

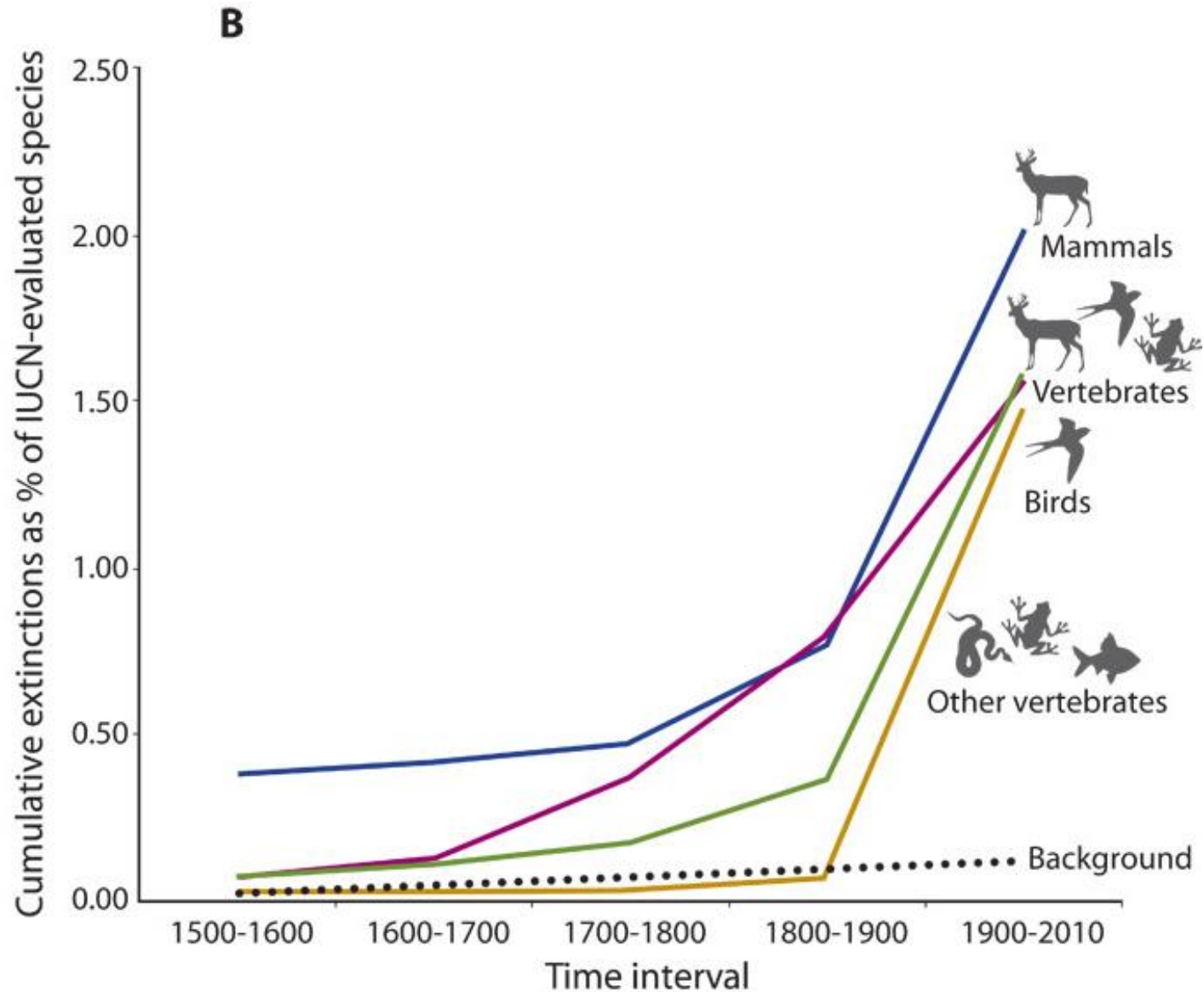
Use of Canines to Detect Early Life History Stages of a Threatened Butterfly



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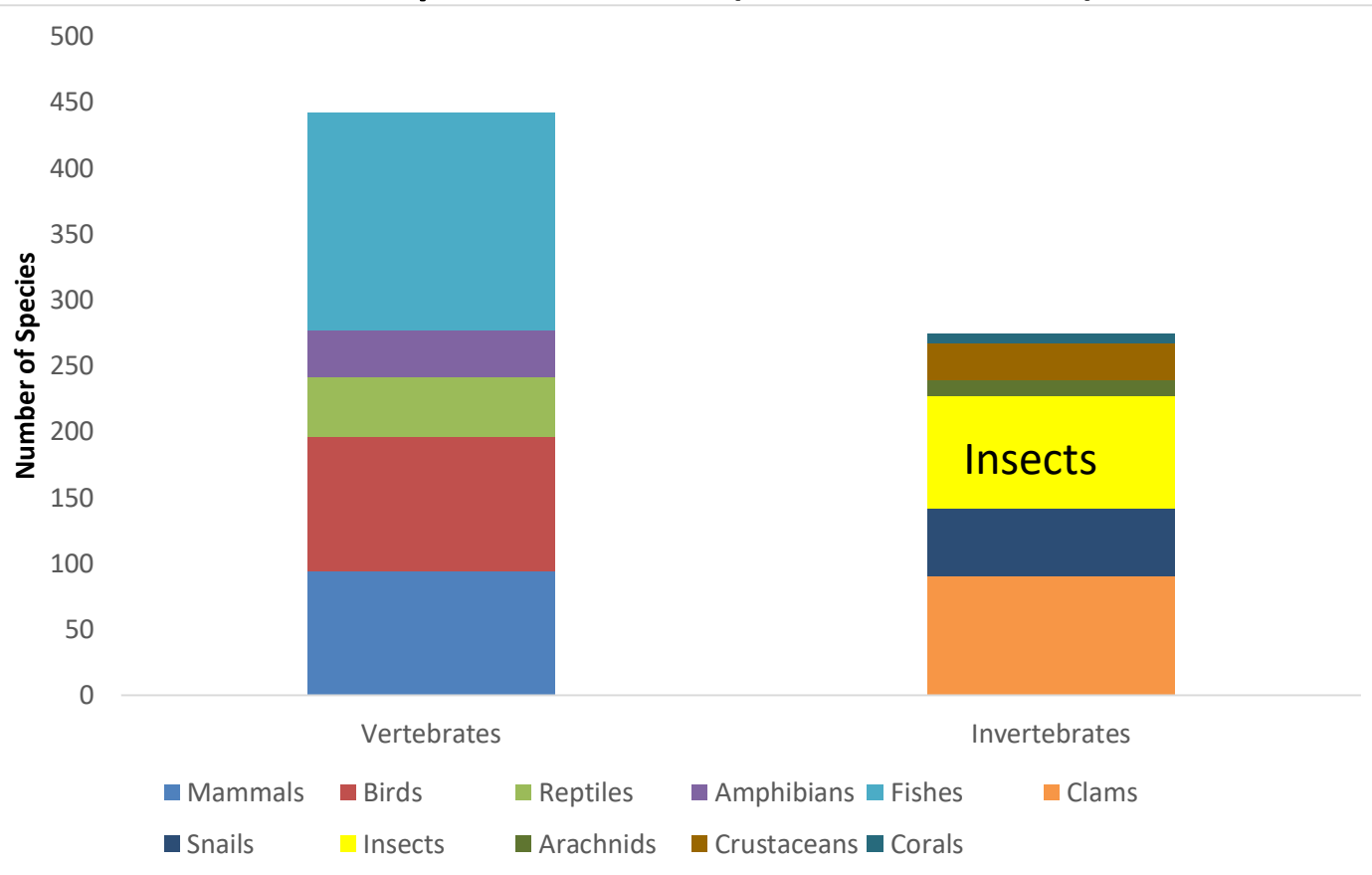
Extinction Rates



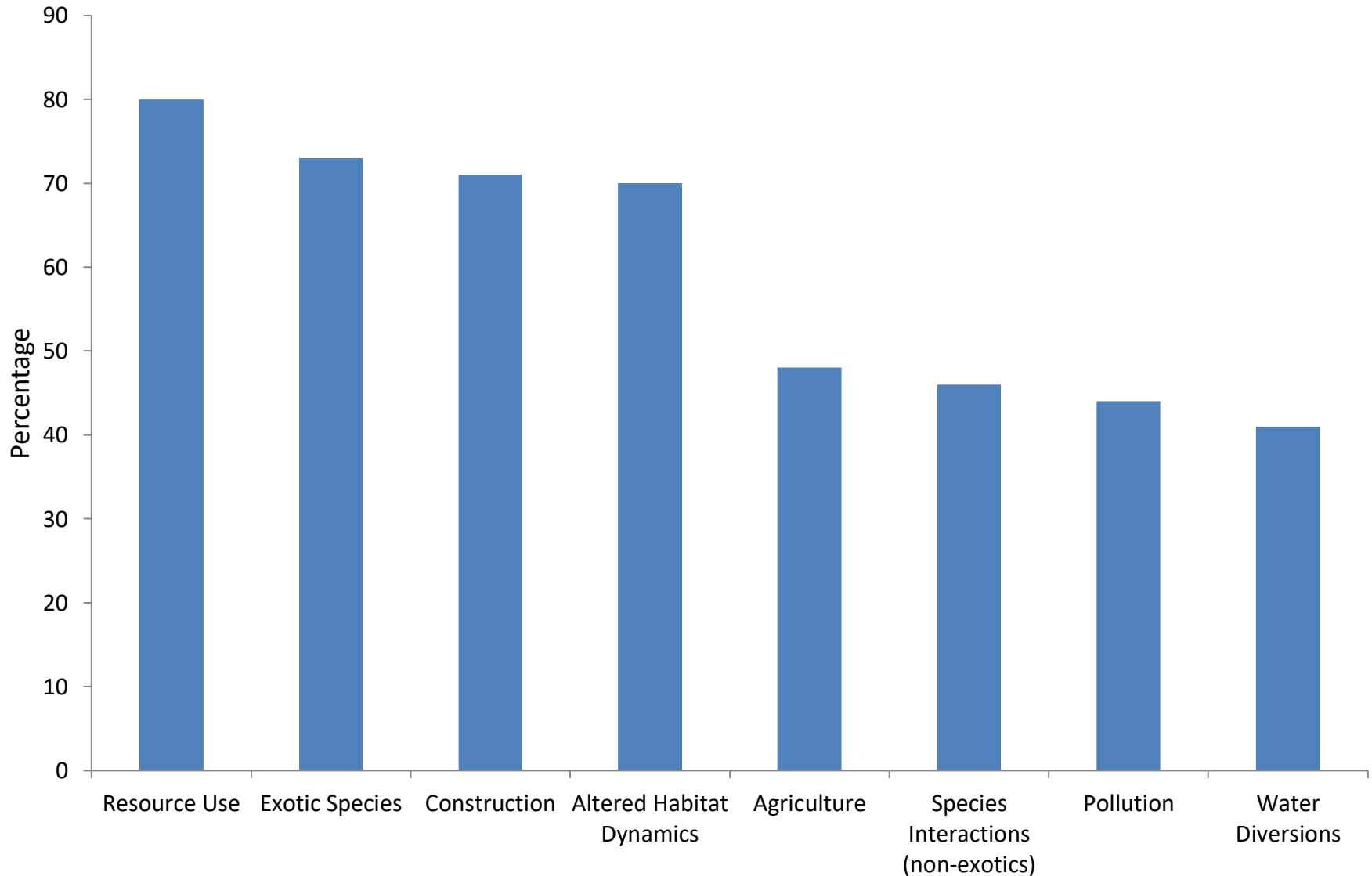
Ceballos et al., 2015

Taxonomic Bias

- International Union for Conservation of Nature (IUCN)
- Endangered Species Act (ESA)
- Documenting insect extinctions are currently underrepresented (Dunn, 2005)



Causes of Decline



Lawler et al., 2002

Insect Conservation: Large Blue Butterfly

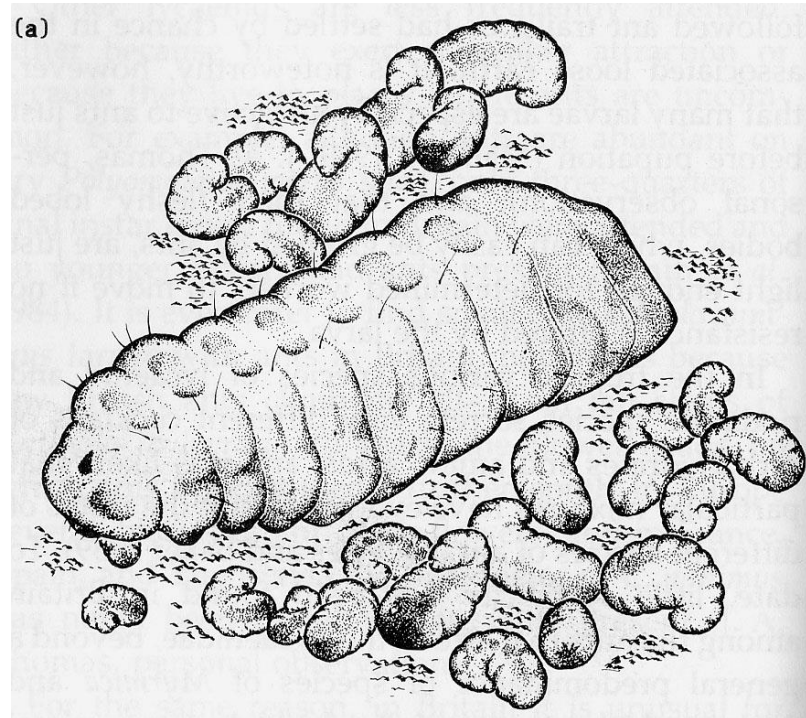
(Maculinea arion)



Photo By: PJC&CO from Wikimedia Commons

Large Blue Butterfly

- Early responses focused on habitat restoration
- Critical life history stage relied on *Myrmica sabuleti* ants
- Extirpated in the UK in 1979



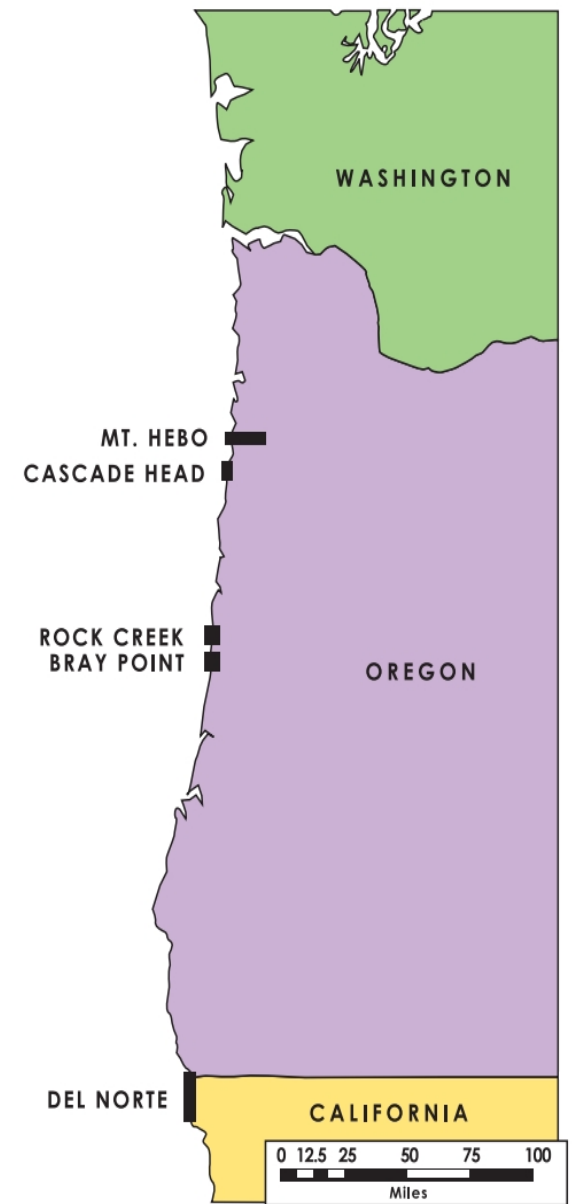
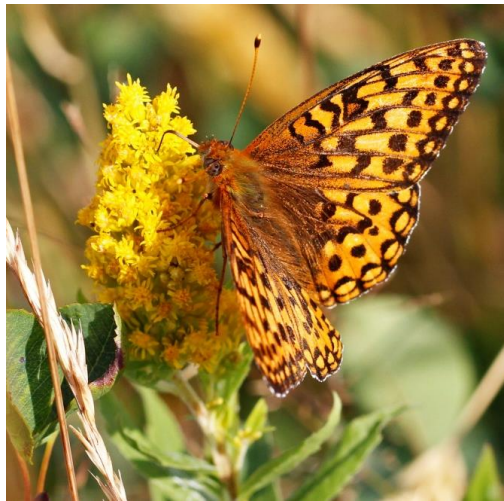
Conservation Implications

- Species decline can be reversible
- Understanding life history is essential

Oregon Silverspot Butterfly

(*Speyeria zerene hippolyta*)

- OSB Habitat:
 - Early successional communities
 - Salt-spray meadows
 - Oregon Coast and northern California coast.
 - Extirpated in Washington.
- Larval host plant: early blue violet (*Viola adunca*)

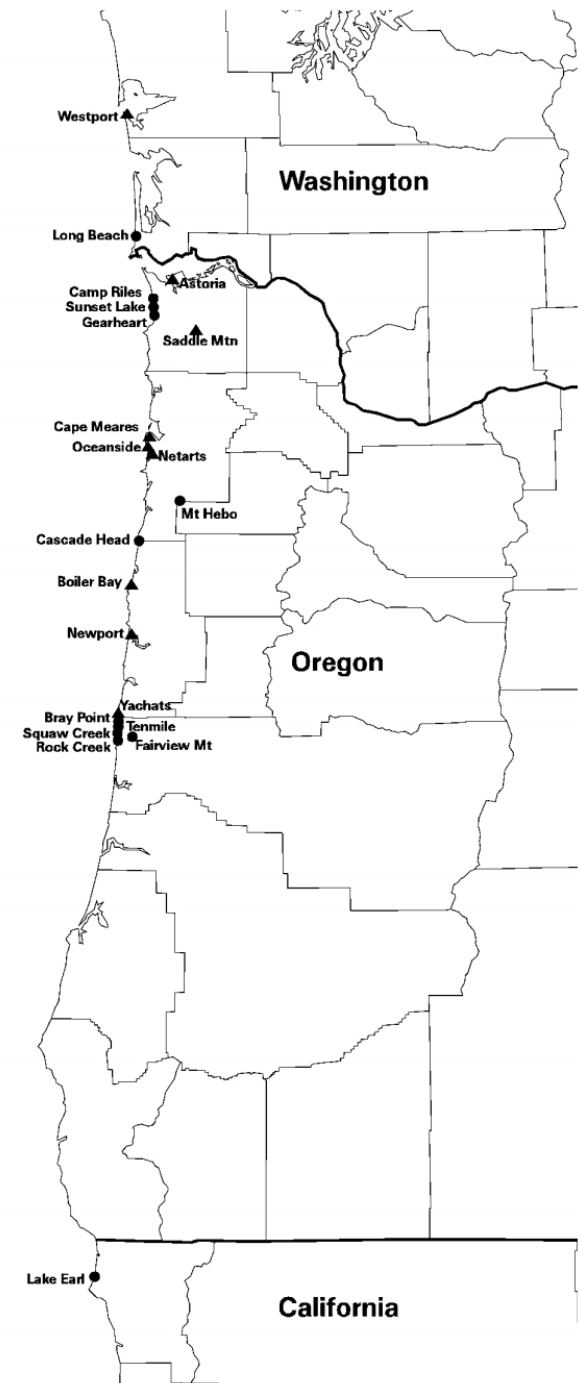


(Oregon Zoo 2009)

History of Decline

- Habitat loss

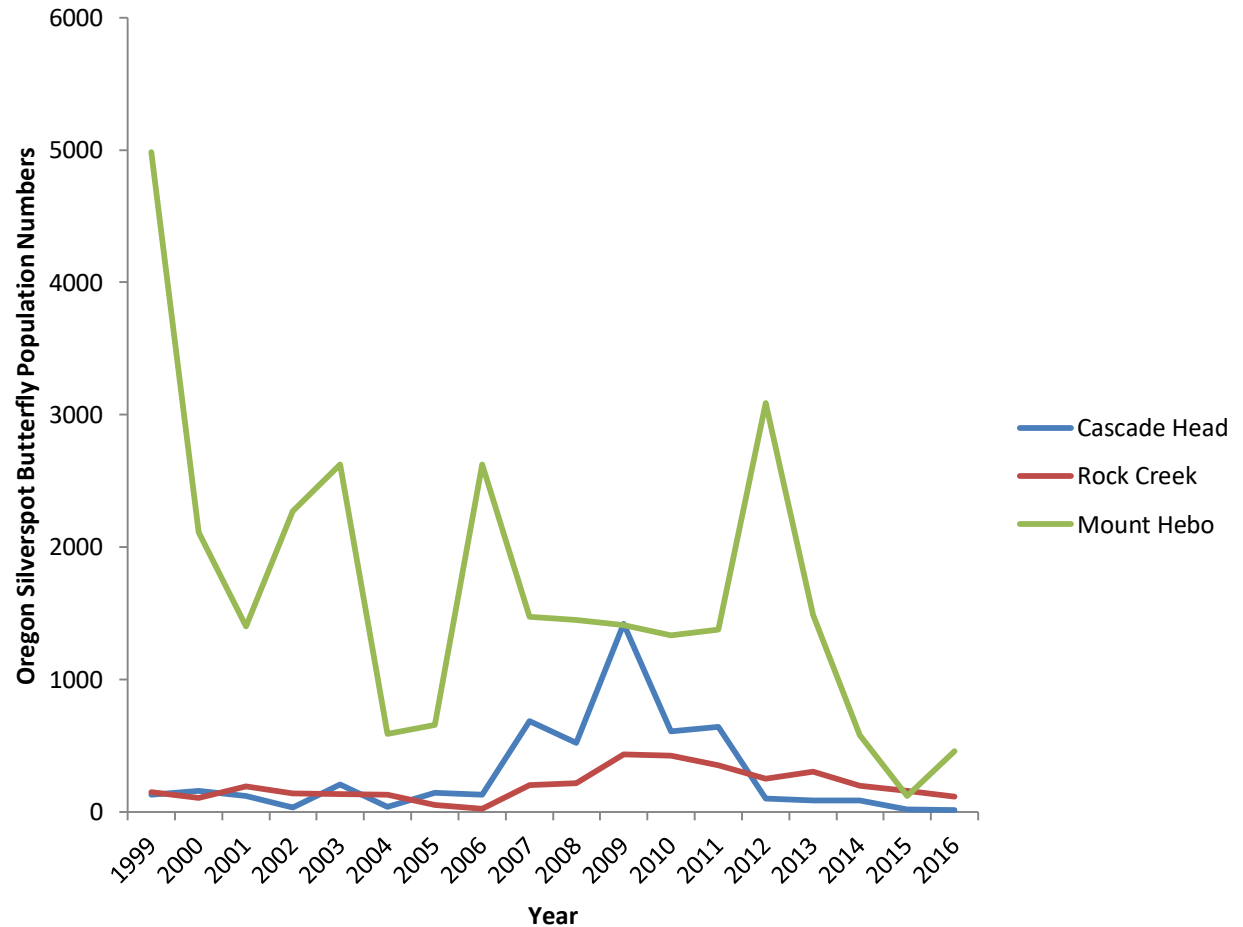
- Extant
- ▲ Extirpated



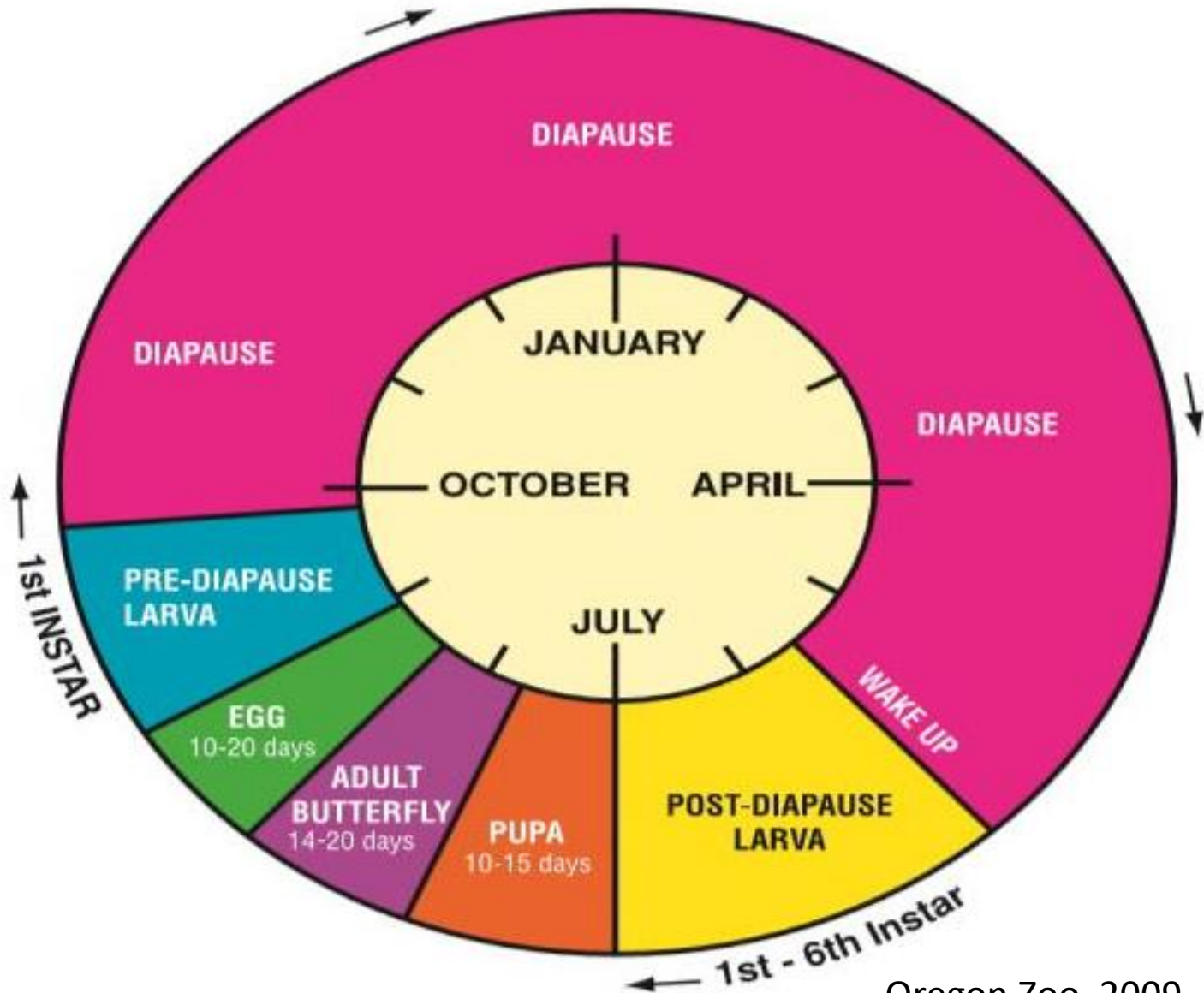
U.S. Fish and Wildlife
Service 2001

Remaining Threats

- Succession
- Invasive species



OSB Life Cycle

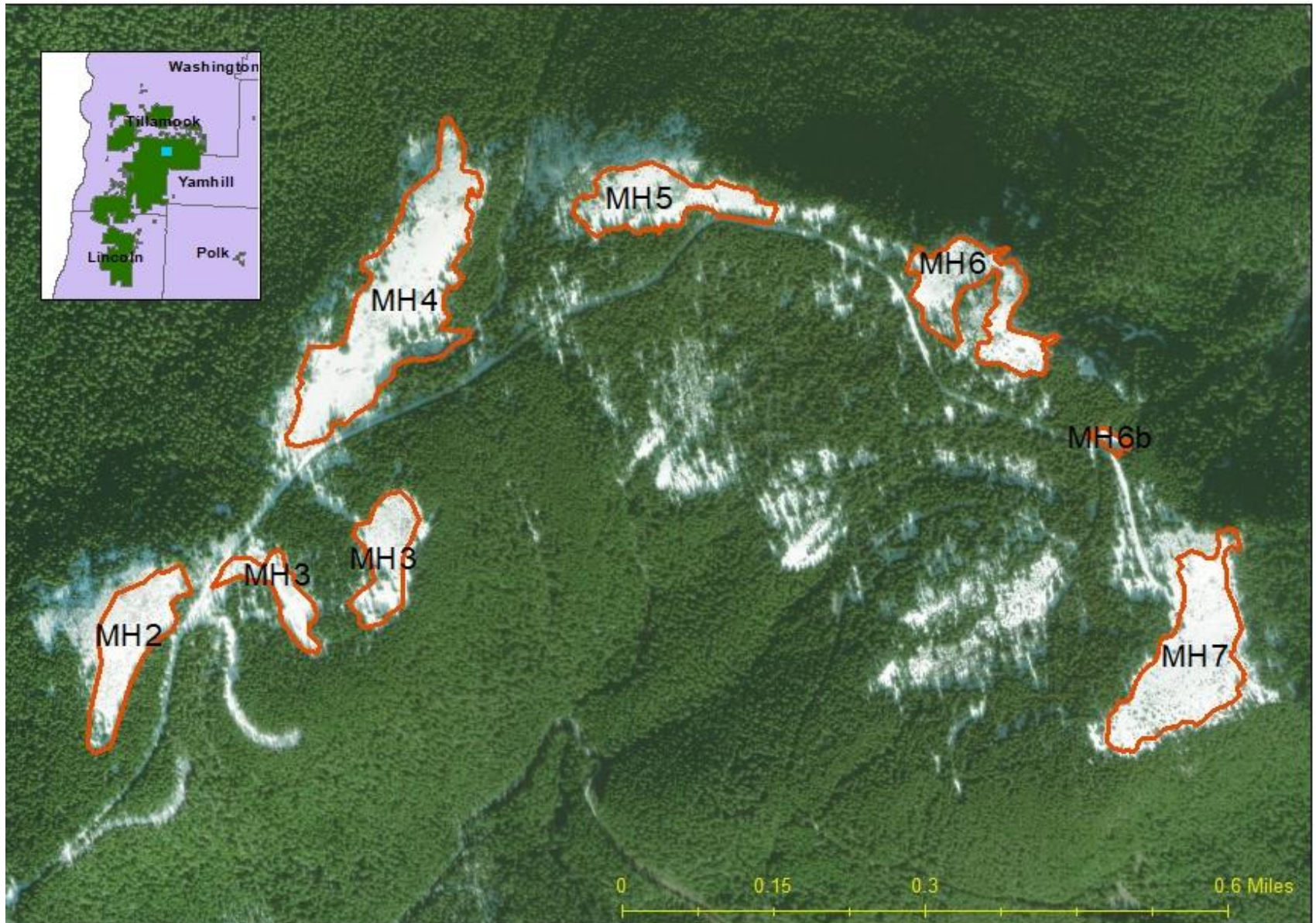


The Conservation Canines Project

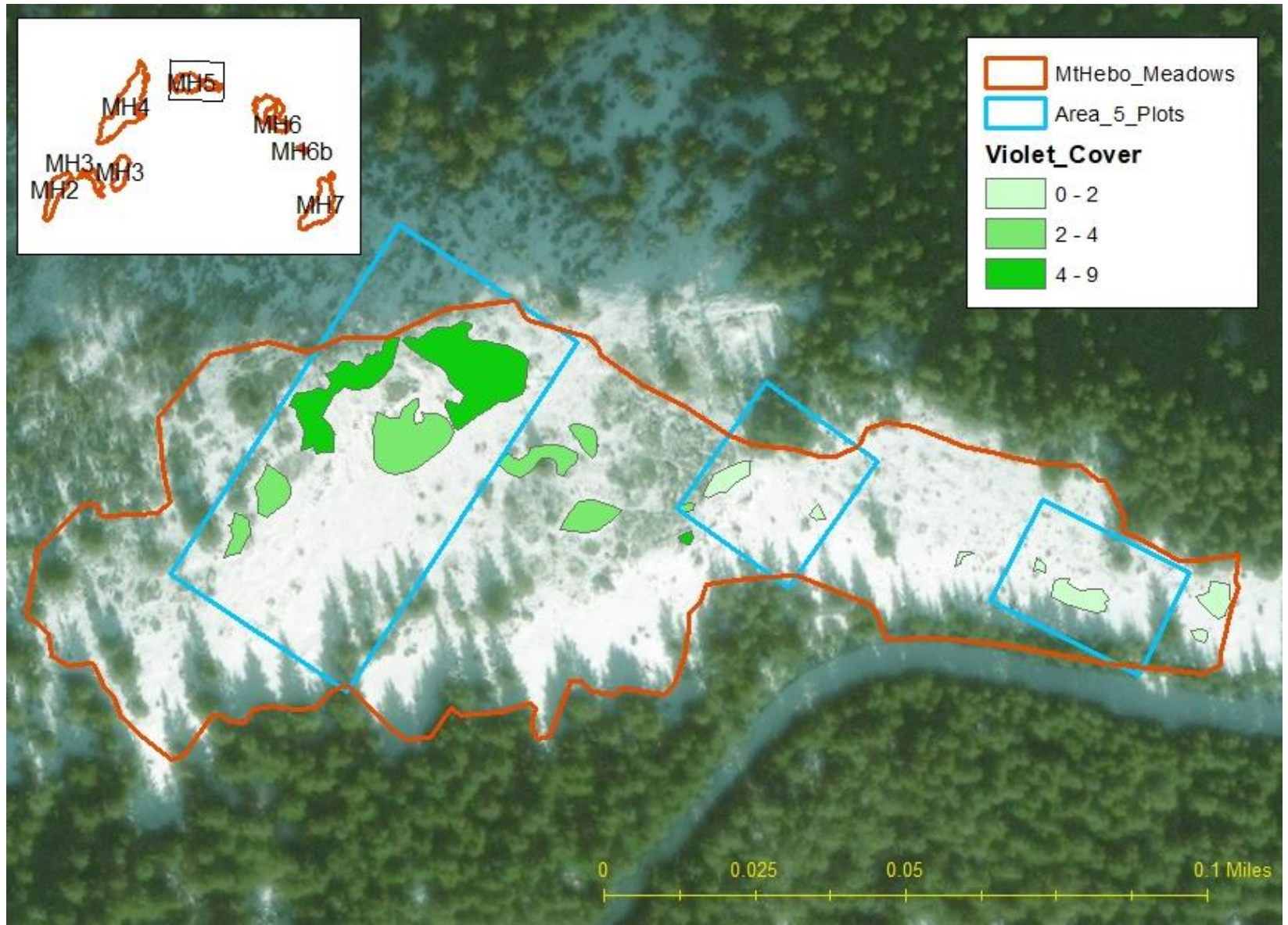
- Determine feasibility of using scent detection dogs to locate cryptic life history stages
- Assess dynamics of pilot search project



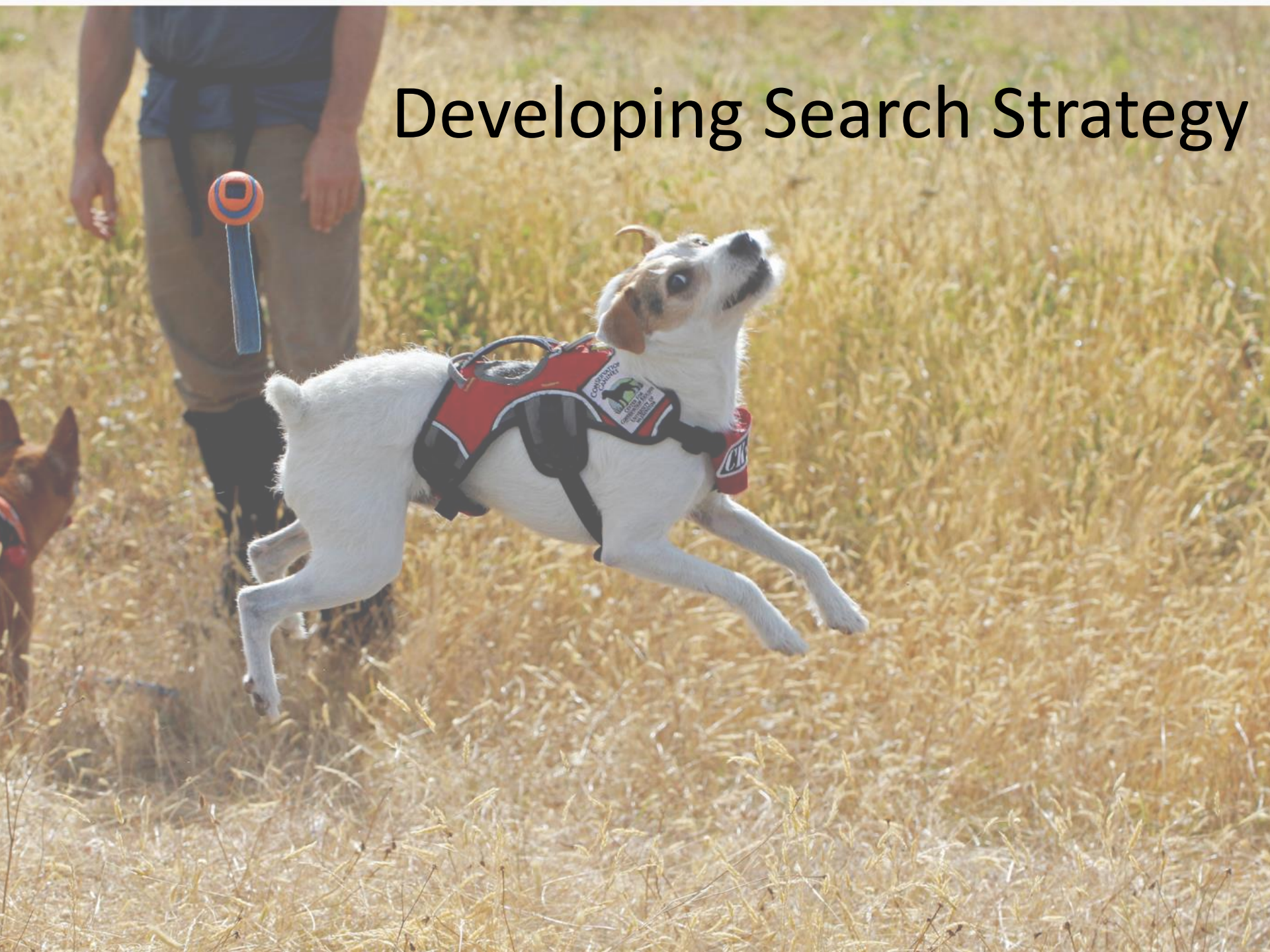
Mt. Hebo OSB Habitat



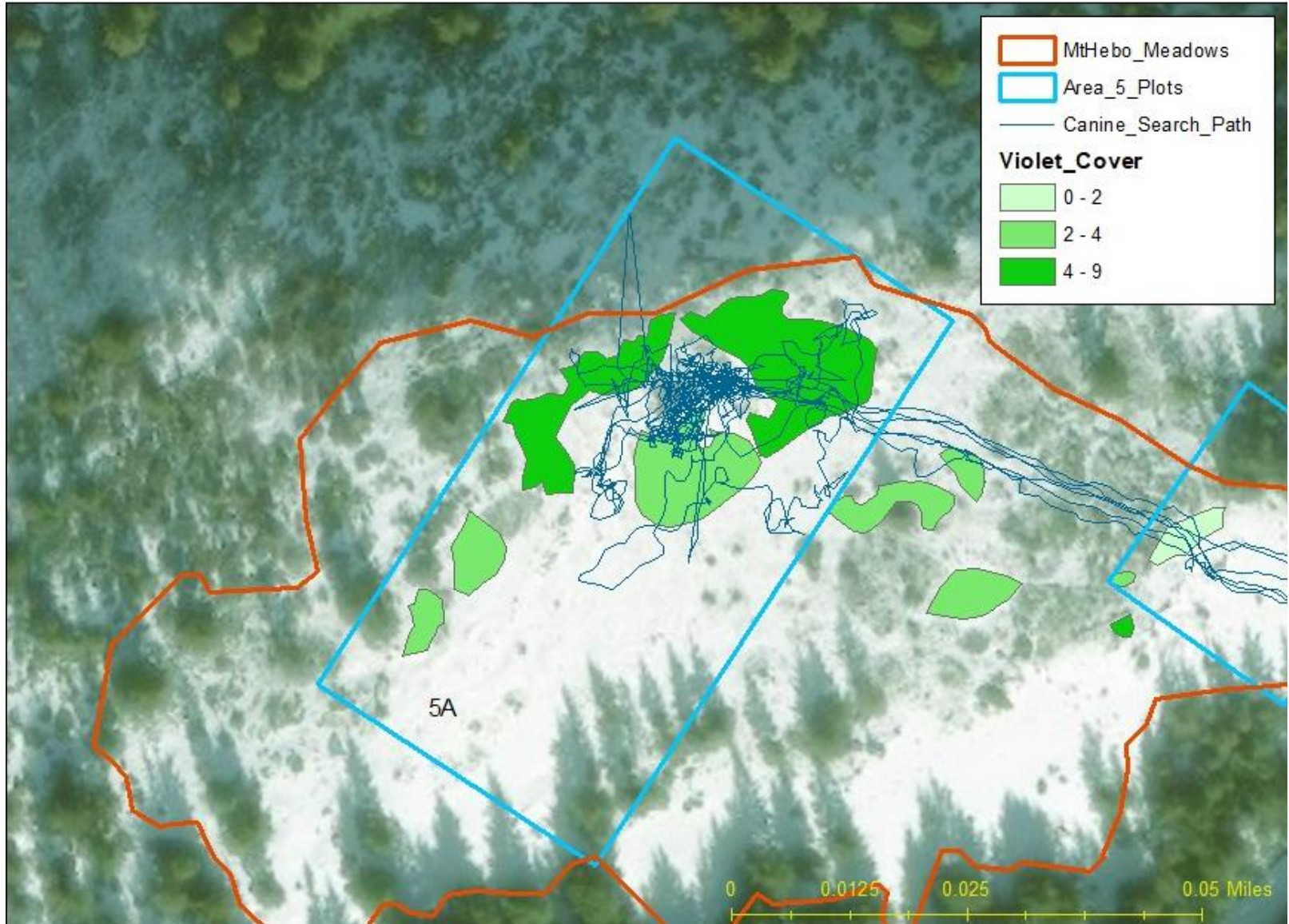
Study Plots



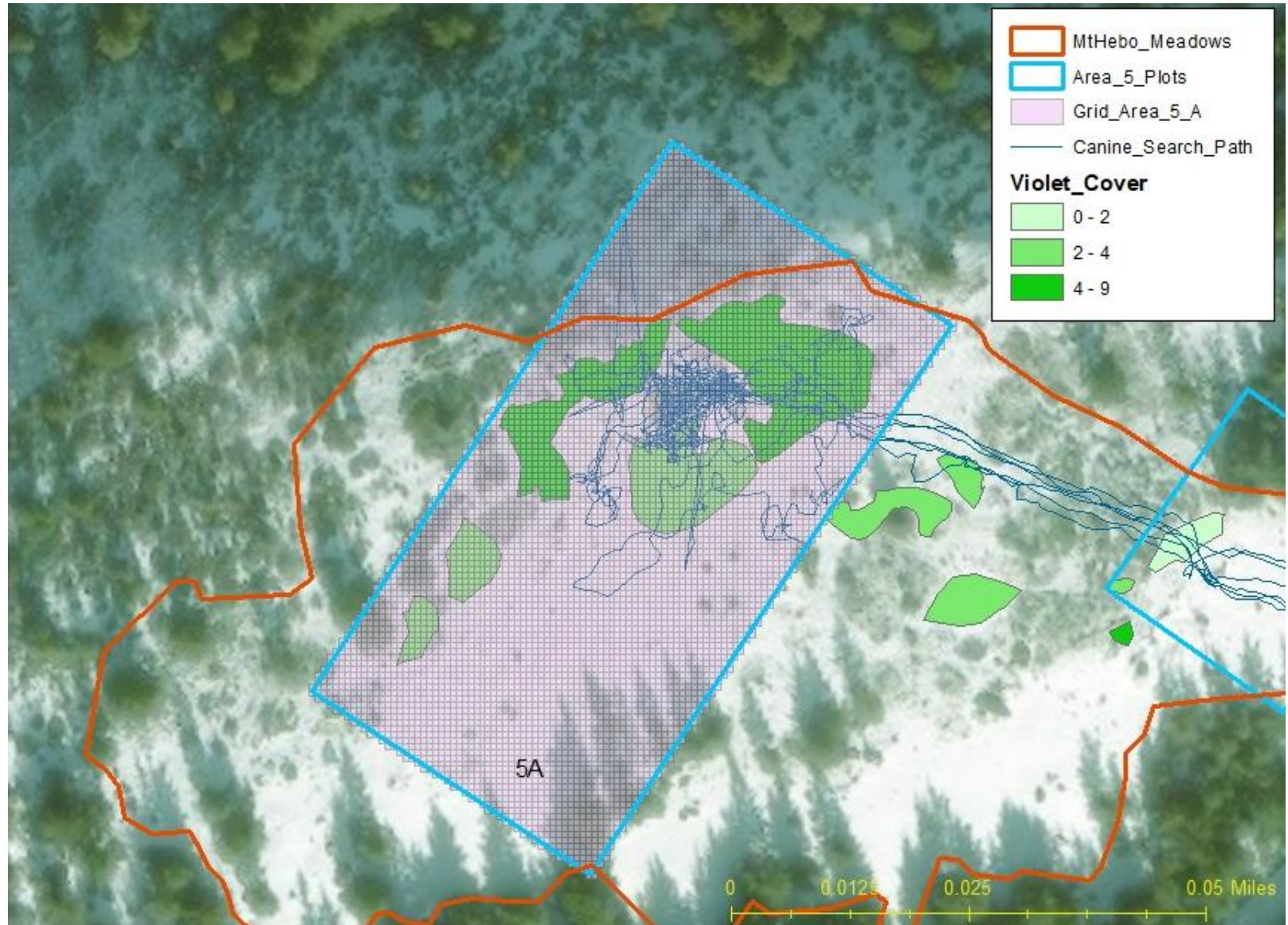
Developing Search Strategy



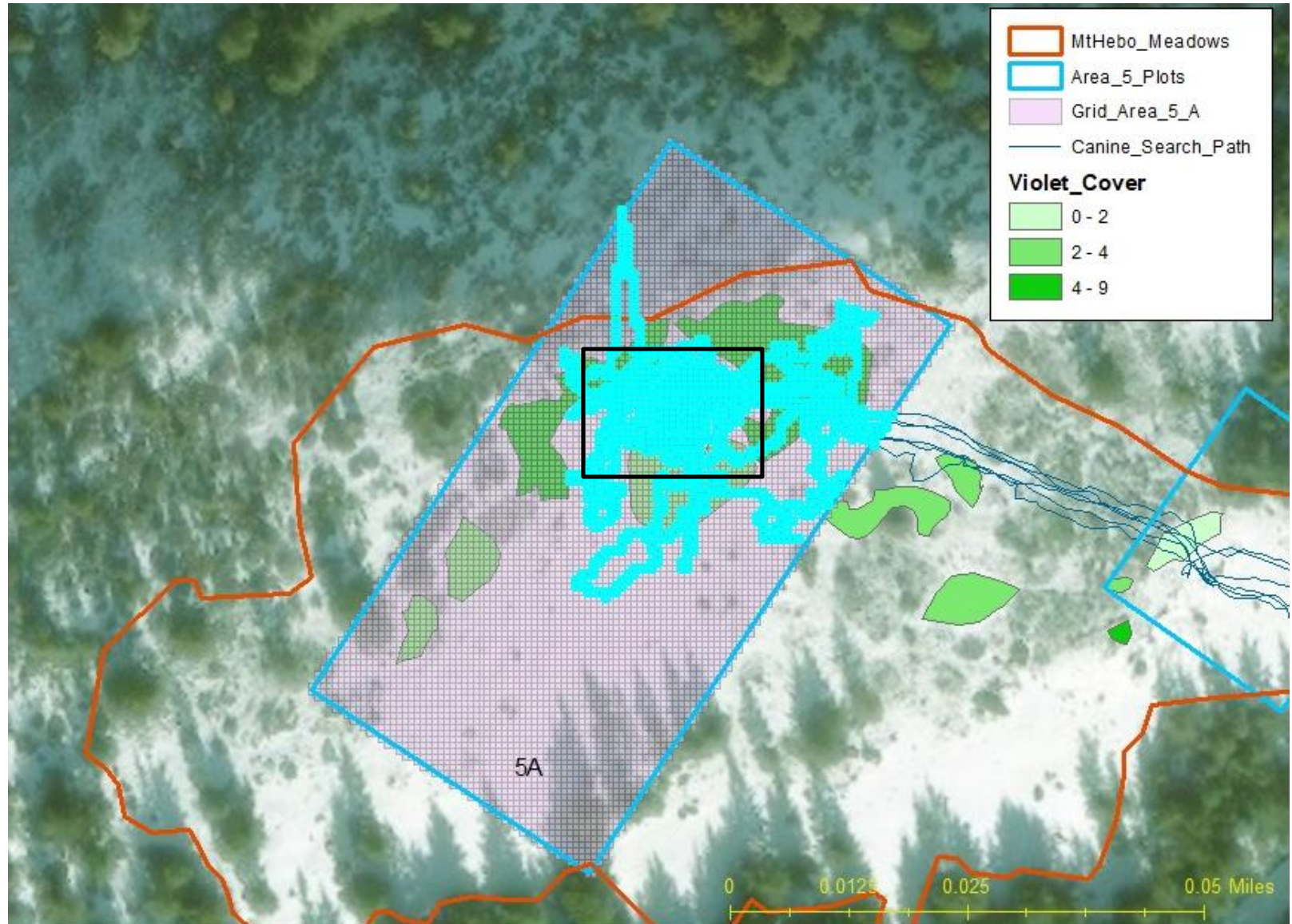
Quantifying Search Effort



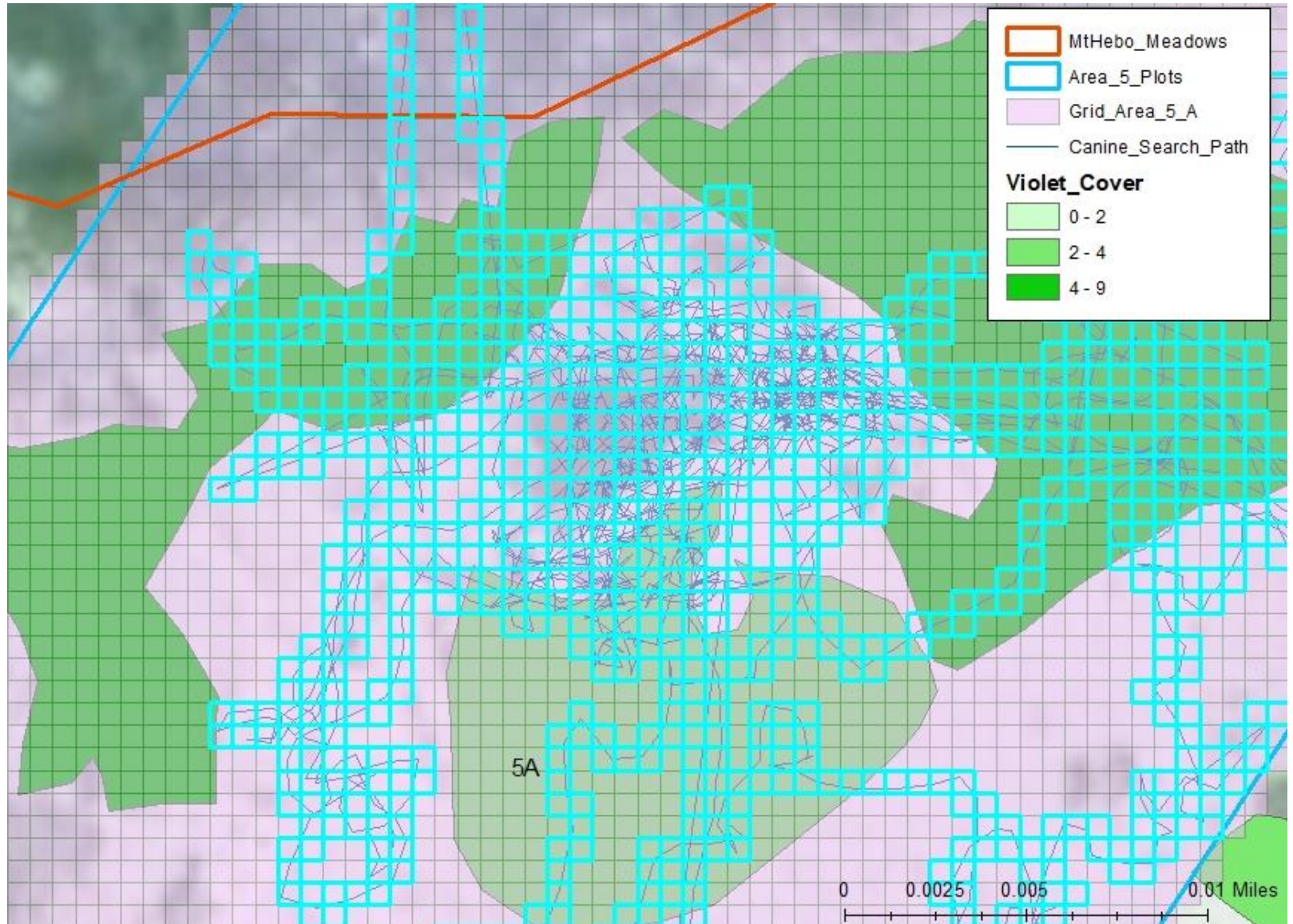
Quantifying Search Effort



Quantifying Search Effort



Quantifying Search Effort



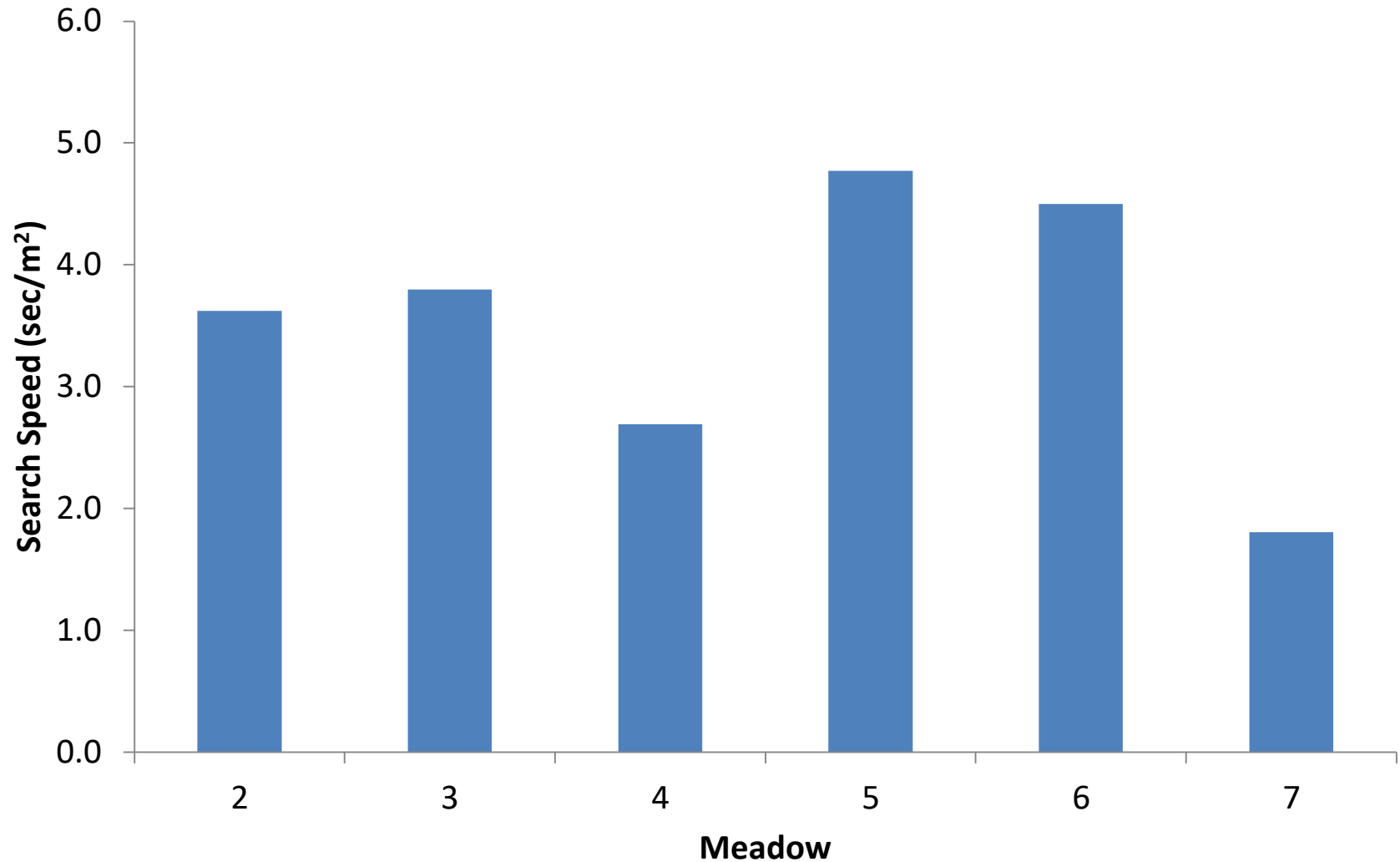
Results - Meadow Area Searched

Meadow	Total Area (m ²)	Plot Area (m ²)	Plot % of Total Area	Area Searched (m ²)	Meadow Searched
2	21086	5046	23.9%	2345	11.1%
3	22500	4607	20.5%	1560	6.9%
4	60788	13292	21.9%	2435	4.0%
5	21530	9647	44.8%	1647	7.6%
6	25010	2802	11.2%	732	2.9%
7	36596	7919	21.6%	1313	3.6%

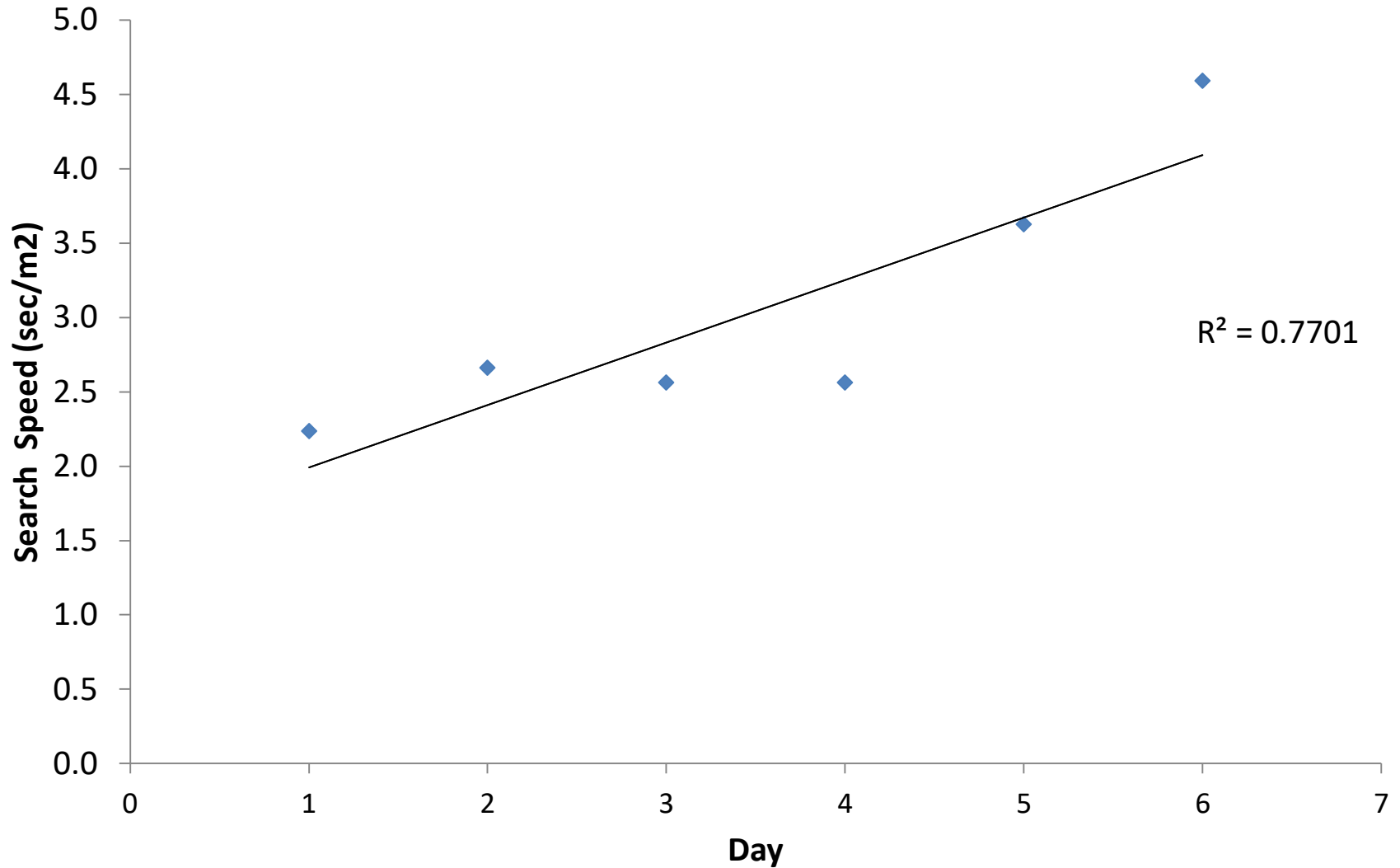
Results - Violet Area Searched

Meadow	Total Violet Area	Plot Violet Area (m ²)	Searched Violet Area (m ²)	Completeness
2	2617	967	461	47.7%
3	388	205	144	70.2%
4	7579	2345	932	39.7%
5	1623	1315	505	38.4%
6	82	53	15	28.3%
7	622	406	97	23.9%

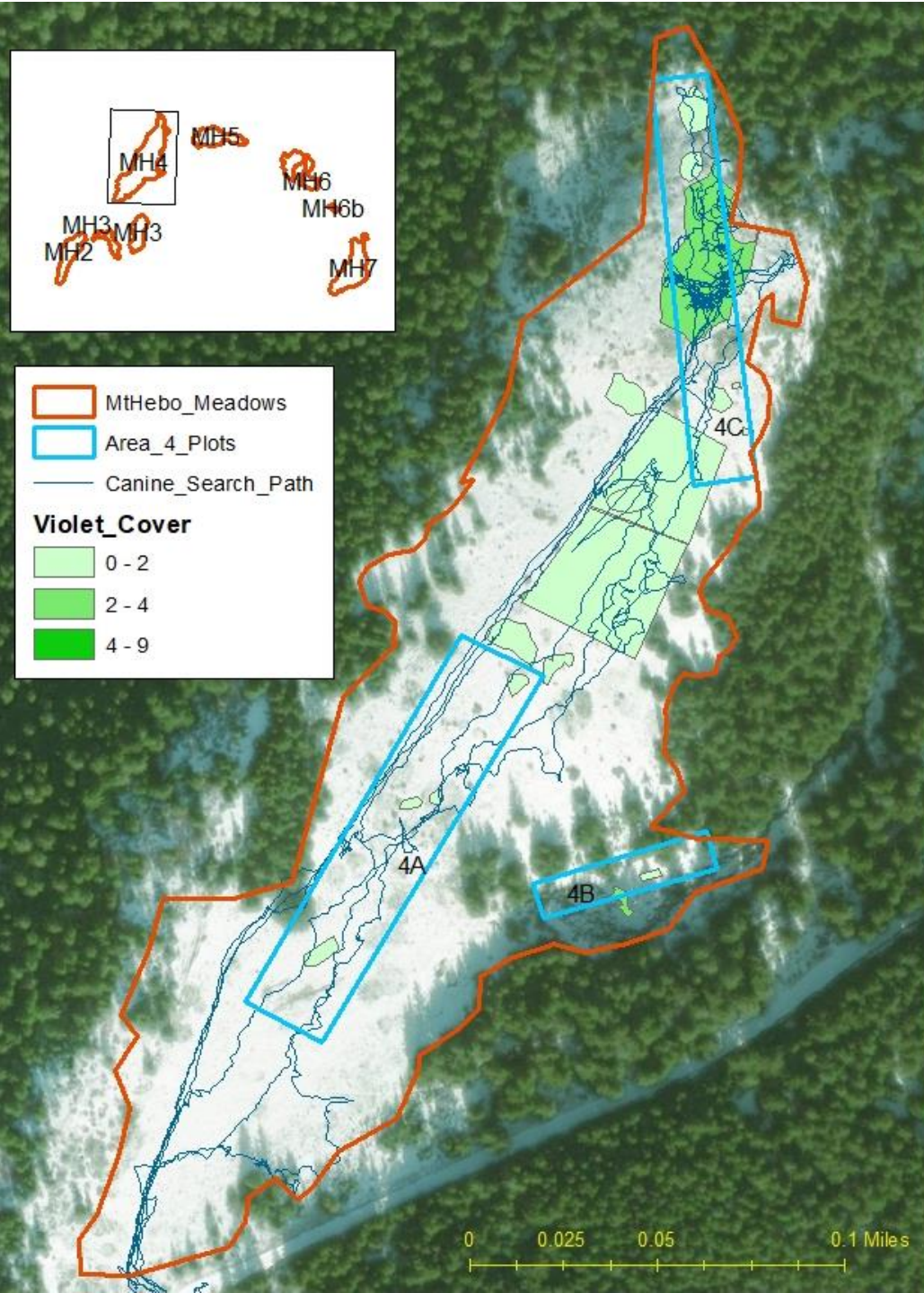
Results - Average Search Speed



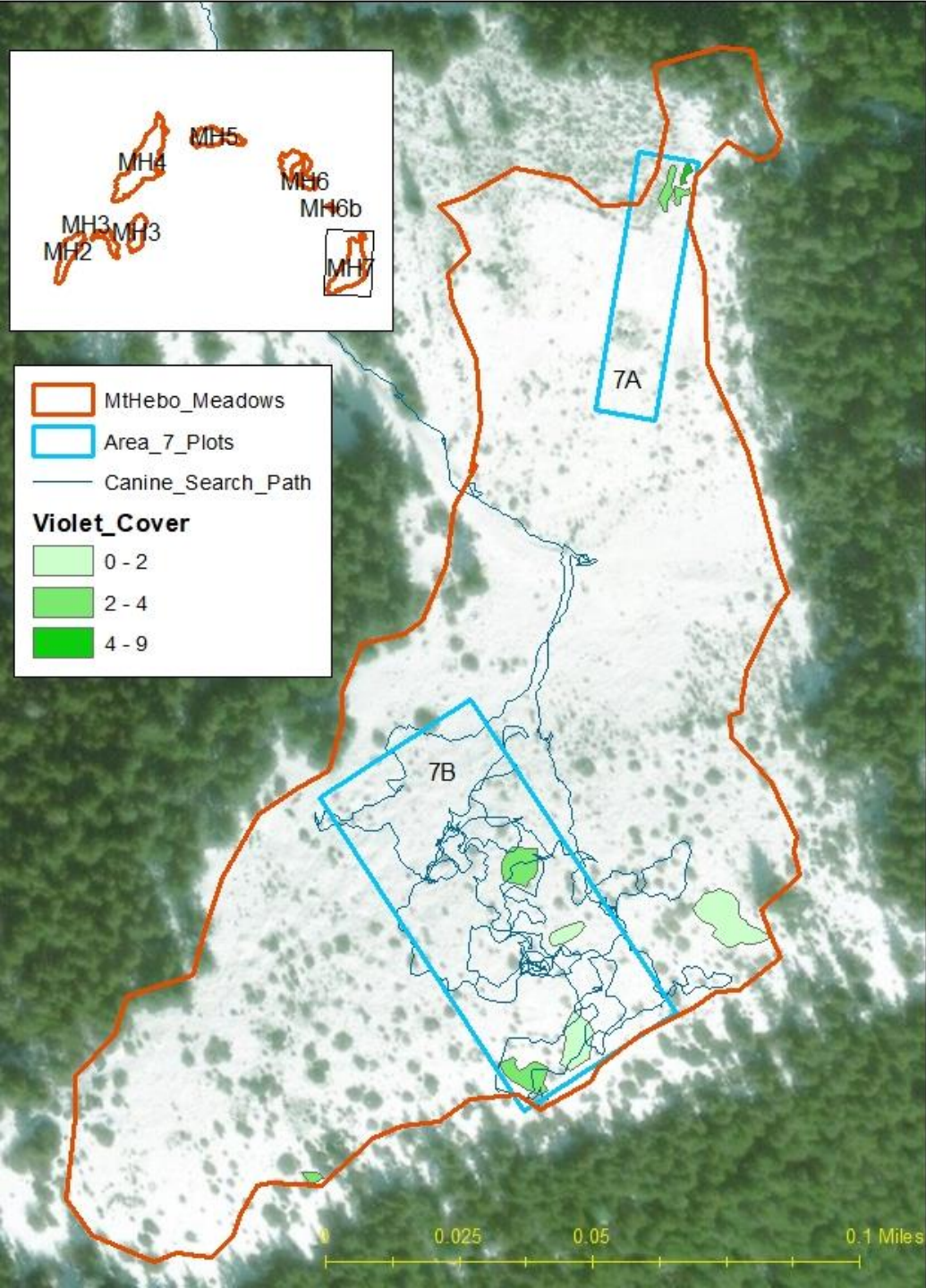
Results - Search Speed Per Day



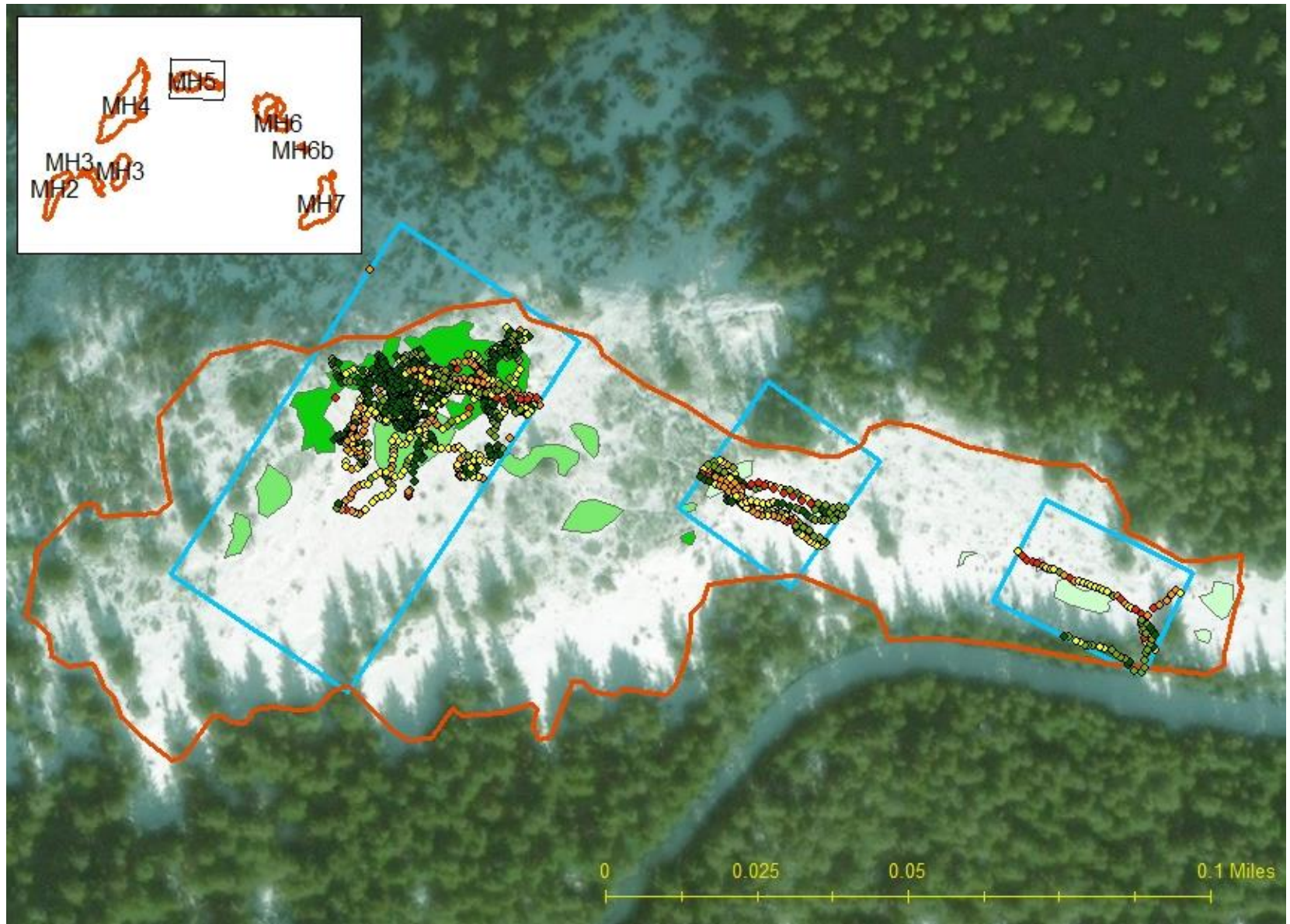
Differences Among Meadows



Differences Among Meadows



Differences Between Days



Differences Between Days

Days 1-4

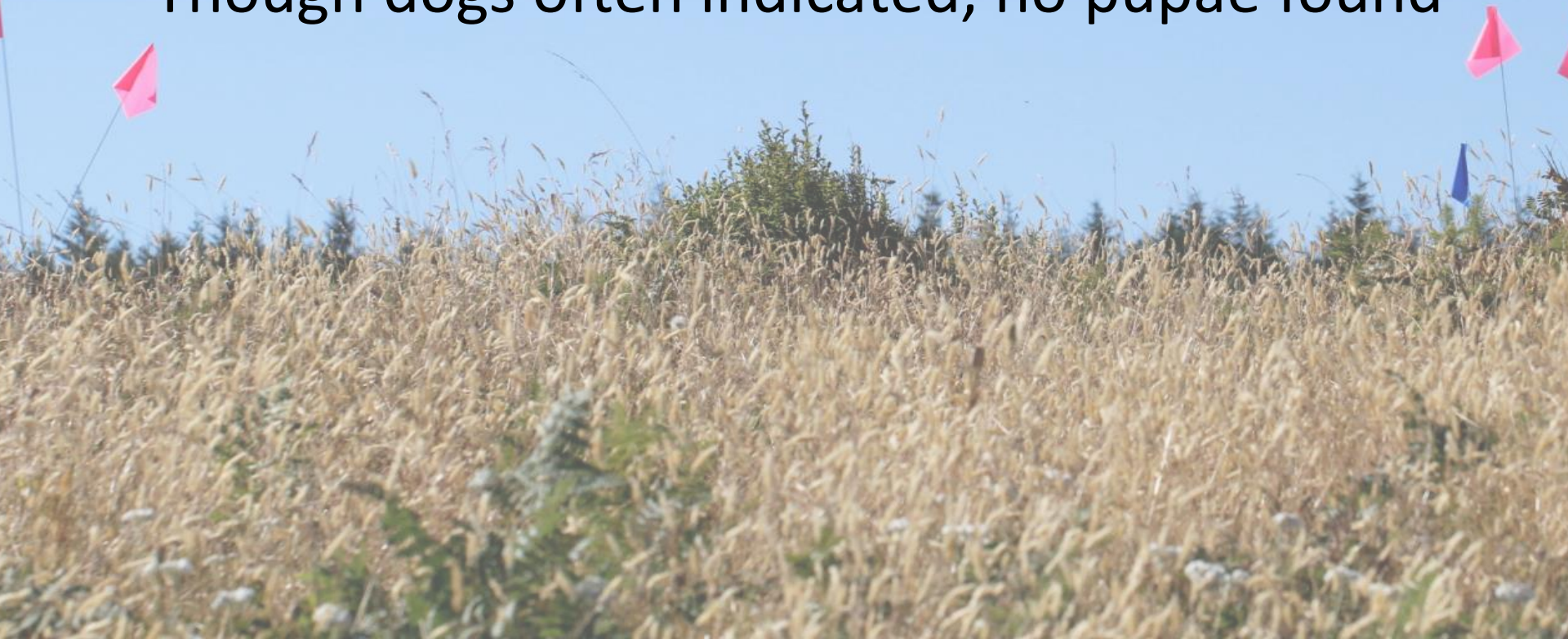


Days 5-6



Implications of Pilot Study

- Non-intrusive
- Dogs not limited by extent of meadow habitat
- Though dogs often indicated, no pupae found



Challenge

- Finding the right scent



Next Steps

- Modify rearing and handling methods
- Incorporate focused search
- Target additional life history stages



Acknowledgements

- Dr. Rich Van Buskirk
- Siuslaw National Forest
 - Deanna Williams & Doug Glavich
- Oregon Zoo and the Woodland Park Zoo
- Conservation Canines
 - Heath Smith
 - Julie Ubigau



A photograph of three dogs sitting in a forest. On the left is a black dog, in the middle is a brown dog, and on the right is a white dog. All three dogs are wearing red and black vests with "CK-9" printed on them. The background is a dense forest with green foliage.

Alli

Casey

Beckett

Thank You

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