



Small mammal diversity in coastal Humboldt County inferred from owl pellets and complementary trapping surveys



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Introduction

Owl pellets provide a relatively unbiased sample of local prey species and may capture a more diverse array of small mammals than traditional trapping methods¹, thus they have been utilized as a noninvasive tool to index small mammal diversity^{1,2}. The Pacific Northwest is recognized for its high vertebrate diversity, but small mammal communities in Northern California remain relatively understudied. This project sought to evaluate the diversity of small mammals present in coastal Humboldt County, California through the analysis of skeletal remains recovered from owl pellets.

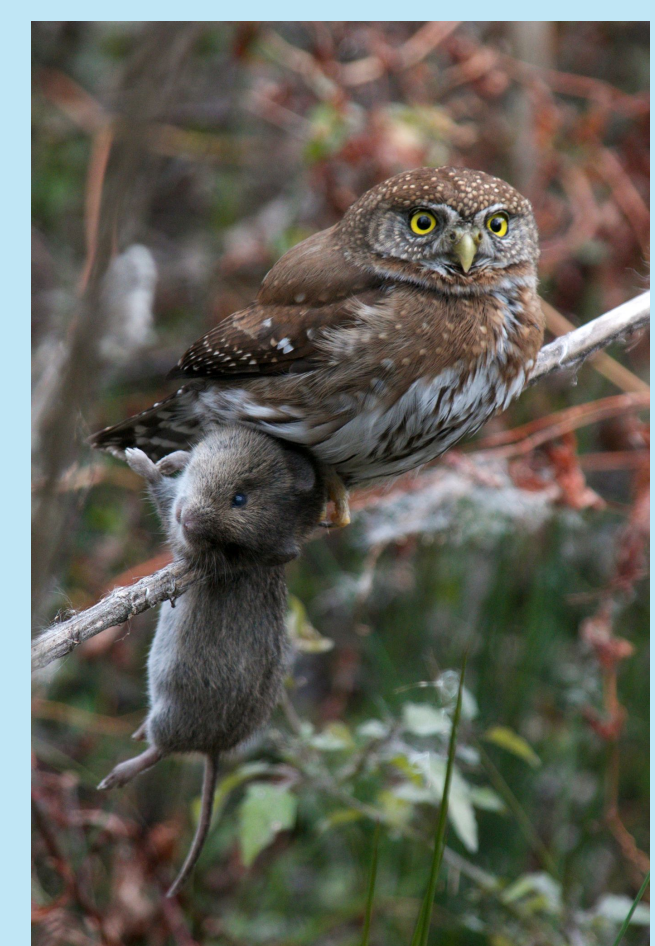


Figure 1: Northern Pygmy Owl with California vole



Figure 2: Map of study site- Humboldt Bay Region. Depicting both owl pellet collection sites and field sampling sites

Methods

Owl Pellets were collected at the Salmon Creek and Lanphere Dune units of the Humboldt Bay National Wildlife Refuge.

- Pellets were dissected, and cranial fragments were removed and identified to species where applicable using detailed cranio-dental morphological analysis³
- Because many specimens were heavily fragmented, dental and palatal characteristics were especially important for identification³
- Identifications were verified through comparison with reference specimens housed in the collection of Cal Poly Humboldt's Vertebrate Museum
- Regionally specific reference specimens were obtained through live trapping conducted at the Salmon Creek unit in fall 2025
- Updated diagnostic cranial characteristics were used for final identification and processing

Citations

1. Heisler LM, Somers CM, Poulin RG. 2016. Owl pellets: a more effective alternative to conventional for broad-scale studies of small mammal communities. *Methods in ecology and evolution*. 7(1): 96-103. <https://doi.org/10.1111/2041-210X.12454>
2. Ghimirey YP, et al. 2023. Decline in small mammal species richness in coastal-central California, 1997-2013. *Ecology and Evolution* 13(12):e10611. <https://doi.org/10.1002/ece3.10611>
3. Verts BJ, Carraway, LN. *Land mammals of Oregon*. 1st ed. 1998. University of California press.

Figure credits

(1) iNat-Edward Rooks, (2) Alyssa Semerdjian, (3) A: Alyssa Semerdjian, B: iNat- Leslie Cavaliere Photography C: iNat- jj1228 D: iNat- Garrett Hughes, E: iNat-Jacqui Simmons, F: iNat- Phil Warren, (4) Abi Hendon, Ali El Shawa, (5) Ali El Shawa Table 1: Abi Hendon



Figure 3: Some species observed, left to right respectively: *Peromyscus sonoriensis*, *Microtus californicus*, *Neotoma fuscipes*, *Glaucomys oregonensis*, *Microtus oregoni*, *Megascapheus laticeps*

Results

Table 1: Small mammal species identified at each owl pellet collection locality and during fieldwork

Family	Genus	Species	Salmon Creek	Lanphere Dunes	Fieldwork
<i>Talpidae</i>	<i>Neurotrichus</i>	<i>N. gibbsii</i>	7		
		<i>Scapanus</i>		3	
		<i>Soricidae</i>	<i>Sorex</i>	<i>S. vagrans</i>	8
<i>S. sonomae</i>	1				
<i>S. trowbridgii</i>				2	
		<i>S. sp.</i>	33	5	
<i>Cricetidae</i>	<i>Microtus</i>	<i>M. townsendii</i>	5		
		<i>M. californicus</i>	54	12	19
		<i>M. longicaudus</i>	6	3	
		<i>M. oregoni</i>	21	4	2
		<i>M. sp.</i>	21	1	
	<i>Peromyscus</i>	<i>P. sonoriensis</i>	12	1	127
		<i>P. sp.</i>	17		
	<i>Neotoma</i>	<i>N. fuscipes</i>			9
<i>Geomyidae</i>	<i>Megascapheus</i>	<i>M. laticeps</i>	2	51	
<i>Muridae</i>	<i>Rattus</i>	<i>R. rattus</i>			3
<i>Sciuridae</i>	<i>Glaucomys</i>	<i>G. oregonensis</i>			1
		Total #	187	91	164

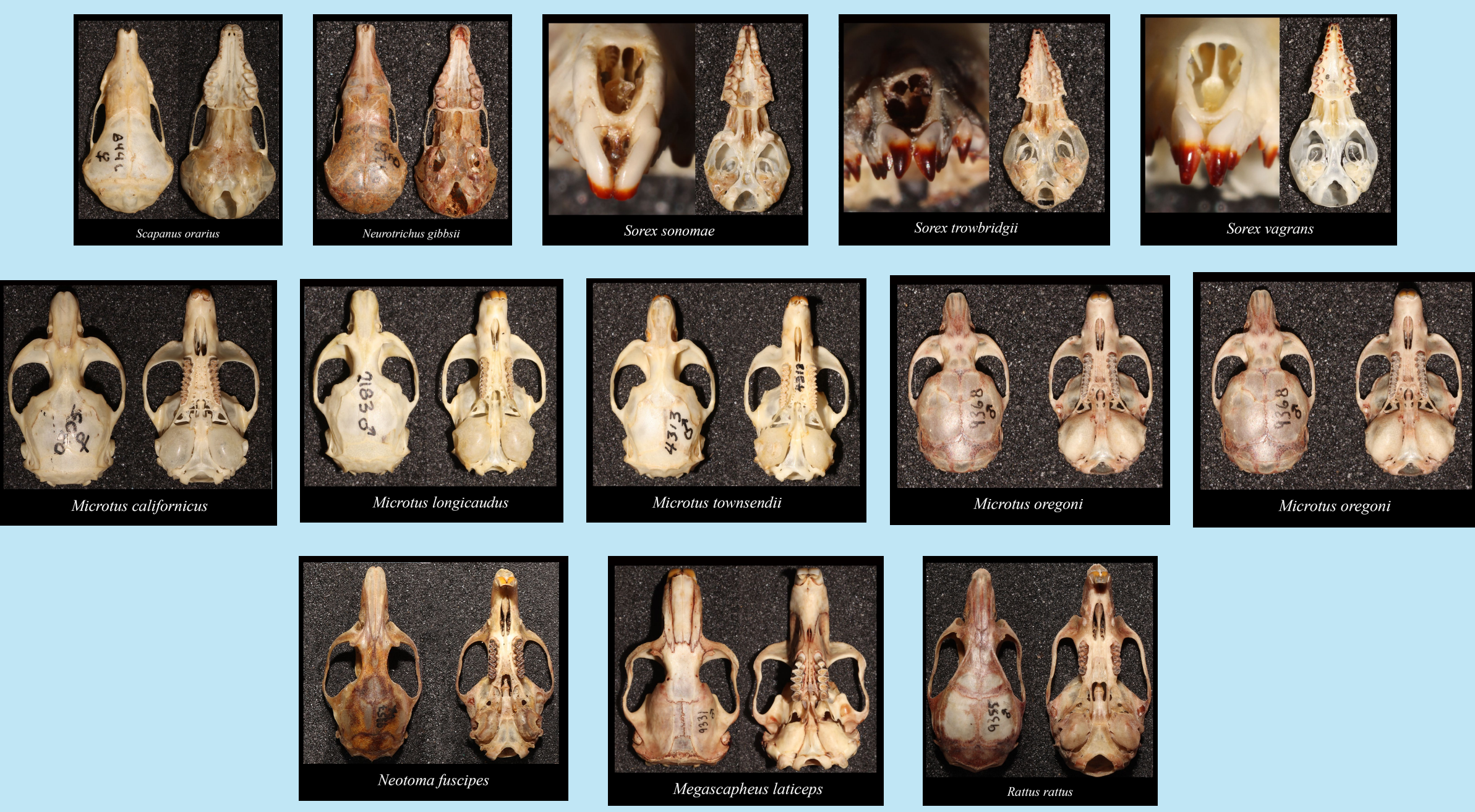


Figure 4: Skull views illustrating craniodental characteristics of most commonly observed species

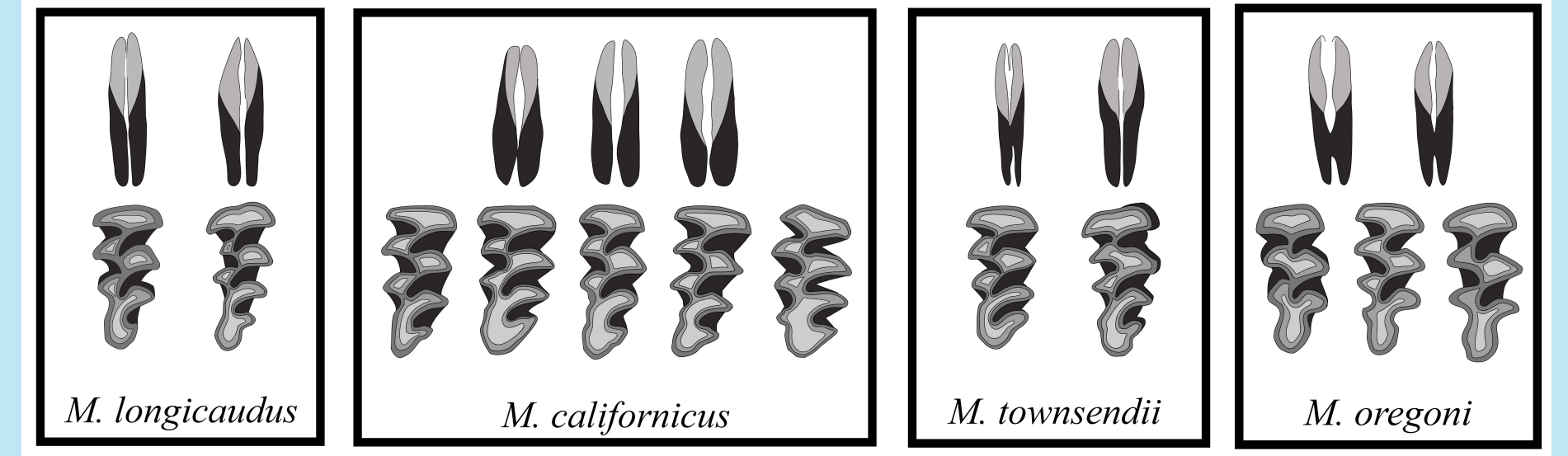


Figure 5: Local morphological variation seen in the incisive foramina (top) and third molar (bottom) of genus *Microtus*

Discussion

Analysis of voucher specimens provided a detailed assessment of regional morphological variation, which in turn facilitated re-assessment of previously identified specimens as well as provided a more in-depth and localized description of diagnostic characteristics present in Humboldt county species. Final assessment of data revealed a difference in abundance between study sites: Salmon Creek was dominated primarily with *M. californicus* and *P. sonoriensis*, this was corroborated in field data. Whereas Lanphere Dunes was predominantly occupied with *M. laticeps*.

Next steps

- Perform statistical analysis on the collected dataset
- Evaluate variation in abundance across study sites
- Develop a manuscript for peer-reviewed publication

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