

CODE 220

Draft Outline of Project Idea

Group # _____

Names: _____

Project Idea Draft Title: Native Animals as Signs of Urban Environmental Health

Research Question: (stated as a testable question)

What is the relationship between native animal populations and environmental health within urban landscapes?

Hypotheses: (stated as mutually exclusive answers to your research question)

If the environment in the city is healthier (more green space, less pollution), then there will be more native animals, and they will be healthier.

Prediction: (stated as a range of expected results will lead you to reject or accept the stated or null hypotheses)

I think if the city has more green space, clean water, and less pollution than we will see more animals living there. If the city is dirty or has no nature, the animals will go away or not be healthy.

Evidence: (Rationale of your hypotheses based on peer-reviewed scientific literature and science news on your topic)

Review Articles: (list the citation and what it says about your topic)

Aronson, M. F. J., et al. (2017). Biodiversity in the city: key challenges for urban green space management. *Frontiers in Ecology and the Environment*, 15(4), 189–196.

This review says that how we design and take care of green spaces in cities directly affects biodiversity. If a city manages green space with native plants and trees, it helps birds, insects, and small mammals. But if the city only has lawns or concrete, then animal diversity goes down. This shows that environmental health and native animal populations are connected.

Aronson, M. F. J., Lepczyk, C. A., Evans, K. L., Goddard, M. A., Lerman, S. B., MacIvor, J. S., Nilon, C. H., Spotswood, E. N., & Warren, P. S. (2025). Urban biodiversity and ecological

networks: Perspectives and tools for understanding cities as ecological systems. CAB Reviews, 20, Article 0028. <https://doi.org/10.1079/cabreviews.2025.0028>

d. This article connects to our research as it provides a general model on which to examine and explore urban greenspaces and how they relate to the topics of environmental health. Since we are reviewing human-animal concepts, this article will be of much use.

Di Giulio, M., Holderegger, R., & Tobias, S. (2009). Effects of habitat and landscape fragmentation on humans and biodiversity in densely populated landscapes. *Journal of Environmental Management*, 90(10), 2959–2968. <https://doi.org/10.1016/j.jenvman.2009.05.002>

d. Connection: This article connects to the overall topic of our research by exploring the interactions between habitats and how human interactions with these environments can be both beneficial and limiting. Since our research is focused on human-animal interactions, I feel that this article connects to the topic well.

Tartaglia, E. S & Aronson, M. F J. (2024) . Plant native: comparing biodiversity benefits, ecosystem services provisioning, and plant performance of native and non-native plants in urban horticulture. This review article looked at a ton of studies and found that native plants support more wildlife and ecosystems service than non-native plants in cities. That means they help the environment (ex. Birds, bugs, air and plants) grow better. even though some non-native plants can get job done, natives are better all around. According to article non-native trees can still provide shade and help clean the air but they often do not support as many insects, bugs, and other small animals like squirrels. Native trees keep ecosystems, because they strengthen local food webs and help protect nature long-term in cities.

Research Articles: (list the citation and what it says about your topic)

Narayan, E. J., & Hero, J. M. (2019). Urbanisation and its effects on stress physiology in eastern grey kangaroos. *General and Comparative Endocrinology*, 281, 145–153.

This research measured stress in kangaroos by looking at hormone levels. It showed kangaroos in urban areas were more stressed than those in natural places, especially when pollution or human activity was higher. That means the health of the environment is tied to how well animals are doing.

Wang, Y., Liu, Y., Li, Y., Zhang, Y., & Liu, Y. (2024). Urban biodiversity and ecological networks: Perspectives and tools for understanding cities as ecological systems. *iScience*, 27(9), 109377. <https://doi.org/10.1016/j.isci.2024.109377>

d. This article discusses the one health method of ecosystem restoration; a holistic approach that utilizes perspective analysis when conducting habitat restoration and ecological preservation. With respect to our research assignment, I beleive that this article offers a unique perspective on the topic at hand.

Aronson, M. F. J., Lepczyk, C. A., Evans, K. L., Goddard, M. A., Lerman, S. B., MacIvor, J. S., Nilon, C. H., Spotswood, E. N., & Warren, P. S. (2023). Urban biodiversity and ecological networks: Perspectives and tools for understanding cities as ecological systems. *People and Nature*, 5(4), 1010–1025. <https://doi.org/10.1002/pan3.10604>

d. Connection: This article connects to the topic of our research as it relates to the relationships between wildlife conservation and urban landscapes and how these relationships can create new challenges that can affect both groups. Using this research, we can investigate these challenges and develop our experiment around them.

<https://link.springer.com/article/10.1007/s00267-005-0148-8>

Tarsitano, Elvira. "Interaction between the environment and animals in urban settings: integrated and participatory planning." *Environmental Management* 38.5 (2006): 799-809

Urban biodiversity is shaped by habitat size, edges, and connectivity, showing that cities aren't just "built vs. nature" but gradients where species respond differently to urbanization (Garden et al., 2006). This makes biodiversity a strong measure of urban health, since changes in species richness and distribution reflect habitat quality. Tarsitano (2006) adds that ignoring animal populations in urban planning leads to unbalanced ecosystems and poor health outcomes, while integrating them into planning highlights their role as key indicators of ecological stability. Together, these studies show that native animal populations directly reflect the environmental health of urban landscape

SciComm Articles: (list the citation and what it says about your topic)

Gaston, K. J., & Cox, D. T. C. (2021). Why wildlife gardens matter. *Frontiers for Young Minds*. This article explained in simple words that planting gardens with native plants really helps animals in cities. It said that even small actions, like making a backyard wildlife garden, can bring back birds and insects. It also said this improves the environment for both humans and animals.

Johnson, Marc TJ, and Jason Munshi-South. "Evolution of life in urban environments." *Science* 358.6363 (2017): eaam8327.

The article looks at how urban environments are shaping the evolution of animals, plants, and even microbes. Some native species are adapting quickly to city life, while others struggle or decline. These changes show that native populations aren't just living in the city—they're reacting to it, and how they do reflect the health of urban ecosystems. Basically, if species are adapting and surviving, it signals a more resilient, healthier environment; if they're disappearing or turning into pests, it's a warning that the city's ecological balance is of

Proposed Experiment: (Experimental Design of your research project)

Independent Variables: what treatment or comparison groups or what factors will you modify

Native animal and plant groups, such as mammals, avian species, amphibians, reptiles, trees, shrubs, bushes, fibrous plants, etc.

Dependent Variable: what will you measure

Amount, quality, and yield of plant and animal species.

Control Variables: what will hold constant between treatments

The locations and environment of the study will remain the same, as will the variety of plants and animals present (all native species).

Procedures: what you will do, how, how much, how often, how long, when

1. Source two adequate sites where there is human foot traffic that can also support nonhuman life (parks, trails, sidewalks, campus areas, etc.)
2. Test control site first through the use of trail cameras and ethnographical data collection, leaving it unaltered and simply collecting data on plant and variety, quality, and (in the case of animals) movement patterns.
3. Construct experimental environment by removing nonnative plants, removing garbage, introducing live native plants (will be recorded to ensure the separation between organic plant growth and introduced plants).
4. Test experimental environment through the use of trail cameras to capture animal populations and ethnographical data collection to capture native plant growth.
5. Record data to test against hypothesis and form a conclusion statement on the outcome of the research.

Constructed Figure(s): graphic representation of the proposed results of data that supports your proposed hypothesis/research question. (hint: it's based on your **Prediction Statement**)

