



UNDERSTANDING THE RISK OF TICKS AND TICK-BORNE DISEASES IN ALASKA

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Project Team

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Why do we care about ticks?



Photo courtesy: California Department of Public Health

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.



Dermacentor albipictus (Winter tick or Moose tick)



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

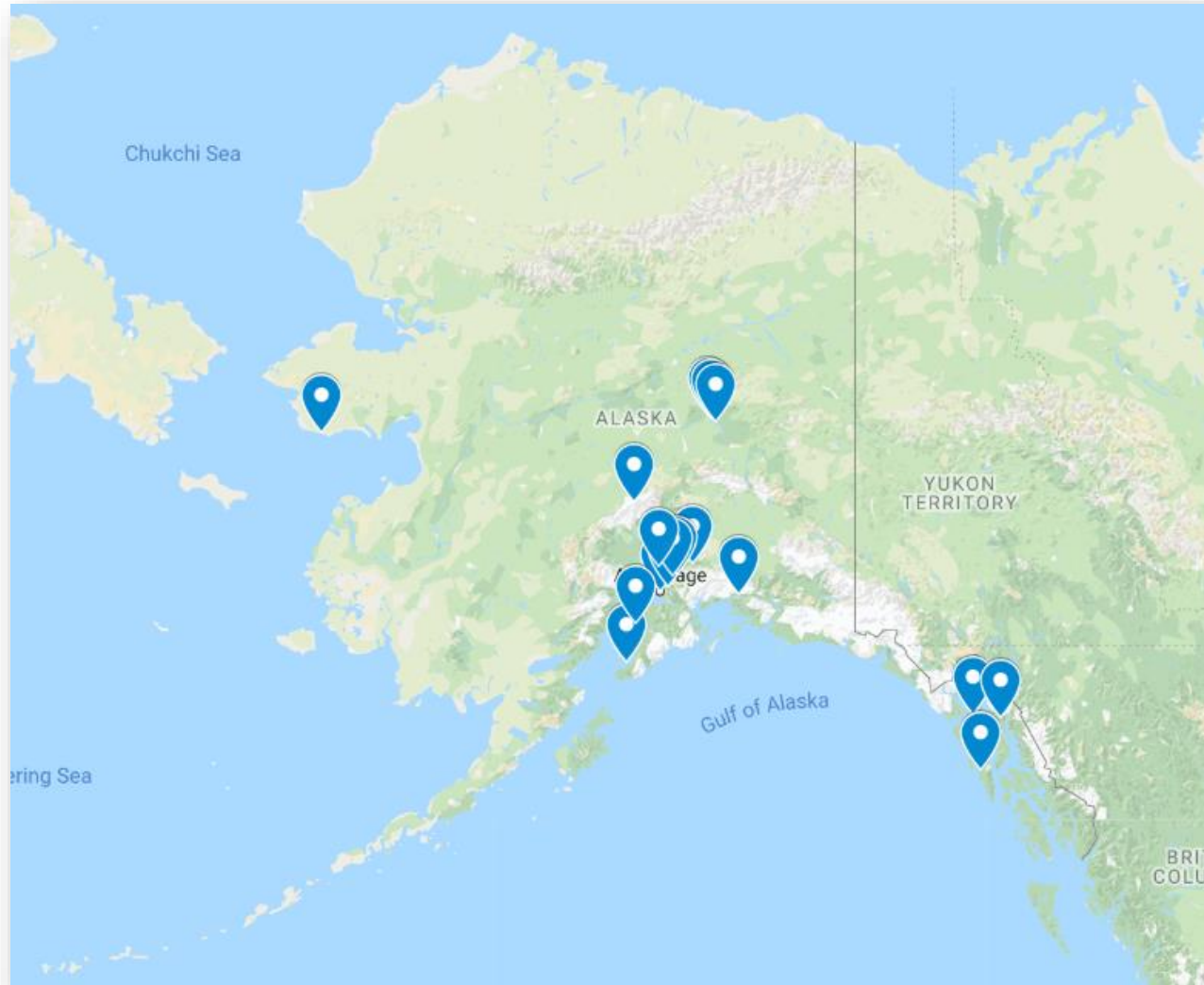
The prevalence and medical importance of native tick species in Alaska is not well understood.



Non-Native Ticks in Alaska

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

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.

6 Non-native tick species identified in Alaska

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

Hosts of
**American dog
ticks and
Rocky
Mountain
wood tick** had
no travel
history.



Non-Native Ticks in Alaska

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

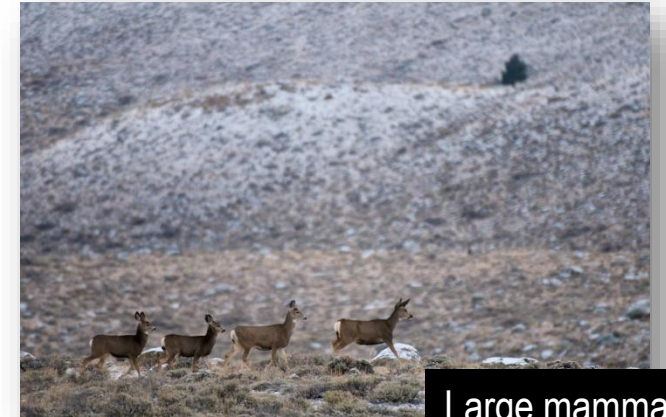
People and pet travel



Bird migration



Mammal movement



Large mammal



Small mammal

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



- better estimate human and wildlife health risk
- develop vector and pathogen control measures, and
- provide current risk information to medical and veterinary professionals.

Surveillance

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Active

- Analyze existing tick records
- Establish long-term field sites
- Tick drags (Every other week Summer 2019)

Passive

- Develop protocol for Submit-A-Tick program
- Develop website
- Develop outreach materials
- Develop pathogen testing protocol
- Conduct outreach

Modeling

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- Identify 1-2 tick species that are likely to be imported into Alaska
- Identify published habitat suitability models for tick species in climatic zones similar to Alaska
- Develop land use and climatic layers for the state
- Extrapolate coefficients from published tick habitat suitability models to Alaska
- Potentially develop probabilistic importation models

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


Passive surveillance

- Development of the Alaska Submit-A-Tick program
- Outreach to public, ADFG biologists, bird and mammal researchers, veterinarians
- Webpages, ADN, DHSS Press Release, Facebook, Posters, Public talks...






Materials for targeted outreach

NON-NATIVE TICK HUNT



SUBMIT A TICK
HUNTERS

Going hunting? Found a tick on an animal? Save it and submit it to ADFG!



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TOGETHER WE CAN DEFEAT NON-NATIVE TICKS IN ALASKA

CHECK YOUR PET FOR TICKS

TRAVELING OUT OF STATE WITH THE FAMILY PET? BE SURE TO CHECK THEM FOR TICKS BEFORE FLYING BACK.



VISIT YOUR LOCAL VETERINARY CLINIC FOR MORE INFORMATION OR GO TO
[HTTPS://TINYURL.COM/ADFG-TICKS-ALASKA](https://tinyurl.com/adfg-ticks-alaska)

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• TICKING TIME BOMB •

TICKS IN ALASKA



NATIVE TICKS

Many Alaskan residents don't know that Alaska is home to one native tick species. This tick generally preys on squirrels and hares.



NON-NATIVE TICKS

Although there is a native tick species, some non-native species have been found in Alaska, which could be problematic to the environment.



MIGRATORY BIRDS

Birds that migrate have a high chance of picking up ticks in different areas around the world and dropping them off in Alaska.



PET CHECK

When traveling, it's important to check your pet for ticks before returning to Alaska. You can even ask your vet to check your pet, when you return!



MORE INFORMATION

For more information on non-native tick species in Alaska, go to: <https://tinyurl.com/adfg-ticks-alaska>.



PROTECT NATURE

Together we can protect the environment and wildlife in Alaska by tracking non-native tick species that may be trying to establish a presence.

Hunters

Pet owners

General public

Sampling, Distribution, and Dispersal

Modeling the Geographic Distribution of *Ixodes scapularis* and *Ixodes pacificus* (Acari: Ixodidae) in the Contiguous United States

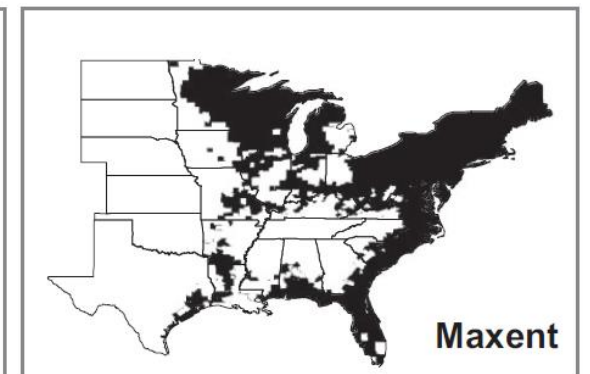
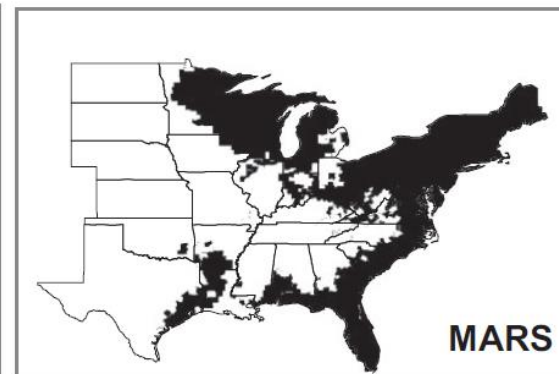
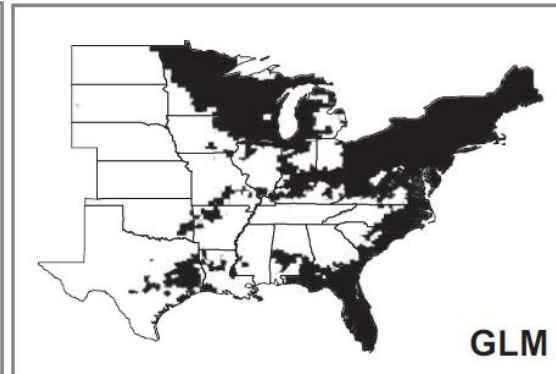
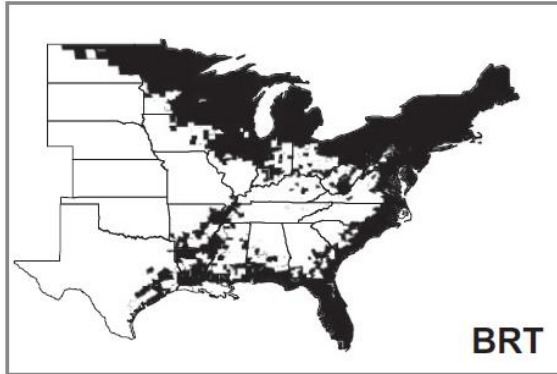
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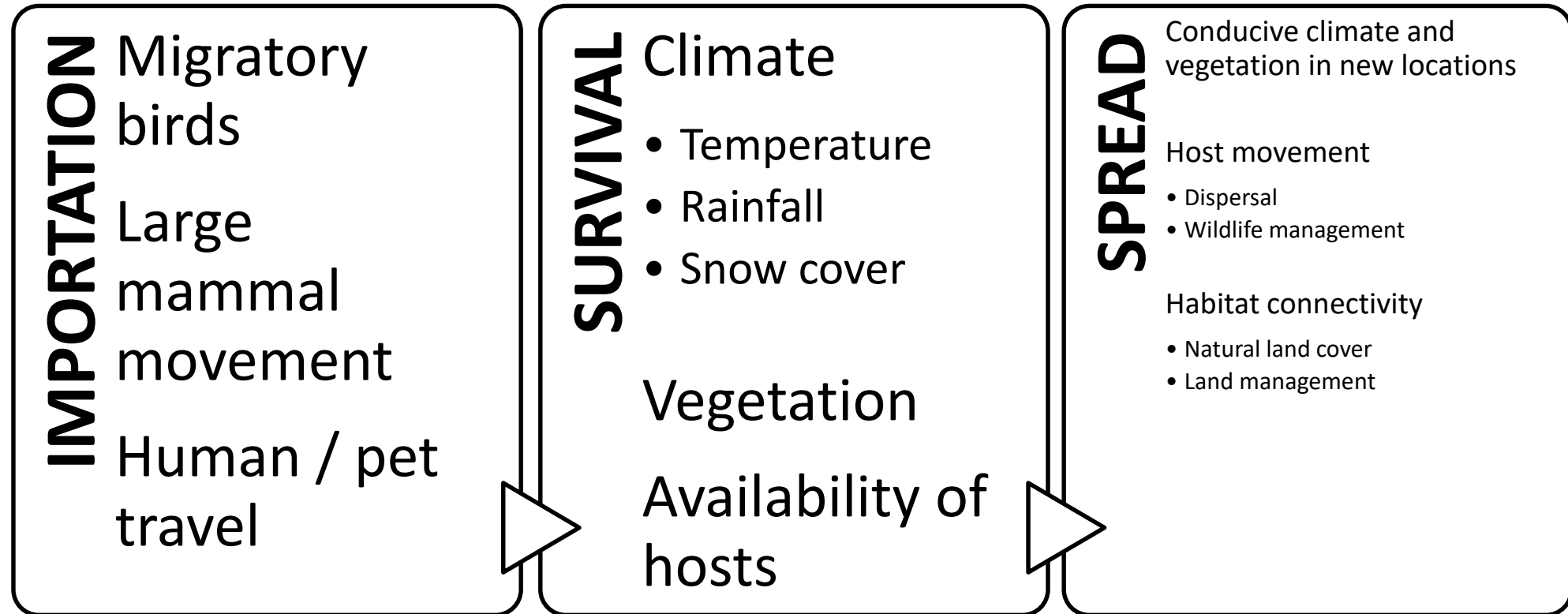
It is *assumed* that there are no medically-important ticks in Alaska, and as a result, Alaska has been *excluded* from previous habitat modeling.

Tick habitat suitability modeling

- Identify 1-2 tick species that are likely to be imported into Alaska
- Identify published habitat suitability models for tick species
- Develop land use and climatic layers for the state
- Extrapolate coefficients from published tick habitat suitability models to Alaska



Probabilistic tick importation modeling



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?



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Ticks in Alaska

Milder winters

**A projected decline of
below freezing frost days**

**Shorter and warmer
winters would be conducive
to several tick species**



Field site selection

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

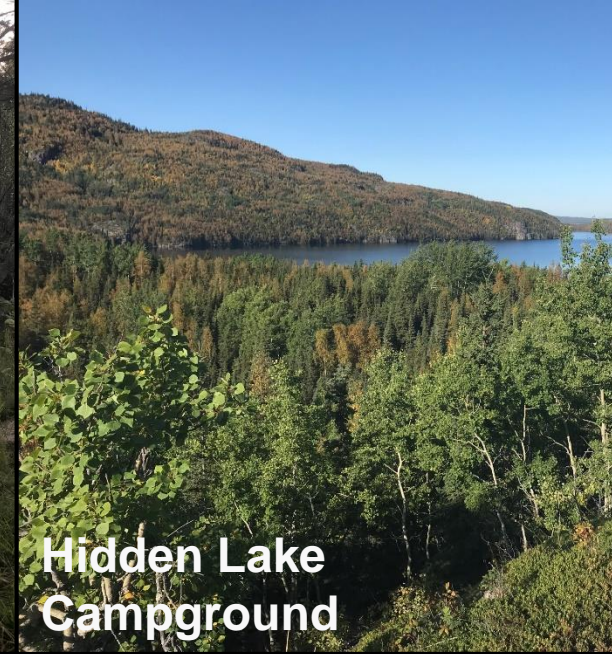


Potential field sites

- Five recreational areas in Anchorage
- Centennial Park in Soldotna
- Creamer's Field in Fairbanks
- Copper River Delta in Cordova
- Kachemak Bay in Homer



Jack Gist Park



Hidden Lake
Campground



Pratt Museum Trail

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 testing results



Dermacentor andersoni



Tick identification and pathogen testing

Alaska Office of the
State Veterinarian



L. Durden at Georgia
Southern University
for species
identification



University of Alaska-
Fairbanks for
pathogen testing by
M. Murphy