EXPLORING THE ROLE OF SCAVENGER DECLINES ON SOIL MICROBIAL FUNCTION

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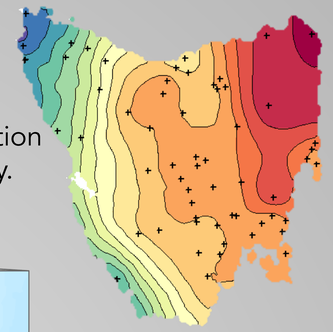
Introduction

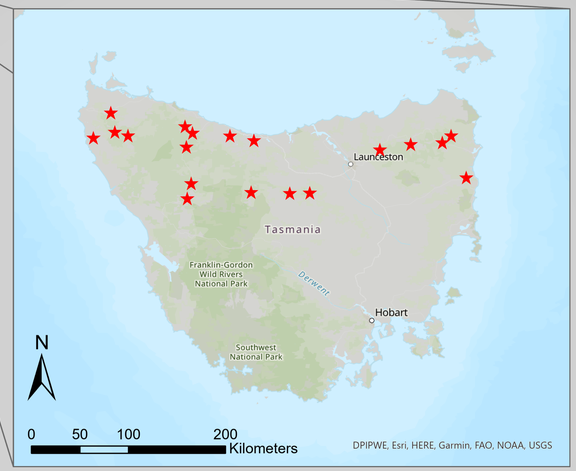
- Globally, top predators/scavengers are in decline but the effects of their loss on ecosystem function remain difficult to predict[1].
- The emergence of a highly transmissible, lethal cancer (DFTD) is pushing Tasmanian devils to the brink of extinction but provides an ideal natural experiment[2].
- Because devils are the top scavenger in Tasmania, their decline may induce a trophic cascade but the effect on soil and ecosystem function is unknown.
- My research investigates the link between scavenger loss, microbial function, and soil biogeochemistry.

★ Sample Sites



Sample sites spanning the East to West gradient of DFTD. Red = localized extinction while Blue = 95-100% of carrying capacity.

n = 19 sites with 3 replicates per site and 2 soil depths per replicate = 114 samples.



Healthy Tasmanian devil versus an individual with DFTD.

Hypotheses

- Devils do not affect soil pH or cation exchange capacity (CEC).
- Lower devil density increases soil C:N by inhibiting rapid cycling of non-plant inputs.
- Lower devil density reduces microbial diversity but increases total biomass.

Driving Questions

Does scavenger presence affect soil biogeochemistry and nutrient cycling?

Does the decline of a dominant scavenger alter soil microbial communities?

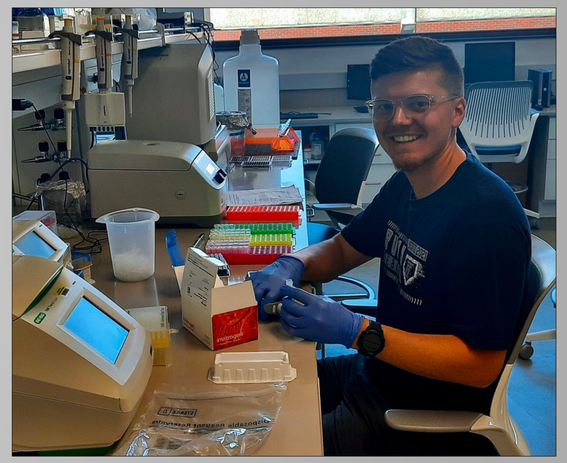
Methods

Moisture Content
Soil pH
Soil fractions (MAOM & POM)
Dissolved C & N pools
Cation exchange capacity

Microbial Biomass (C & N)
DNA Extraction
(bacterial 16S gene, fungal ITS1 region)

Future Work

- DNA extractions and soil moisture analysis has been completed
- Remaining analytical work will be completed this summer
- Statistical analyses, figure development, and manuscript writing will be completed in the next two semesters.



Literature cited

[1]Ripple, et al. (2014). Status and ecological effects of the world's largest carnivores. Science, 343(6167).

[2]McCallum, et al. (2009). Transmission dynamics of Tasmanian devil facial tumor disease may lead to disease-induced extinction. Ecology, 90(12).

Acknowledgments

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