Selection of Day-Roost Habitat by Flammulated Owls

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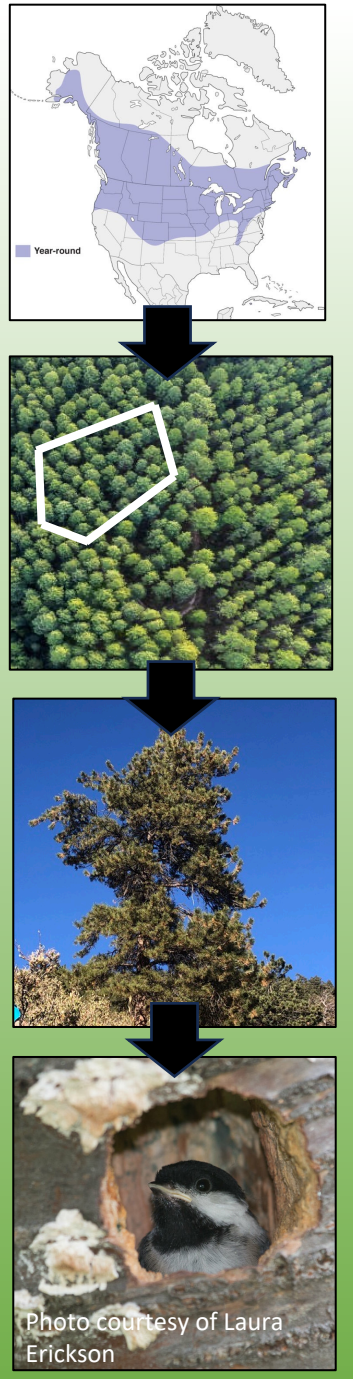
Habitat Selection

- **Selection of habitats that maximize fitness**

- Spatial Scales
  - First-order: Geographic range
  - Second-order: Home range
  - Third-order: Microhabitats for specific activities
  - Fourth-order: Specific resource item

- Patterns vary depending on scale

- Guide habitat management strategies
  - Sensitive Species



Flammulated Owls (*Psiloscops flammeolus)*

- Small, migratory, insectivorous raptor
  - Breeds in Western North America
- Old-growth Ponderosa Pine (*Pinus ponderosa)* forests
  - Frequent low-intensity fires -> Frequent high-intensity fires
- Nesting and Hunting habitat selection well-documented

Photo Courtesy of Isabel DeVito

Day-Roost Selection

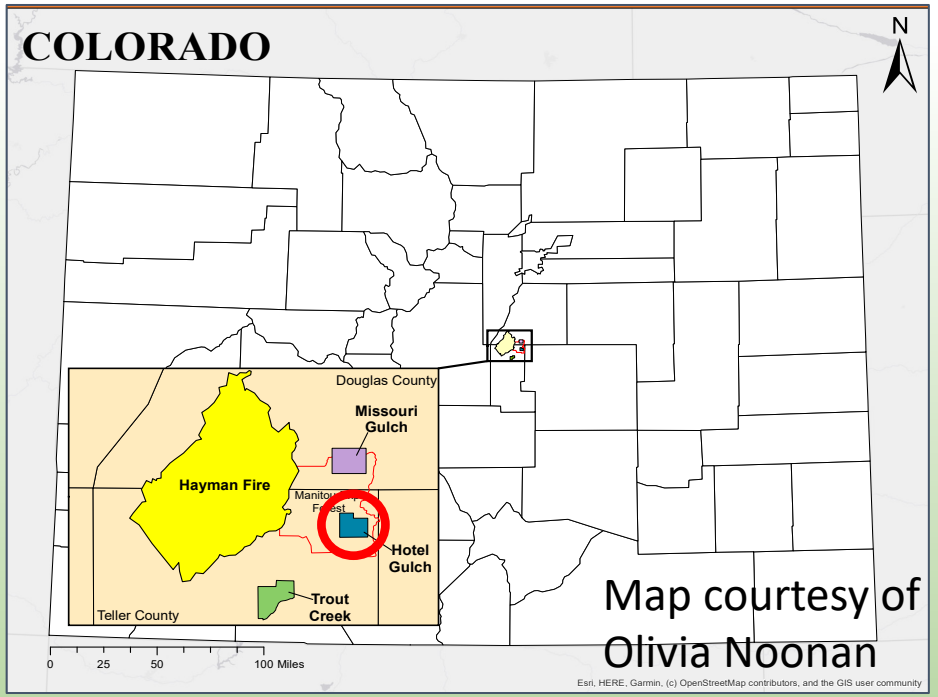
- Third-order habitat selection
- Sleeping location
- Reduce metabolic costs
  - Stable thermal environment
  - Shields against wind and precipitation
- Reduce Predation
  - Camouflage
  - Hides animal from view
- Impacts of old-growth forest loss

Research Questions and Hypotheses

- What characteristics do flammulated owls look for when selecting day-roosts?
- Are characteristics of old-growth forests as important for day-roost habitat as they are for nesting and hunting habitat?
- Stand Scale
    - Old stands, Ponderosa Pine/Douglas Fir, Dense trees
- Tree Scale
    - Large DBH, Ponderosa Pine/Douglas Fir, Large crown volume
- Perch Scale

Study Area

- Manitou Experimental Forest
  - Hotel Gulch Study Area
- July and October 2023



Map courtesy of Olivia Noonan

Radio Telemetry

- Radio transmitter backpacks
  - Signal picked up by antenna
  - 3 units: 2 grams each
- Tracked between July 6th 2023 and July 24th 2023

Photo Courtesy
of Isabel DeVito

Data

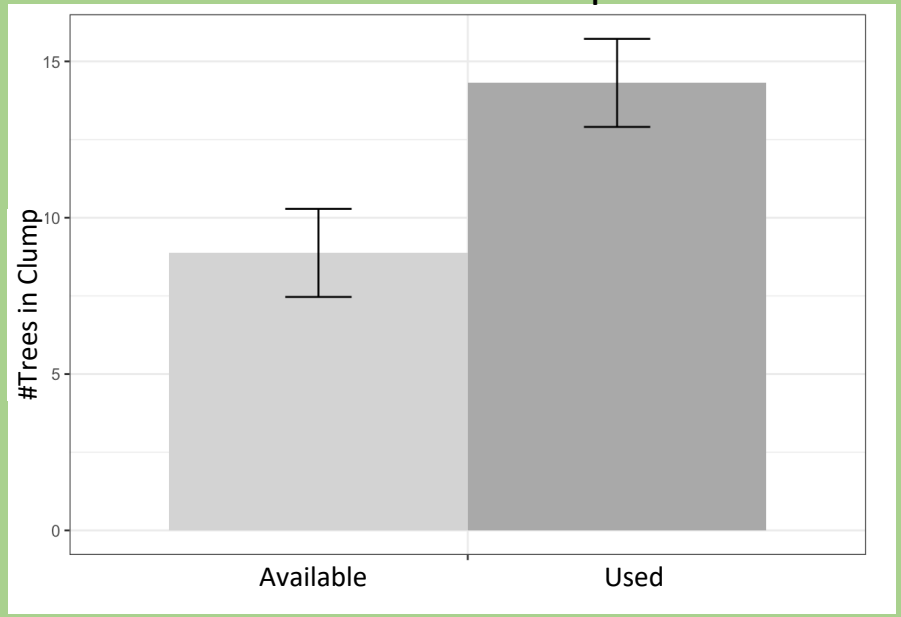
Stand	Tree
Tree Density	DBH
Slope Direction	Species
Distance- Nest	Crown Volume
#Trees- Clump	

- Compared used and available sites
- Combined data sets
  - 1980s + 2023
- Logistic Regression
  - Significant traits
- Model Selection
  - Akaike

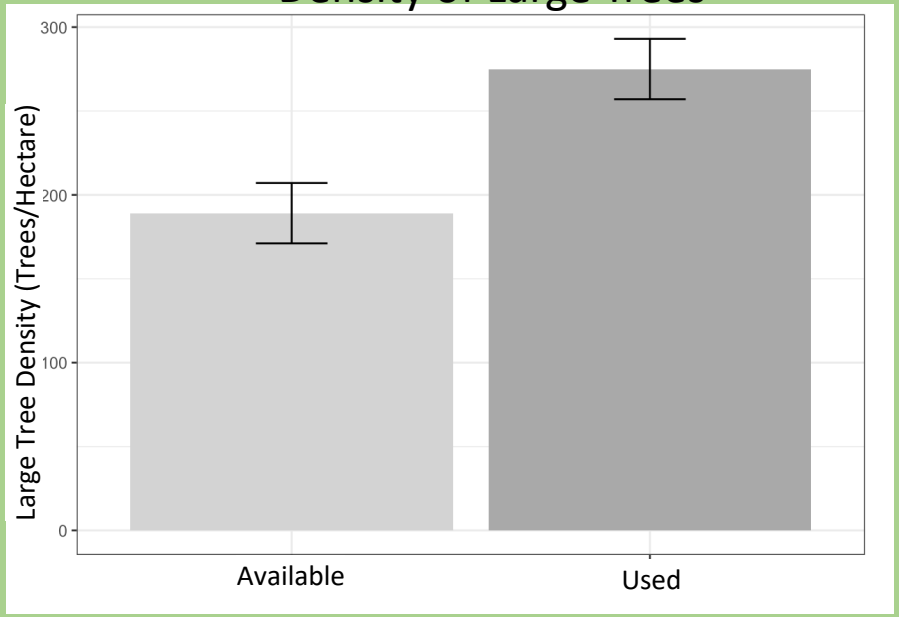
Habitat Selection: Stand Scale

Model	Δ AIC
Slope Direction, Distance, Large Tree Density	20.20051
Slope Direction, Distance, Large Tree Density, Number of Trees in Clump	17.66452
Slope Direction, Distance	14.69017

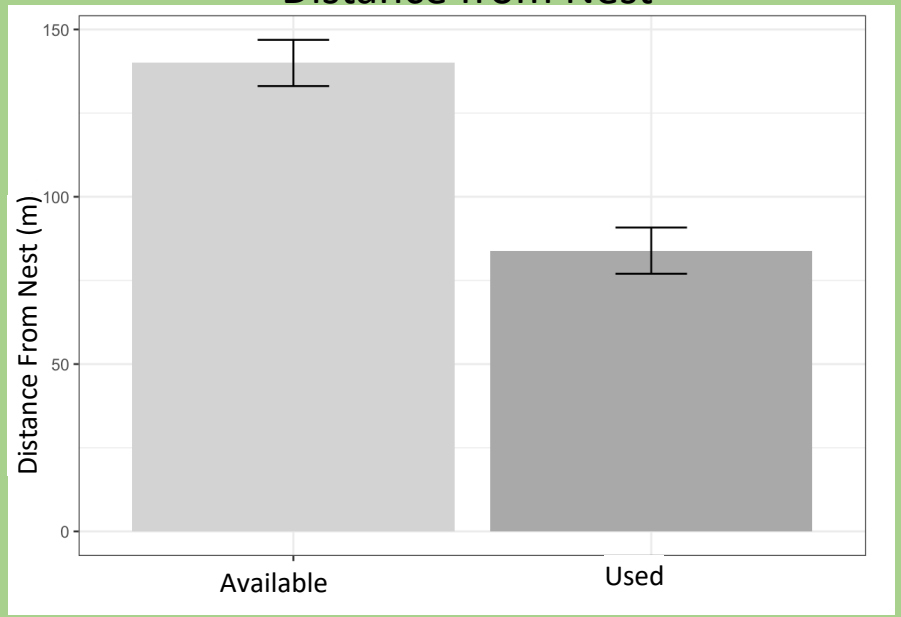
# of Trees in Clump



Density of Large Trees



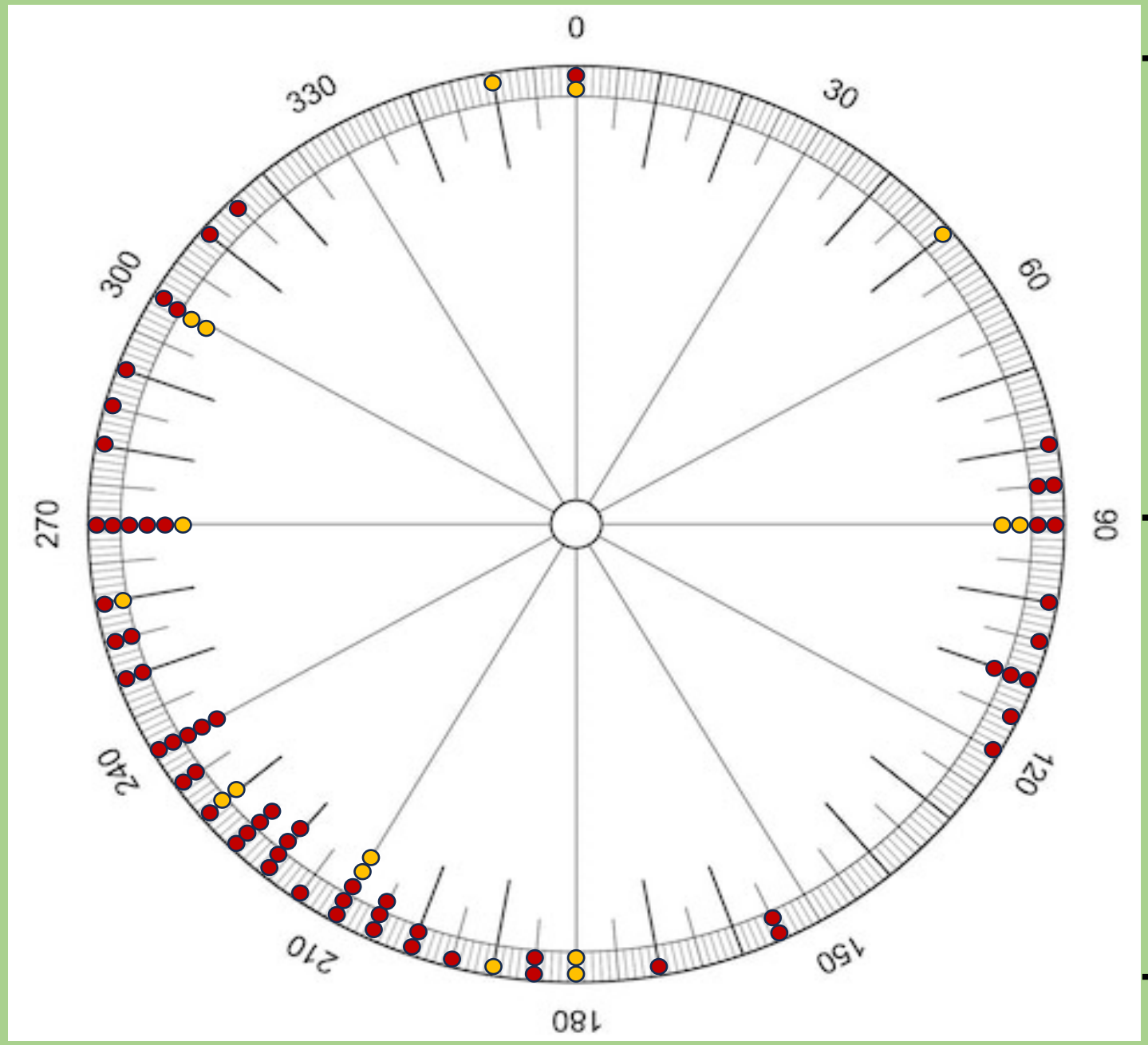
Distance from Nest



Slope Direction

=Used Sites

= Available Sites



North

18% 31.3%

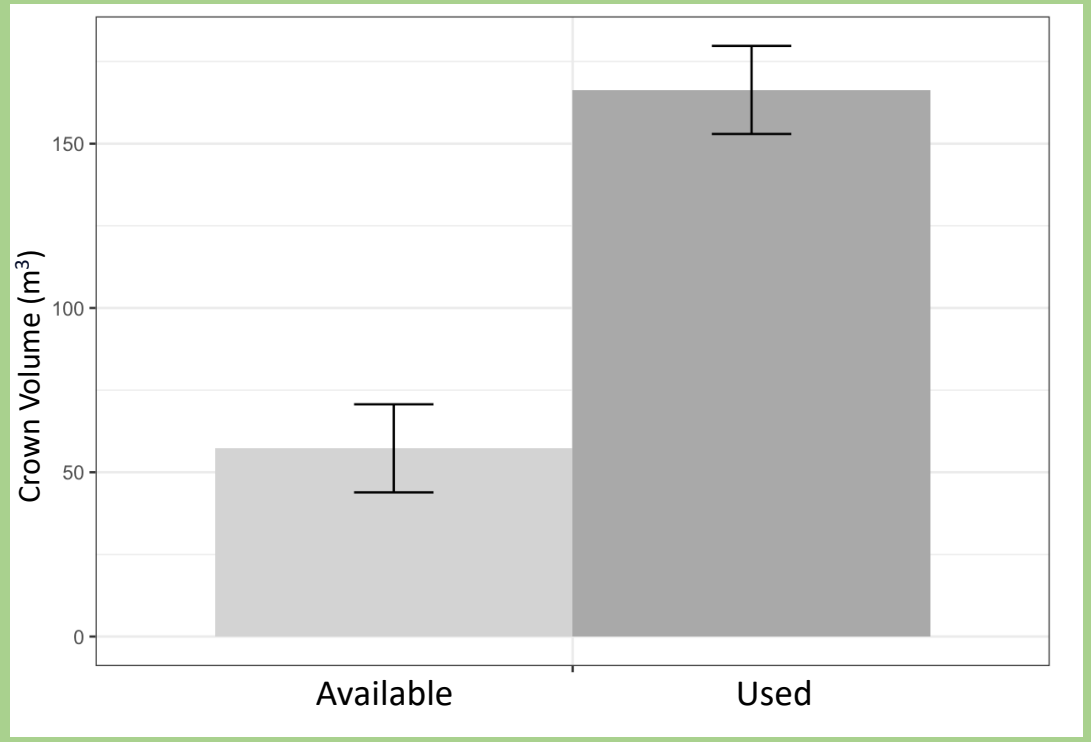
South

70.5% 50%

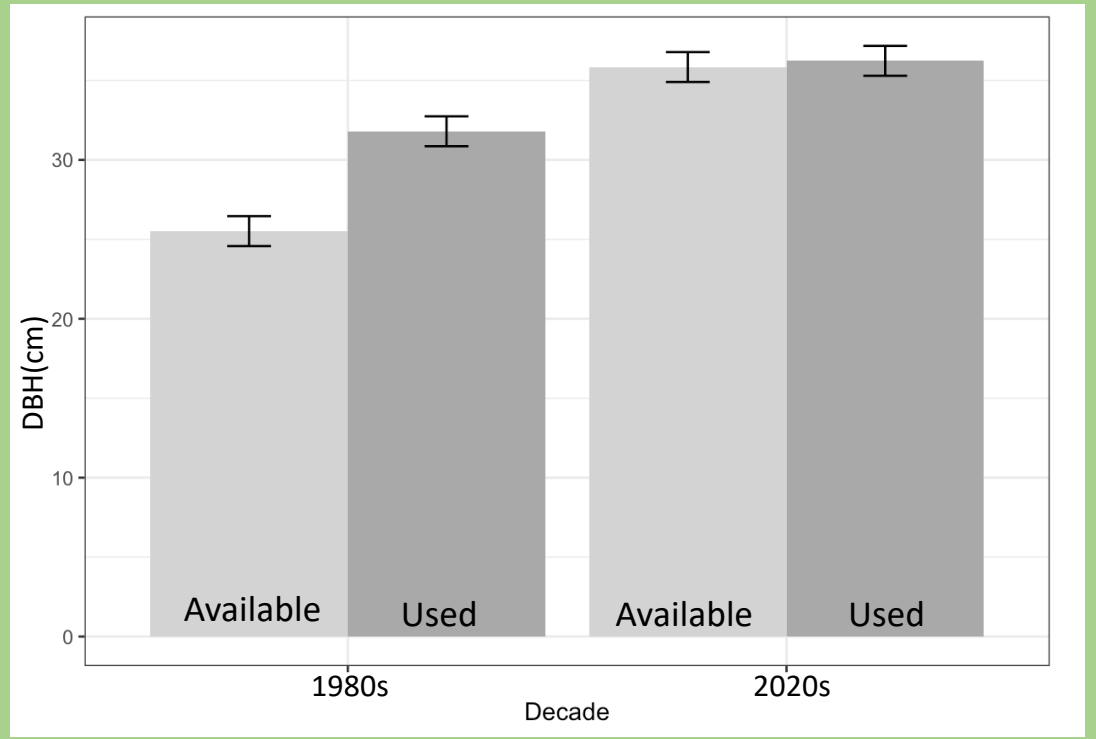
Habitat Selection: Tree Scale

Model	Δ AIC
DBH, Crown Volume	27.3352
Crown Volume	27.2481
Species, Crown Volume	27.1047

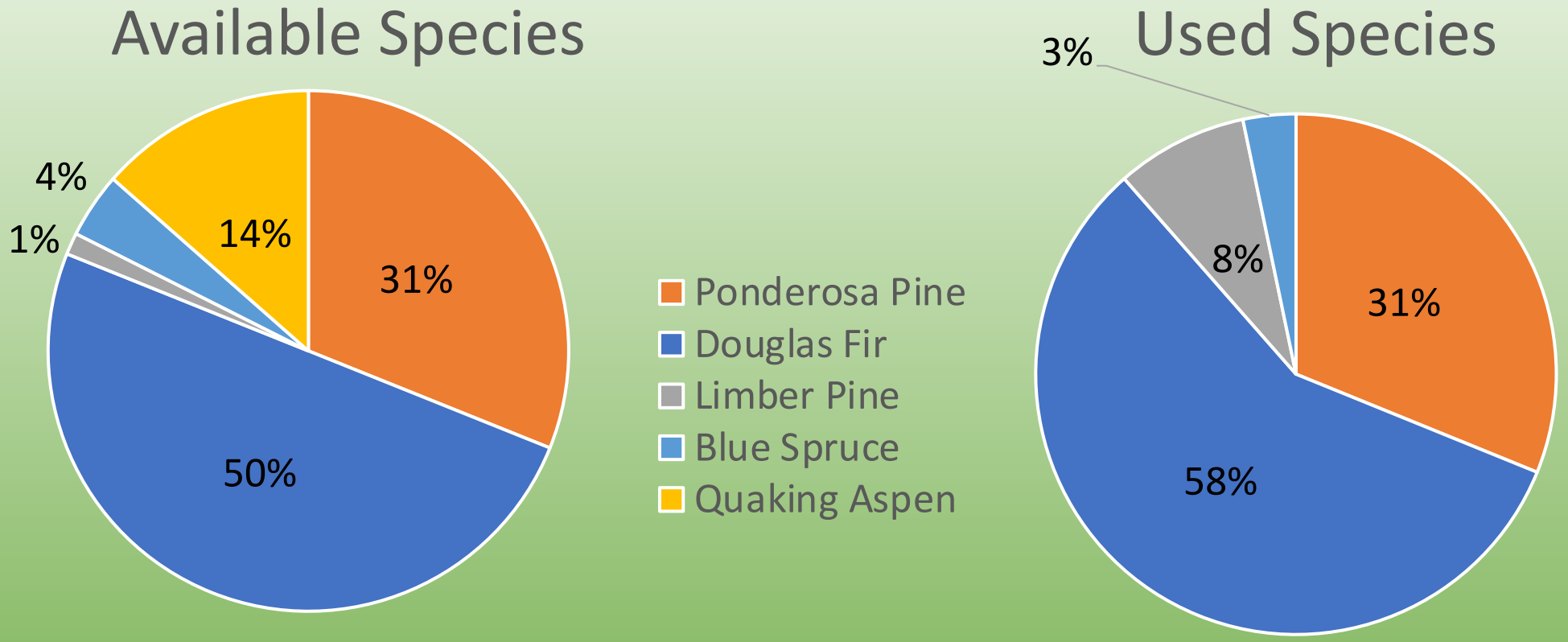
Crown Volume



DBH



Species Makeup



Discussion

Stand Scale

- Close to nest
  - 86 m
- High density of large trees
- Tree Clumps
  - Many interlocking crowns
- South-facing slopes
  - High sun exposure
  - Warm
  - Open Stands

High amount of cover

- Shifting Fire Regimes
  - Alter Clump Dynamics
- Increased risk of predation

Discussion

Tree Scale

- Larger trees (DBH)
- High crown volume
- Conifers
  - Large amount of cover
- Loss of old-growth forest
  - Increase metabolic costs
  - Increase risk of predation
  - Negatively impact flammulated owl populations

Future Directions

- Temperature
  - Warming vs Cooling
  - Climate change
- Development of conservation strategies

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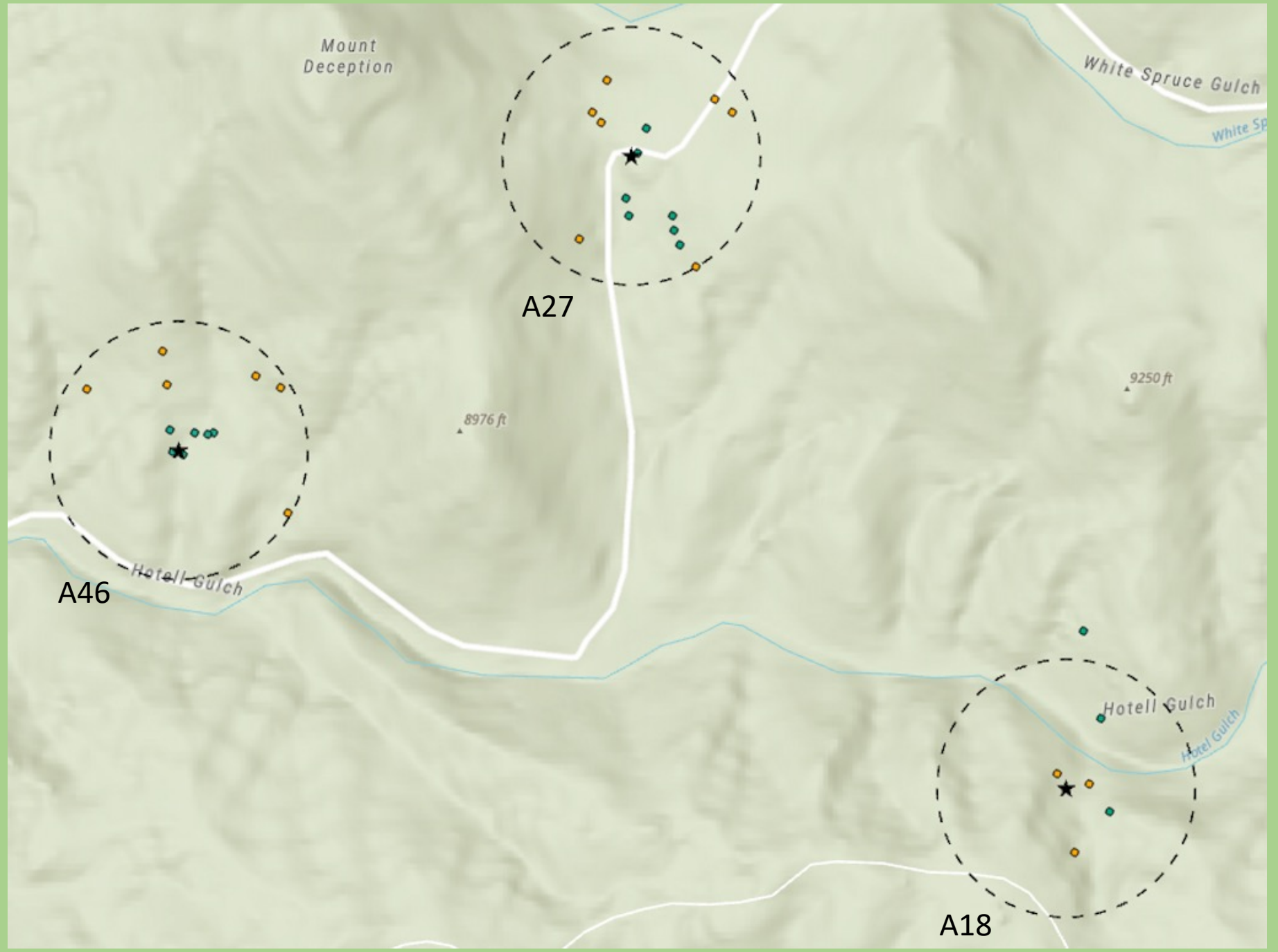
Questions?

2023 Roost Locations

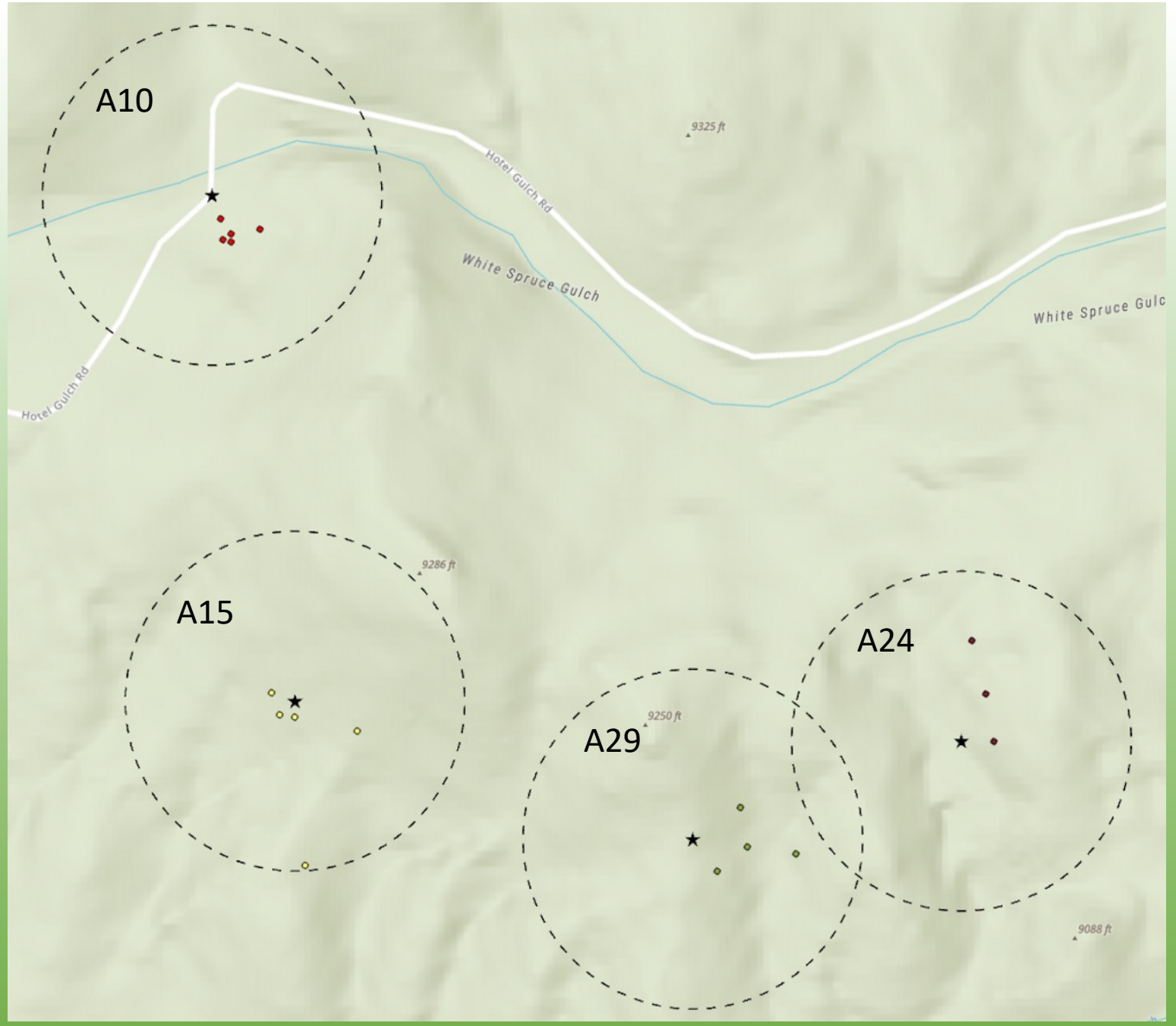


: Random Trees

: Used Trees

: Nest

: Territory Boundary Estimate

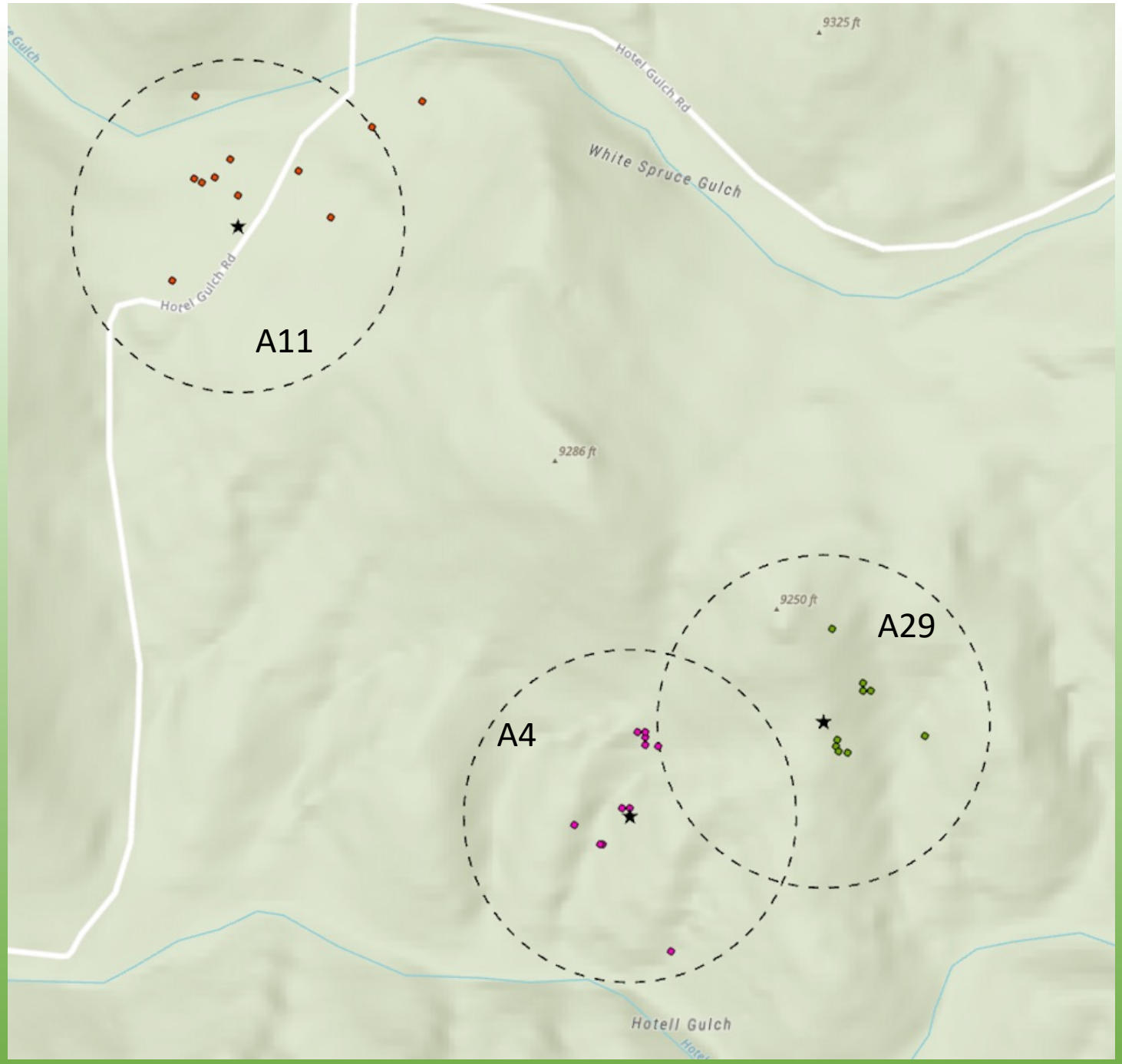


1982 Roost Locations

: Used Trees

: Nest

: Territory Boundary Estimate



1983 Roost Locations

: Used Trees

: Nest

: Territory Boundary Estimate