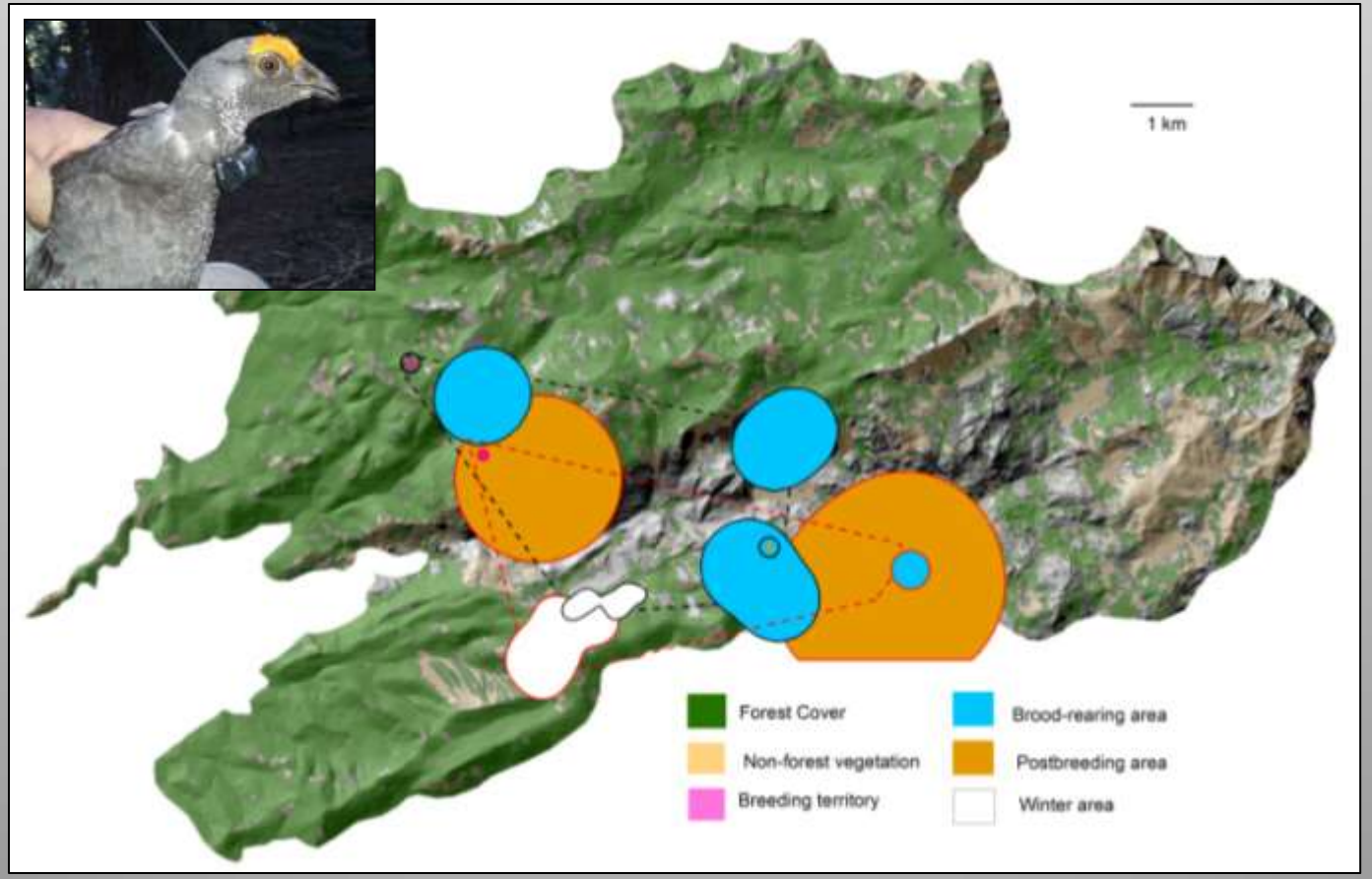
Home Range and Seasonal Movements in a Southern Population of Sooty Grouse



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Current State of Knowledge - Seasonal Movements

Famous for their “inverted” migrations:

- upslope in fall, overwinter at high elevations, downslope in spring.
- some populations breed at high elevations, or are non-migratory.

In California, seasonal movements have not been studied:

- no previous radiotelemetry or mark-recapture studies.

Hoffmann (1956) & Bland (1993), winter droppings at breeding sites:

- concluded grouse at some CA locations might be non-migratory.

Home Range

Studied most intensively in British Columbia:

- dispersed seasonal activity centers = seasonal home ranges.
  i.e., breeding, post-breeding, and wintering areas.

In CA, size and spatial relationship of seasonal ranges are unknown.

Part of a multi-year assessment of habitats and populations

Movement/Home Range Questions:

Are Sierra Sooty Grouse migratory?

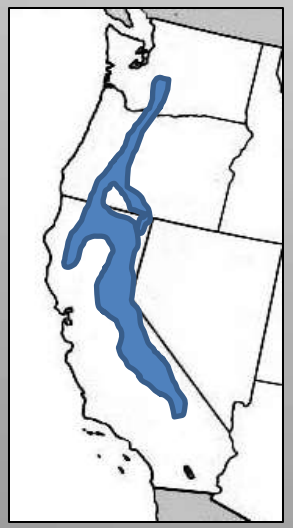
If migratory:

- what are the spatial relationships between seasonal ranges?
- how large are the different kinds of seasonal ranges?
- what is the timing of seasonal movements?

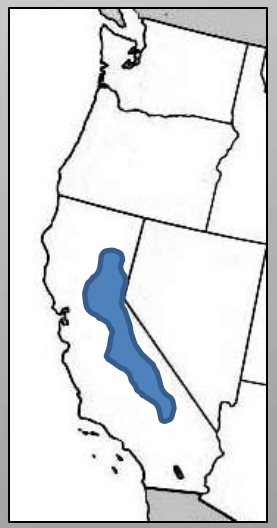
Study species:

Sierra Sooty Grouse (*Dendragapus fuliginosus sierrae*)

Sierrae phenotype (Grinnell & Miller)



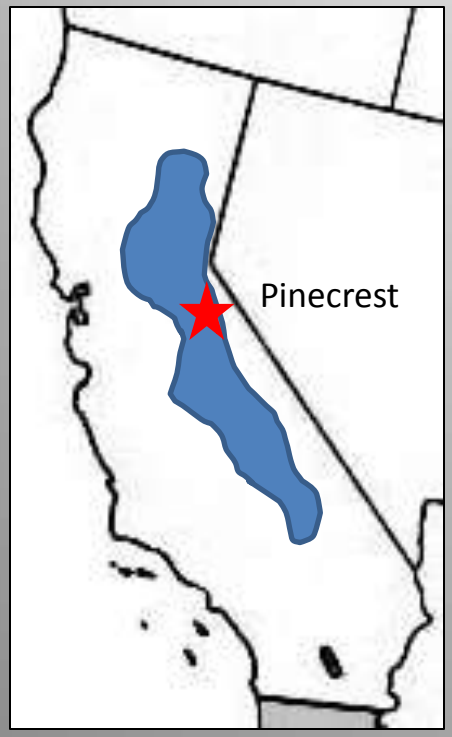
Sierrae mtDNA haplotype (Barrowclough)

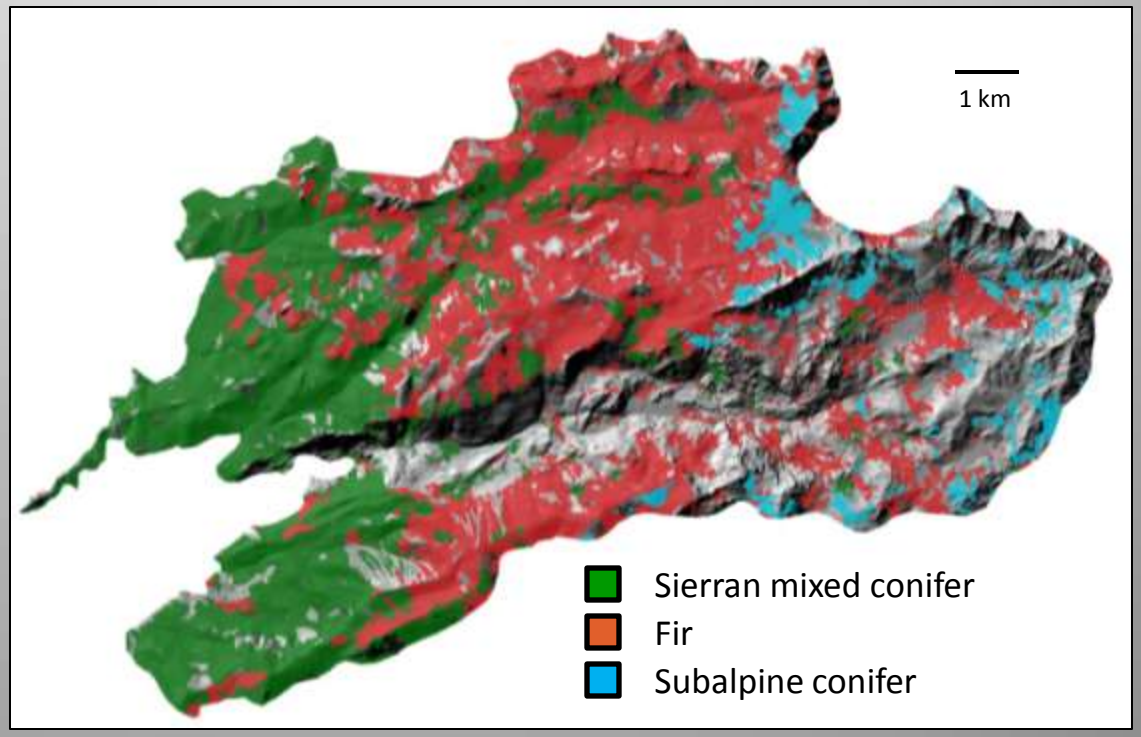


Study area:

Pinecrest, Stanislaus National Forest, Tuolumne County.

- located near center of *sierrae* haplotype.
- pine-dominated below ~2100 m (7000 ft), fir-dominated above.





Radiotelemetry Methods

10 males and 4 females

18 g necklace-style VHF transmitters (Advanced Telemetry Systems).

Re-located every ~10 days by homing, year-round.

Data Analysis

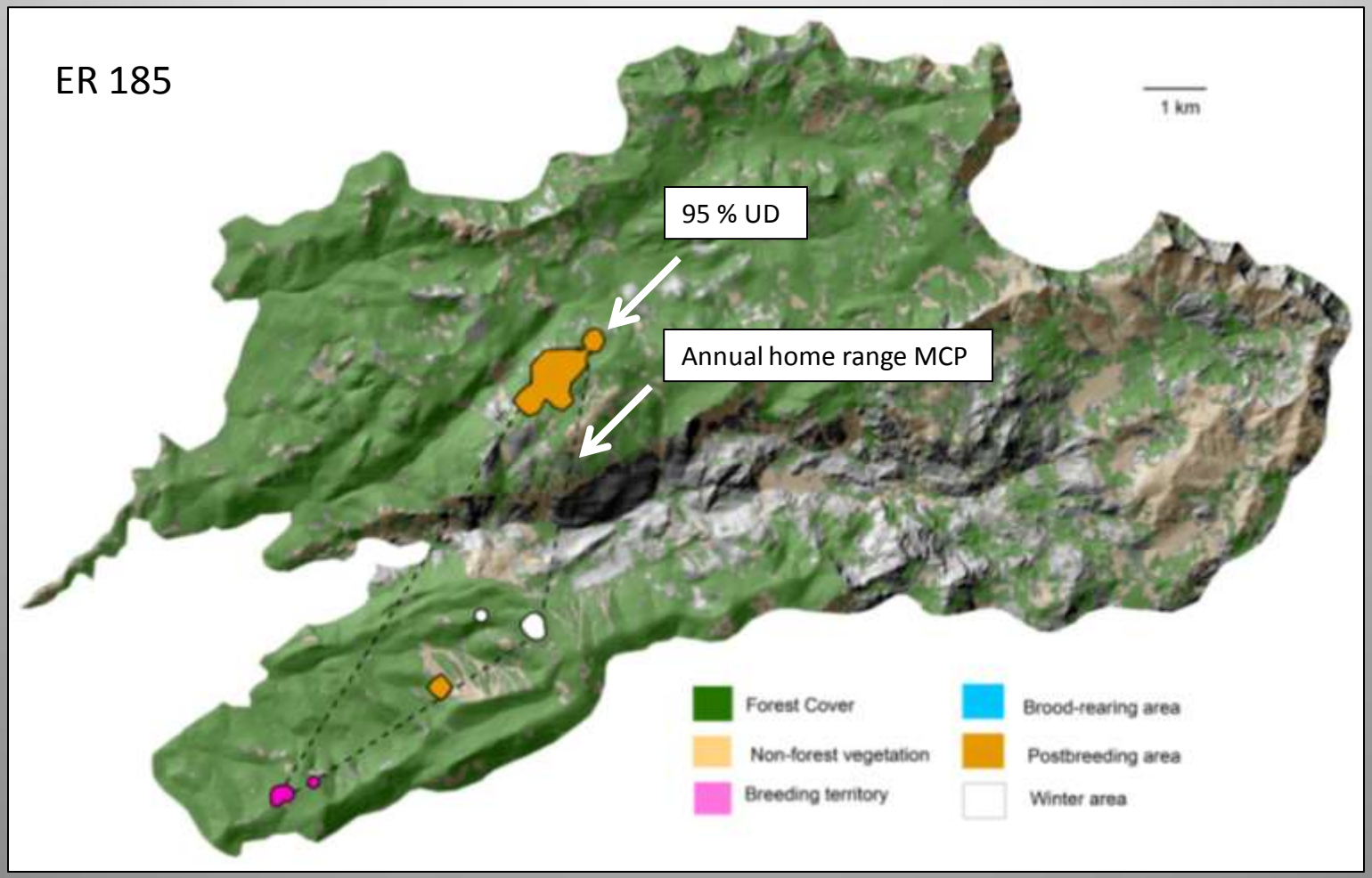
'Adehabitat' package for Quantum GIS.

Annual home ranges: 10 individuals (8M, 2F) surviving >11 mo.

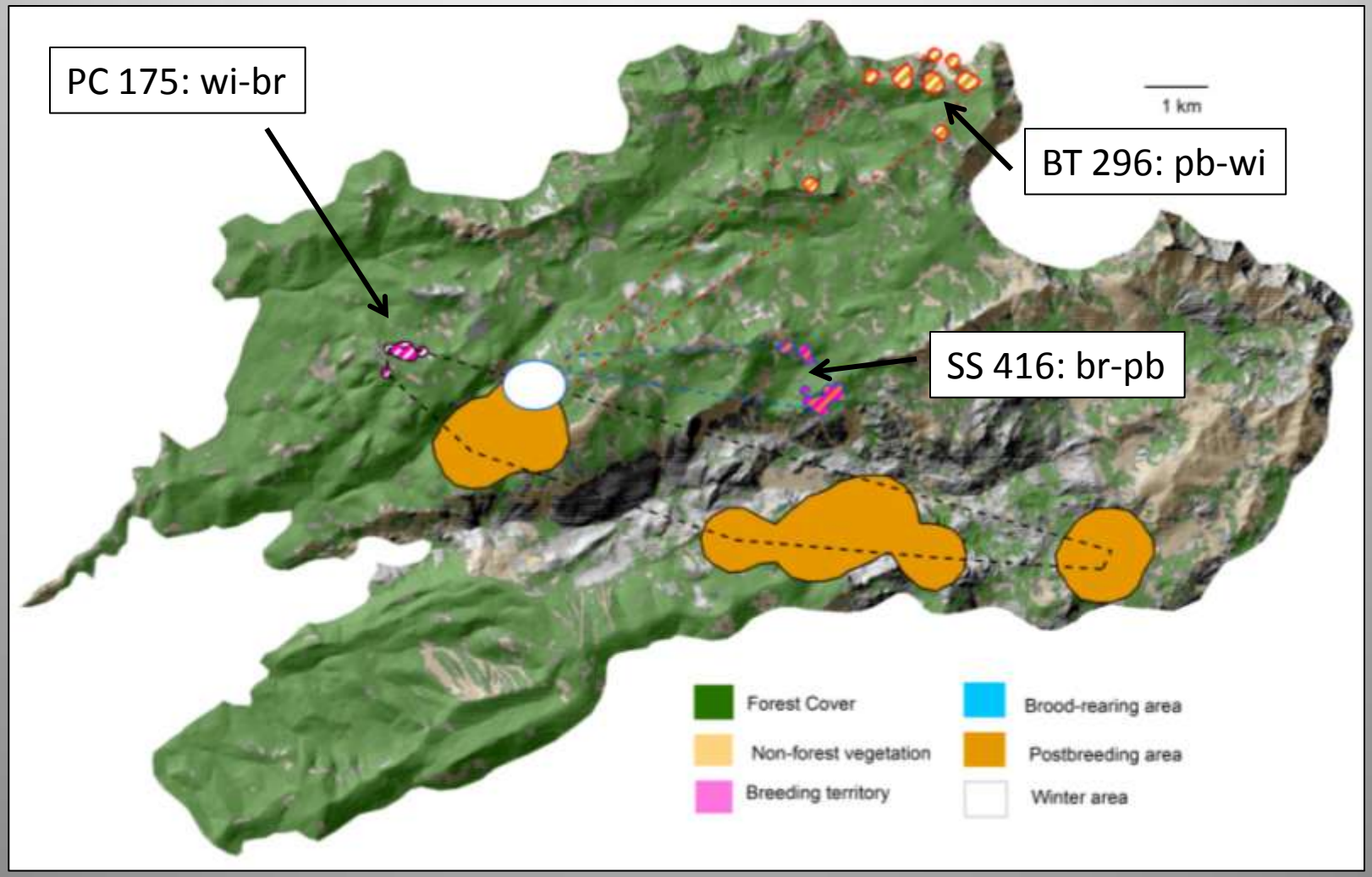
Seasonal ranges: up to 14 individuals.

Findings Regarding Seasonal Movements

1) 50 % migrated between breeding, post-breeding, and wintering areas (3 M, 2 F).



2) Others remained in one area through two successive seasons.



3) Average distance moved between seasonal ranges = 5.1 km (range = 0.8-12.7 km).

4) Most birds (7/10) wintered slightly higher than they bred.
   - average elevation gain not statistically significant.
   - 2 did not change elevation.
   - 1 wintered at a lower elevation.

5) Greatest elevation change was from breeding to postbreeding:
   - Average gain = 237 m.

6) Birds descended an average 132 m from postbreeding to winter.

Findings Regarding Home Ranges

1) Average annual home range size:

Min. Convex Polygon (95% of fixes): 11.9 km^2 (range: 0.5-27.3 km^2)

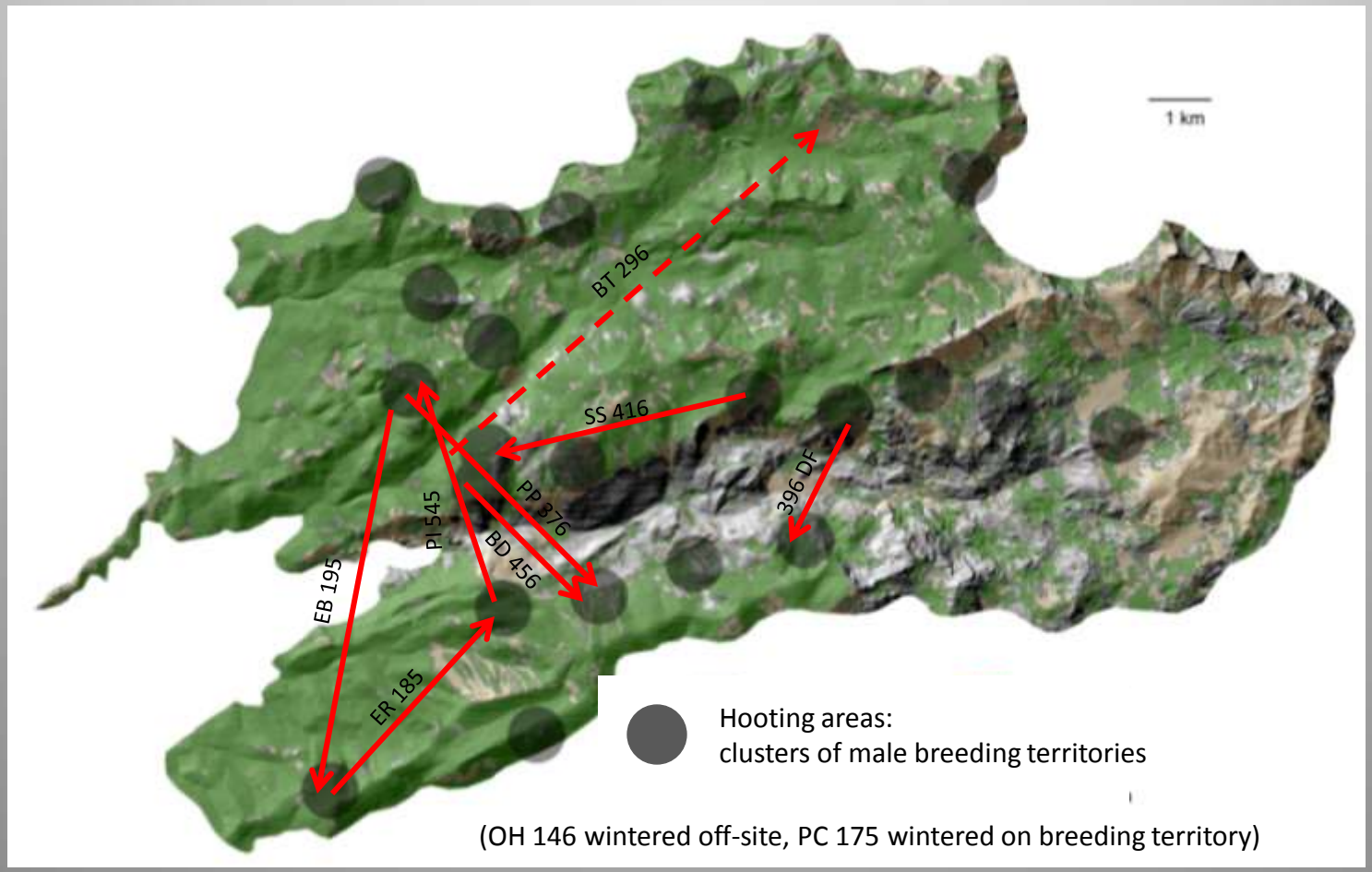
Fixed kernel (95% util. dist.): 7.5 km^2 (range: 1.3-13.3 km^2)

2) Average seasonal home range size:

Range type	Minimum Convex Polygon ha (range)
Male breeding (n = 7)	6.1 (0.6-21.1)
Female brood-rearing (n = 2)	420.0 (26.5-813.1)
Postbreeding (n = 9)	344.4 (4.8-1085.7)
Winter (n = 6)	15.1 (1.8-66.5)

Findings - Other

Breeding areas of some served as wintering areas for others:
"Seasonal range time-sharing."



(OH 146 wintered off-site, PC 175 wintered on breeding territory)

Discussion Regarding Home Ranges

Seasonal ranges for breeding and brood-rearing at Pinecrest were much larger than reported in British Columbia:

Location	Male breeding range , MCP (ha)	Female brood-rearing range, MCP (ha)
Pinecrest	0.6-21.1	26.5-813.1
British Columbia	0.6-2.1	3.2-39.2

- differences could largely be methodological (e.g., time period).

Winter home ranges at Pinecrest were comparable to those in OR: 1.8-66.5 ha at Pinecrest vs. 2-90 ha in OR (Pelren 1996).

Discussion - Seasonal Movements

Sierra Sooty Grouse *do* undertake seasonal migrations, but:

- Use the same altitudinal zone in spring and winter.
- High-elevation postbreeding is probably for moisture:

Discussion - Seasonal Range Time-sharing

Limited areas serve as high-value breeding *and* wintering habitats.

Require special attention by managers.

Explains presence of winter droppings at breeding sites.

In northern regions, seasonal habitats are geographically isolated.

- seasonal migration is therefore resource-driven.

In the Sierra Nevada, seasonal habitats overlap spatially.

- seasonal migration is less resource-driven
- possibly a “ghost of their evolutionary past.”

Social function, if any, is uncertain:

Might be gathering info. on resources at alternate breeding sites.

Breeding site fidelity is currently thought to be strong.

But “floating” between hooting areas might be more common.

More research is needed on the breeding biology of Sooty Grouse.

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