SONOMA STATE UNIVERSITY

School of Science and Technology

Soil Dwelling Organisms: Why Do They Live Where They Live?

- What factors of soil contribute to the concentration of organisms found underneath natural and man-made cover?

GABE HOLMES, SOPHIA DEMETRIOU, ETHAN HERLIHY

Why Is This Important?

- Primary consumers (insects, macroinvertebrates, amphibians) require specific habitat conditions (Schloter, 2003)
- Vital to an ecosystem (Wolters, 2001)
- Understanding why organisms live in one area opposed to another

Man-made Cover #4
Species: *Homo sapiens*

What is Natural Cover?

- Fallen tree branches (Avg. 4’x8.5”)

Natural Cover #3

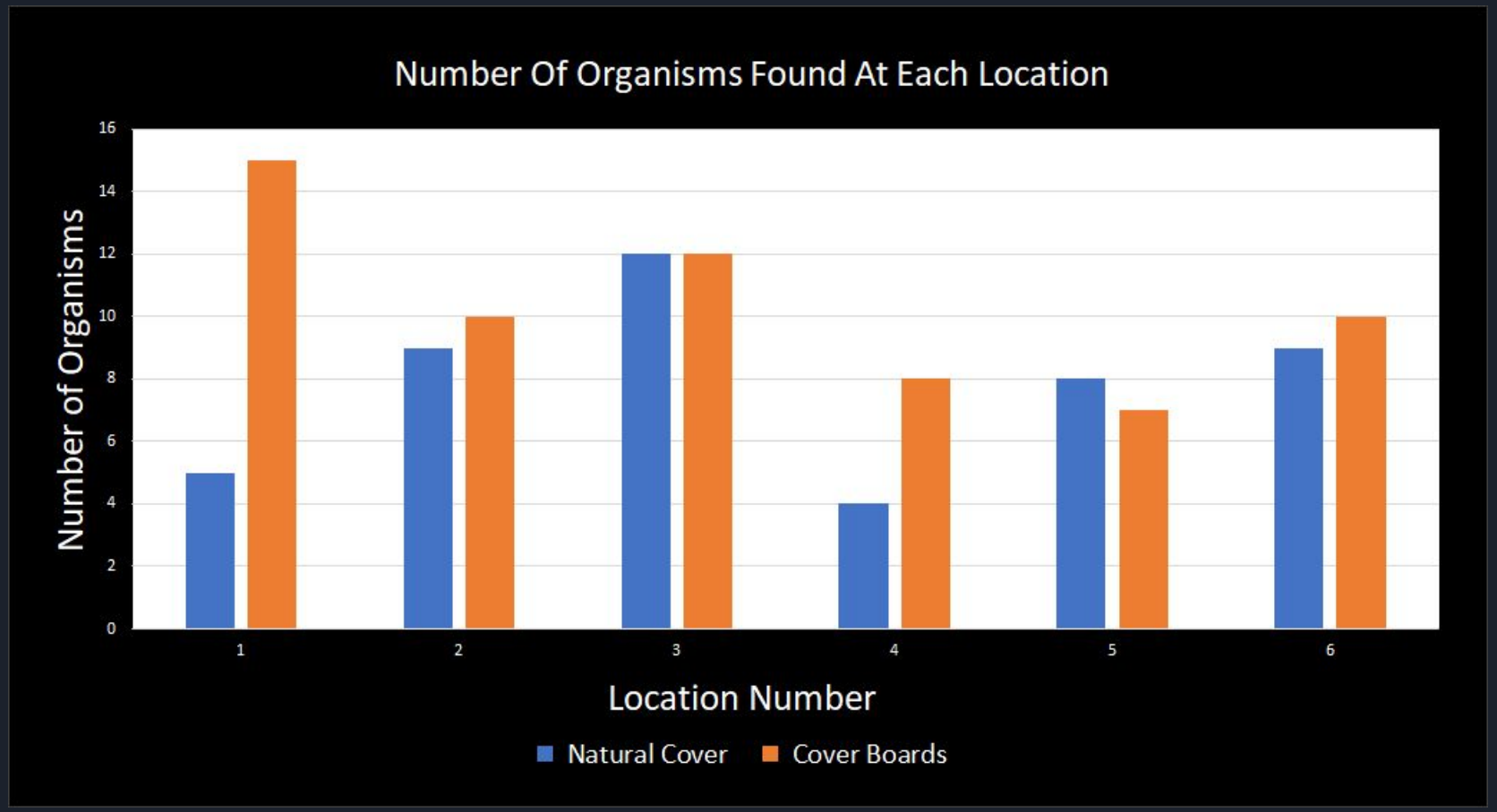
What is Manmade Cover?

- 2’x4’ flat plywood

Man-made Cover #4

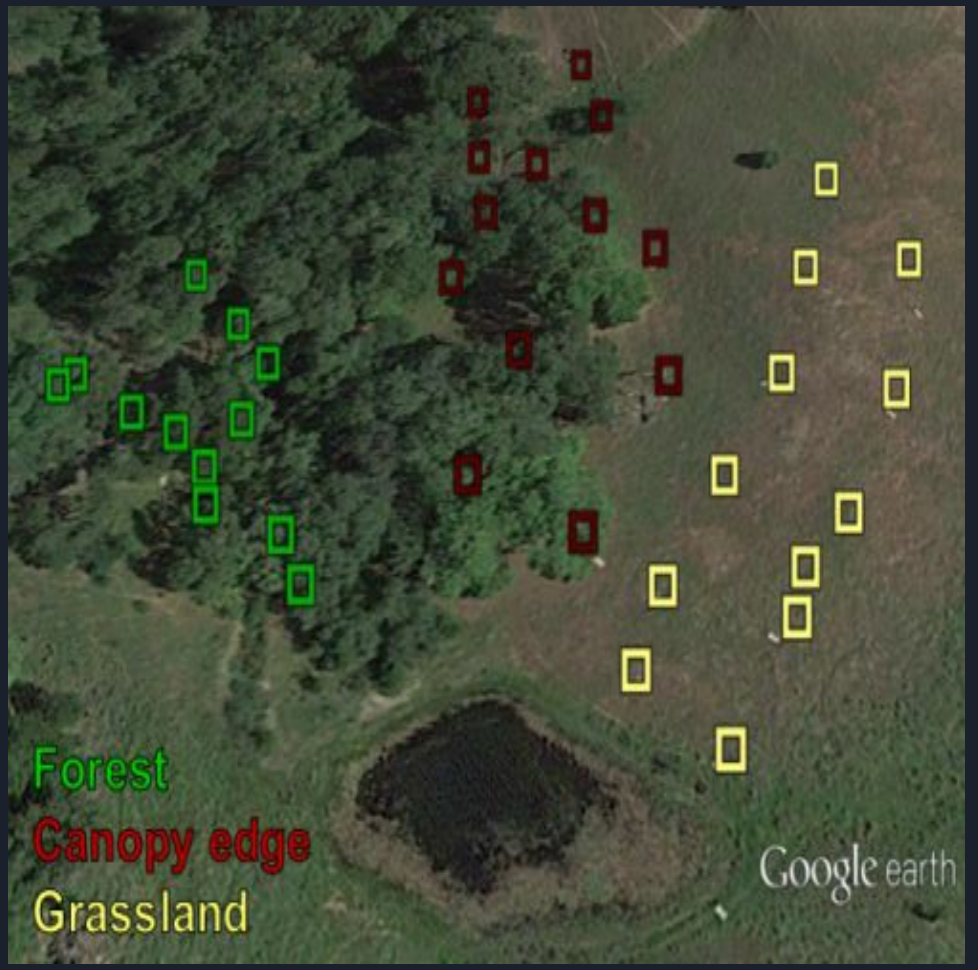
Hypothesis

- Higher concentration of organisms underneath cover boards



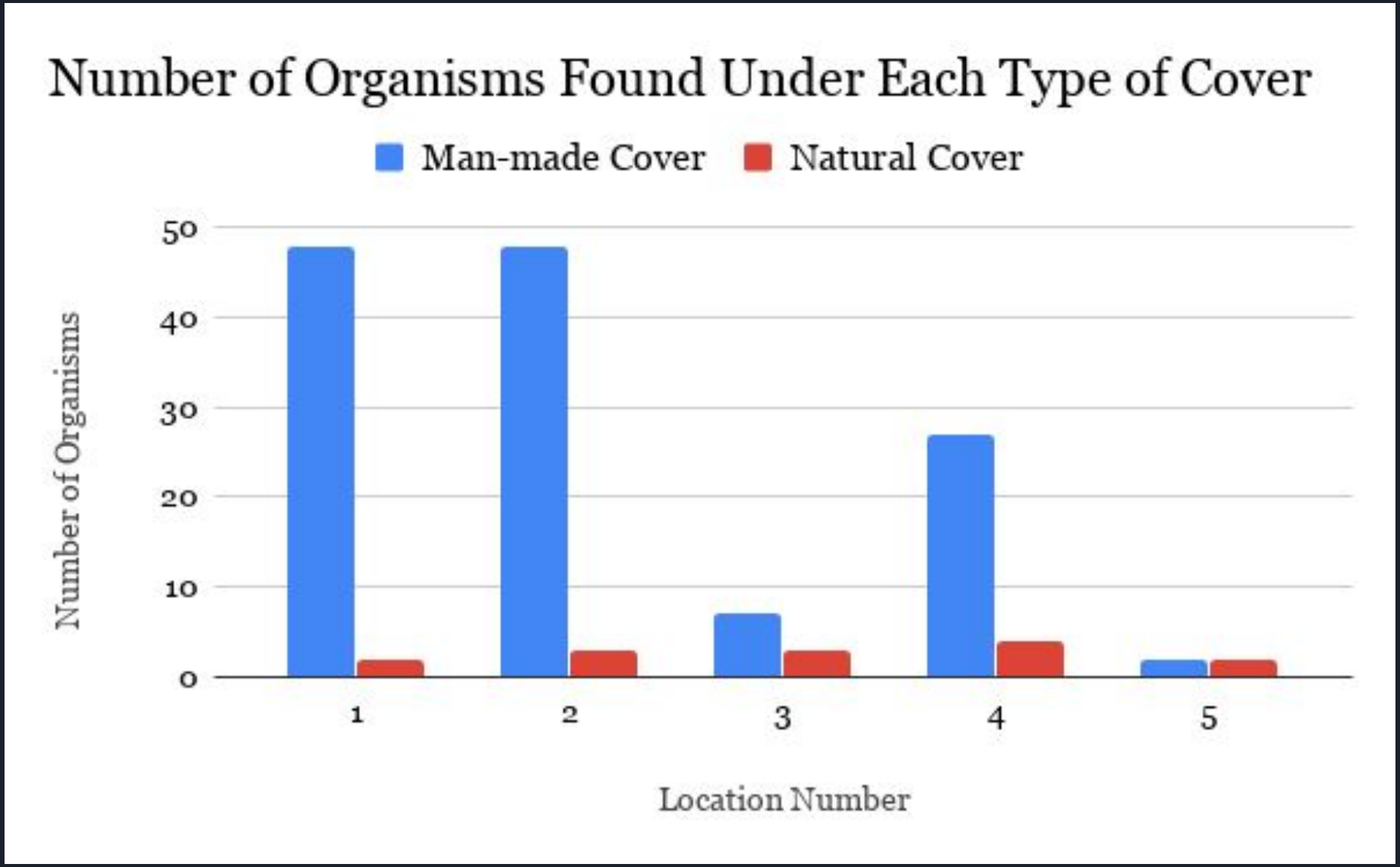
Methods

- Assessed five man-made cover boards and five natural wood covers at Kelly Pond
- Recorded coordinates of each location
- Recorded number and type of species at each location and photographed each individual
- Tested soil temperature and moisture level

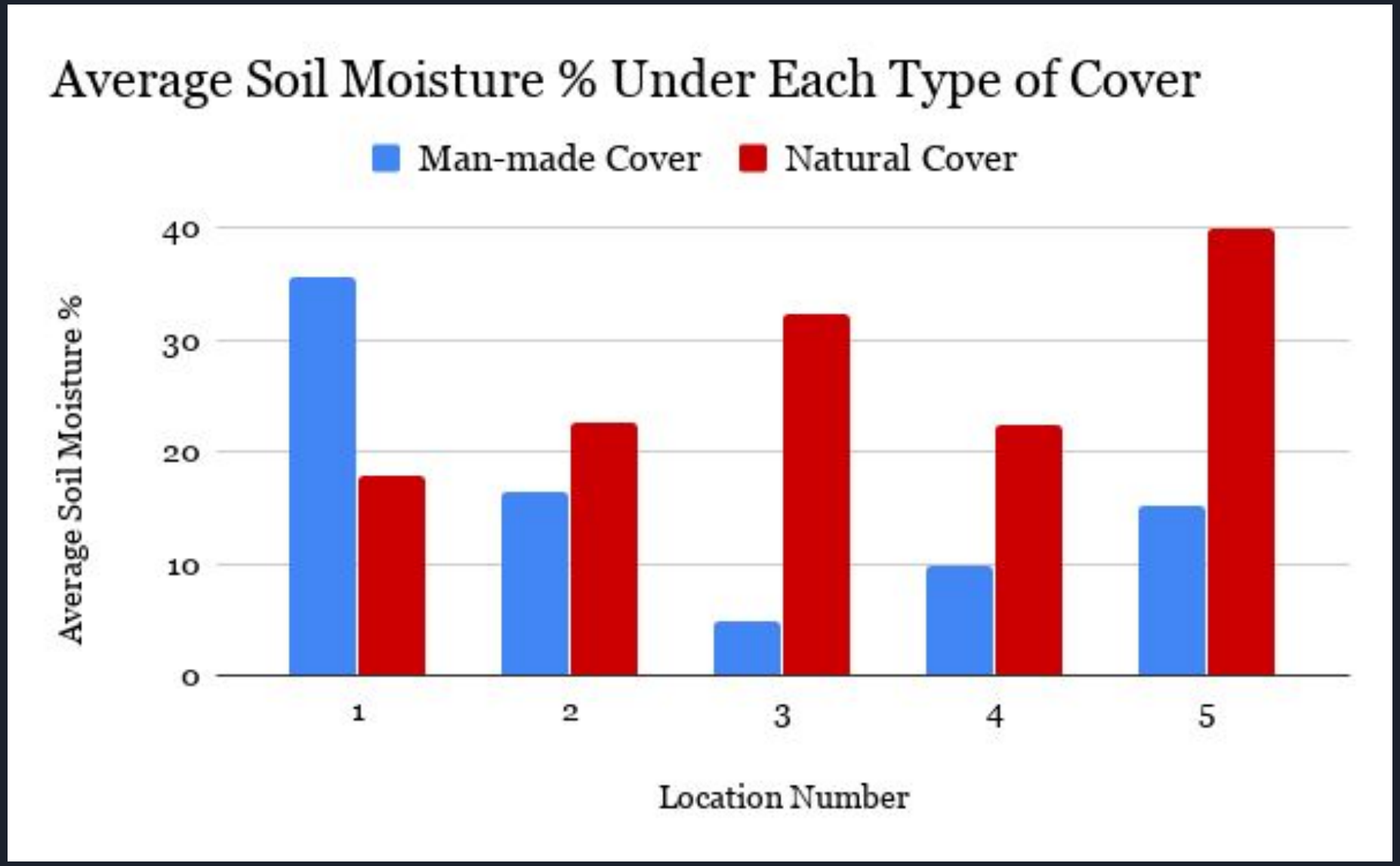


https://protecthabitat.wordpress.com/coverboard-methods/

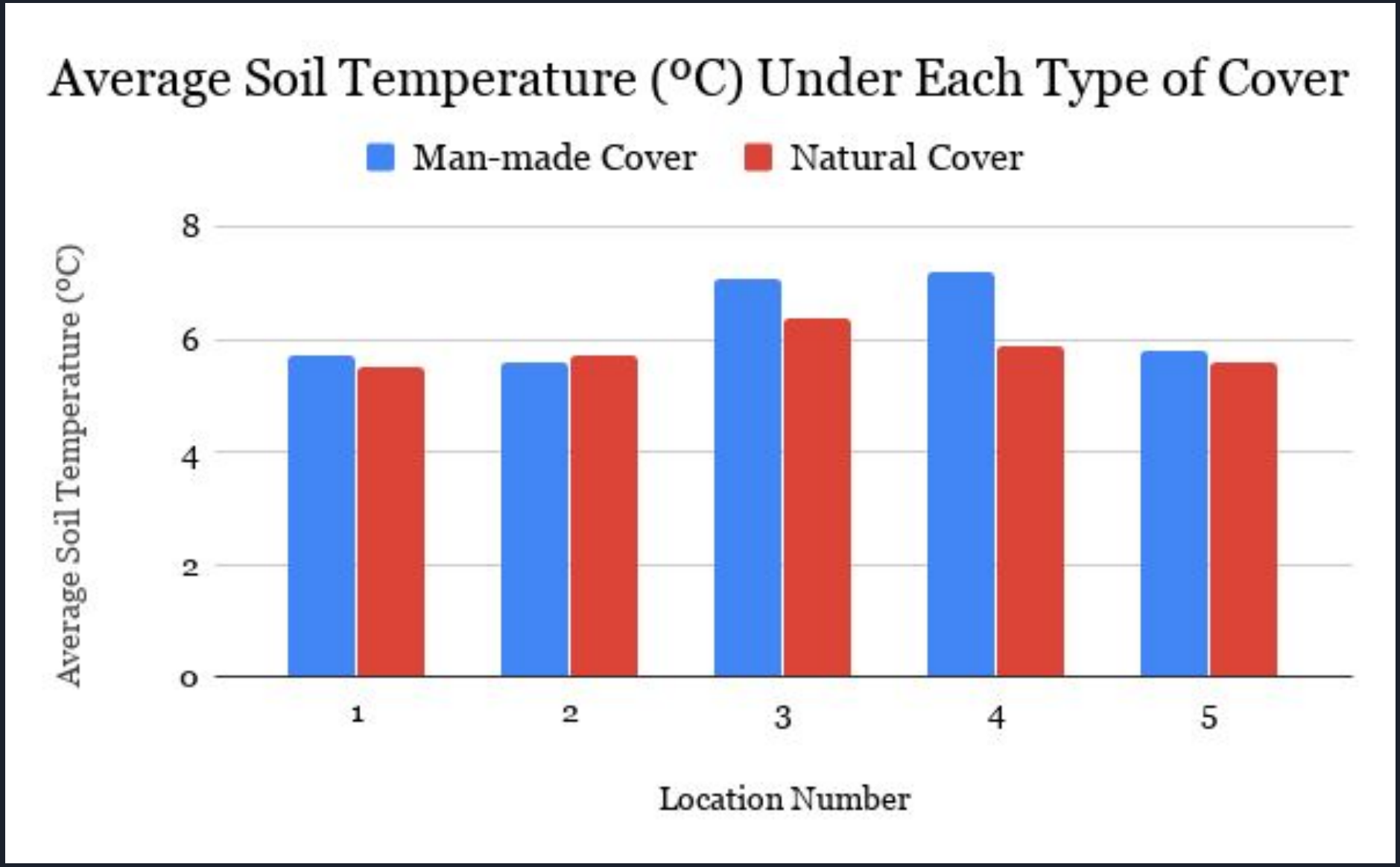
Results


Number of Organisms Found Under Each Type of Cover
Man-made Cover
Natural Cover
50
40
30
20
10
0
Number of Organisms
1
2
3
4
5
Location Number

Results


Average Soil Moisture % Under Each Type of Cover
Man-made Cover
Natural Cover
Average Soil Moisture %
40
30
20
10
0
1
2
3
4
5
Location Number

Results


Average Soil Temperature (°C) Under Each Type of Cover
Man-made Cover
Natural Cover
Average Soil Temperature (°C)
8
6
4
2
0
1
2
3
4
5
Location Number

Results

Cover Type	Man-made	Natural
Avg. # of Organisms Found	26	3
Avg. Soil Moisture (%)	16.4	26.9
Avg. Soil Temperature (°C)	6.3	6.8

Man-made Cover #4
Species: California Bordered Plant Bug (*Largus californicus*)

Identified Species Found

- Pill bug
- Jerusalem Cricket
- California Bordered Plant Bug
- Camel Cricket
- Earth Worm
- Milky Slug
- *Ensatina* Salamander
- California Slender Salamander
- Western Forest Scorpion
- Black Harvester Ants
- Earthworm
- Millipede
- Common Snail

Natural Cover #5
Species: Jerusalem Cricket (*Stenopelmatus*)

Unidentified Species Found

Man-made Cover #5

Man-made Cover #1

Man-made Cover #1

Conclusion

- Significantly more species were found under the man-made cover boards than the natural cover
- Soil moisture levels significantly higher under natural cover
- Soil temperatures were relatively similar

Man-made Cover #3
Species: Western Forest Scorpion (*Uroctonus mordax*)

Man-made Cover #5
Species: *Ensatina* Salamander (*Ensatina eschscholtzii*)

Discussion

- Organisms might prefer man-made cover over natural cover because it is a flat surface and isn't underground as well as drier soil.
- For species preservation, we recommend protecting areas that have relatively low soil moisture.

Man-made Cover #4
Species: California Slender Salamander (*Batrachoseps attenuatus*)

Sources of Information

Schloter, M., Dilly, O., & Munch, J. (2003). Indicators for evaluating soil quality. *Agriculture, Ecosystems & Environment*, *98*(1-3), 255-262. doi:https://doi.org/10.1016/S0167-8809(03)00085-9

Wittmann, J. (2019). Personal Communications

Wolters, V. (2001). Biodiversity of soil animals and its function. European Journal of soil Biology, 37(4), 221-227. Https://www.researchgate.netpublicaiton/223828190_Biodiversity_of_soil_fauna_and_its_function

Acknowledgments

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Thank You!