we can learn what kinds of ticks are feeding on Alaskan wildlife and if they are carrying any pathogens.

Request a field kit today via uaa_alaskaticks@alaska.edu

Tick Collection Guide for Small and Large Mammal Biologists

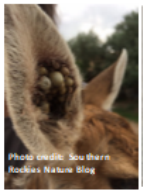
Ticks in Alaska can be found on small and large mammals, and birds. Small and large animal movement creates opportunities for tick and tick-borne pathogen dispersal. Moreover, wildlife can be reservoirs of tick-borne pathogens that cause disease in humans and animals. In Alaska, the arrival of the winter tick (*Dermacentor albipictus*) is a major concern. This tick multiplies rapidly on moose hosts, leading to substantial infestations that cause anemia and hair loss. The moose tick has been found in the Yukon on elk, moose, mule deer, and other wildlife. The migration of mule deer into the Interior of Alaska from Canada may bring moose tick into the state.

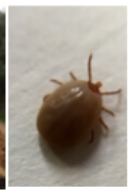
The Office of the State Veterinarian, Alaska Department of Fish & Game, and researchers at the University of Alaska are working together to understand the role of ticks and tick-borne pathogens in Alaska. The **Alaska Submit-A-Tick Program** collects tick submissions from the public, veterinarians, and wildlife biologists for species identification and pathogen testing. Tick submissions are included in a long-term database of ticks found in the state.

We recognize that tick collection is an additional task during a busy field season and appreciate your contribution to this surveillance effort. This guide was developed to assist with the collection and submission process of ticks found on mammals.

Screening small and large mammals for ticks

When searching for ticks on mammals, take extra care to look near the ear canals, nape, mandibular area, perimeter of the eyes, and feet of each animals. Ticks may be attached (i.e. feeding) or unattached. Attached ticks will likely be engorged and more visible than unattached ticks. Ticks go through three life stages (larva, nymph, and adult), and they look slightly different at each stage. Ticks are very small. Adult ticks are about the size of an apple seed, nymphs are about the size of a poppy seed, and larva are the size of a grain of sand. If you aren't sure if what you found is a tick, feel free to send it in, and we will identify it for you.





Tick removal and collection

1. Comb through the mammal's fur with your fingers to find ticks. Part fur so you can see the skin surface.

2. Using fine pointed tweezers, pluck off each tick. Gently grasp the tick as close to the skin's surface as possible, and pull upward with steady, even pressure. Do not twist or jerk the tick because this can cause the mouthparts to break off and remain in the skin.

3. Place dislodged ticks into a vial. Other clean, hard-sided containers can be used. Ziploc bags will work in a pinch, but it is easier for ticks to be crushed during transport.

Note that **multiple ticks** can be placed in the same vial (or container) if they are from the **same animal.** Please put ticks from different animals into different containers. If you are submitting multiple vials, be sure to number each vial and include the number on the submission form.

4. Fill out the *Alaska Submit-A-Tick form*. This form can be found below or at http://dec.alaska.gov/eh/vet/ticks. If you have ticks from more than one animal, record your contact information on the *Submit-A-Tick form* and then use the *Biologist Extension form* to record the information about tick submissions.

5. Send ticks and completed forms to the Office of the State Veterinarian: **5251 Dr. Martin Luther King Jr. Drive, Anchorage, AK 99507**

Thank you for your participation! Contact us at *alaskaticks@alaska.edu* to request sample vials, shipping materials, or if you have any questions.

The Winter tick has been found on wildlife in the Yukon. If you see a moose with hair loss, note the location, take a photo if possible, and immediately contact Dr. Kimberlee Beckmen (kimberlee.beckmen@alaska.gov) or ADF&G

LEO
NETWORK

AEHA
ALASKA ENVIRONMENTAL HEALTH ASSOCIATION

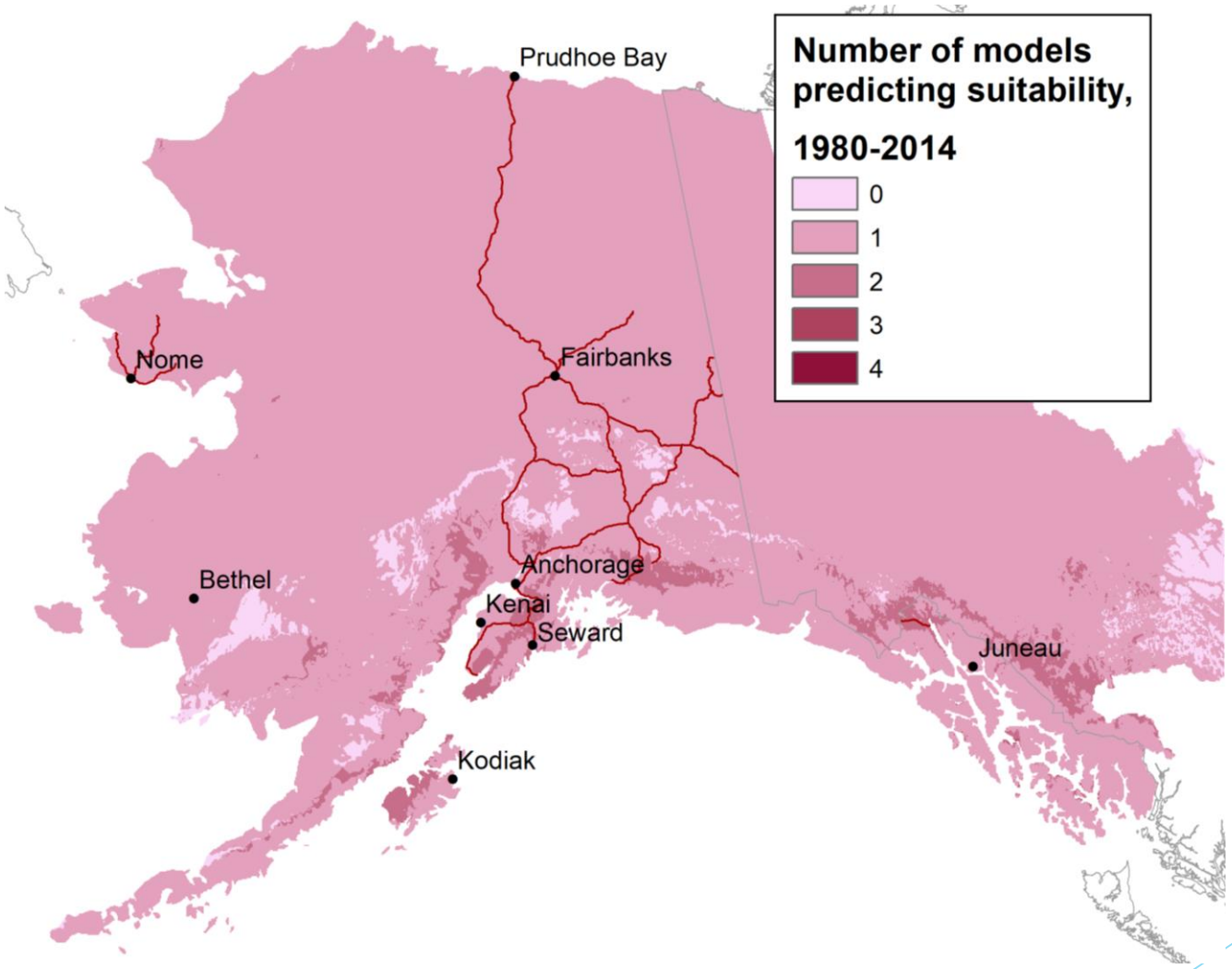
Alaska State Veterinary Medical Association

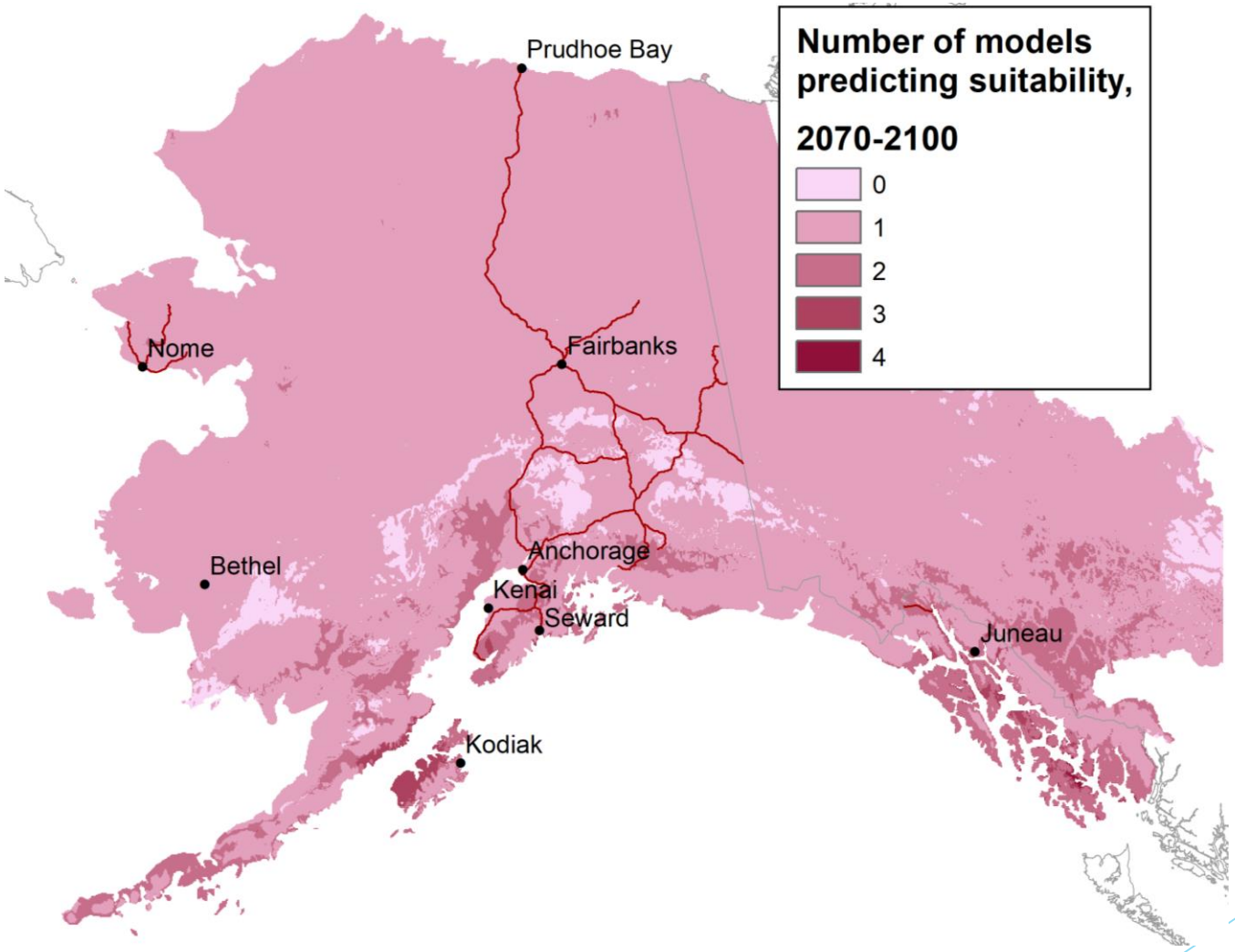
Modeling

Tick habitat suitability modeling

- Goal is to determine areas the can support medically important ticks, both under the current climate and in the future (shorter and warmer winters are conducive to several tick species)

- Focus on 2 species: *Ixodes pacificus* (western black-legged tick) and *Ixodes scapularis* (black-legged tick)


Number of models predicting suitability, 1980-2014
0
1
2
3
4
Prudhoe Bay
Nome
Fairbanks
Bethel
Anchorage
Kenai
Seward
Juneau
Kodiak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1
2
3
4
Prudhoe Bay
Nome
Fairbanks
Bethel
Anchorage
Kenai
Seward
Juneau
Kodiak

Key Implications

- What is the current risk of being exposed to a tick-borne disease in Alaska?
- Are non-native ticks establishing populations in Alaska?
- Are there non-native ticks in Alaska that will affect our wildlife populations?
- Where in the state should we target our tick surveillance efforts?
- When should I test patients for tick-borne diseases?
- *How effective are community monitoring programs for helping us detect emerging human and animal health threats?*

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