### Thesis Prospectus 2023-24

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**Faculty Reader Approval (date): March 25, 2024**

**MES Director Approval (date):**

1. Working title of your thesis[[1]](#endnote-1).

Trickster’s Glimpse: Fox and Coyote

1. In 250 words or less, summarize the key background information needed to understand your research problem and question.

 In 2022, Cascade red fox (*Vulpes vulpes cascadensis*) was listed by Washington Department of Fish & Wildlife (WDFW) as an endangered species (Lewis et al., 2022). One of the potential threats WDFW identified is increased competition by coyotes (*Canis latrans*) due to reduced snowpack, which could allow coyote greater access to alpine habitats they were previously excluded from in the winter months. In western academia coyote is typically studied in singular phases, such as diet, habitat, and behavior. With singular studies, people tend to focus too deeply whereas a Traditional Ecological Knowledge framework studies species more holistically. Western academia suggests that coyotes were not present in western Washington prior to European colonization (Hody & Kays, 2018) and therefore interactions between fox and coyote in Washington’s Cascade Range are contemporary. Coyote has a longstanding relationship with the Indigenous people of the Salish Sea and along the Pacific coastline. Coyote is best known in Storyworks as Trickster – he is always hungry, cunning, and mischievous (Cockrell, 1998). Coyote is also endearing and helpful to the people he encounters, often becoming a hero (Hyde,1998).

Q’um Q’um Xiiem describes Storyworks as the “development of an Indigenous theoretical, methodological, and pedagogical framework” from the culture (Q’um Q’um Xiiem et al. 2008). Through Storyworks, animal behaviors and identifying areas or habitats are often embedded (Q’um Q’um Xiiem et al. 2008), providing a much richer and holistic relationship in the natural world (Cajete, 2000). This project will weave together a better understanding of coyote west of Washington’s Cascade Range and interactions between coyote and fox in the mountains, by utilizing published books and archives to find pictures, stories, songs, journals, and recordings of coyote. While the focus is on coyote pre-settlement to current day presence, I do anticipate that archives that will help better inform the predator-to-predator relationship coyote and Cascade red fox may have. By blending Indigenous perspectives with Western academia, I will provide a more holistic understanding of coyotes, their interactions with foxes, and their presence west of the Cascade Mountain Range.

1. State your research question(s).
	1. What was the distribution of coyote in Washington State prior to European colonization?
	2. How did the Cascade red fox interact with coyote in Washington’s Cascade Range prior to European colonization?
		1. Have the ways Cascade red fox and coyote interact changed in recent years?
2. Situate your research problem within the relevant literature. What is the theoretical and/or practical framework of your research problem?

I am centering Traditional Ecological Knowledge (TEK) as a framework for my research. I will research the knowledge and practice of both academic and TEK epistemologies with an understanding of the ethical lenses with which they each derive conclusions (Figure 1). By centering my research in TEK, I seek to clarify and correct the academic understanding of coyote in Washington State and describe interactions between coyote and Cascade red fox.



**Figure 1.** Venn-diagram showing the components and intersections of Traditional Ecological Knowledge (TEK) in knowledge, practice and ethics.

1. Explain the significance of this research problem. Why is this research important? What are the potential contributions of your work? How might your work advance scholarship?

The Cascade red fox is the only fox native to Washington State; lowland foxes were introduced. Cascade red fox is a unique mountain fox that historically occurred throughout the Cascade Range of Washington and British Columbia is currently believed to be restricted to the mountains in southern Washington. They are critically endangered, with an estimated 16 individuals producing the next generation.

Climate change is identified as a major threat to Cascade red fox. Academic science suggests coyotes had limited access to the alpine environments where Cascade red fox occur due to their poor adaptations to deep snow, and that interactions between foxes and coyotes have changed in recent decades due to an increase in access to mountain habitats (e.g., land management, road plowing and development for winter recreation). They also suggest that decreased snowpack due to climate change will increase interactions between coyotes and foxes, and that coyotes may be a threat to foxes due to increased predation and/or competition.

This work has the potential to open a larger dialog between Indigenous knowledge, and western science, to produce a more holistic view of species interactions. This will push back the timeline of our understanding of coyote and fox, as well as the approach to answering questions about the relationships between foxes and coyotes. Importantly, by using an integrated approach to evaluating knowledge, this work will provide updated accounts of coyotes to inform Cascade red fox conservation.

1. Summarize your study design[[2]](#endnote-2). If applicable, identify the key variables in your study. What is their relationship to each other? For example, which variables do you consider as independent (explanatory) and dependent (response)?
	1. I will conduct a comprehensive search of the academic literature using databases available through the TESC library (https://libguides.evergreen.edu/az.php), i.e., AGRICOLA, BioOne, EBSCO, Encyclopedia of Life, Google Scholar, JSTOR, ScienceDirect and USFWS Conservation Library to gather articles regarding coyote distribution. I will use the following search terms in the same combination in each database: coyote, Canis latrans, geographic distribution, western North America, Washington State
		1. I will summarize the literature to describe western academic’s understanding of coyote’s distribution in North America and Washington State over time, from pre-European colonization to current time.

* 1. Through the lens of TEK, I will search publicly available Coast Salish Storyworks about coyotes and foxes, their food sources, and how they co-exist. I will attempt to interpret the timing, seasonality (summer, autumn, winter, fall) and nature of species interactions based on the content of the Storyworks.
1. Describe the data that will be the foundation of your thesis. Will you use existing data, or gather new data (or both)? Describe the process of acquiring or collecting data[[3]](#endnote-3).

I will use existing data that is already published in books, journals and recordings that can be found published in TESC library databases, online and in archives of both TESC and surrounding colleges that are open for public view and reference.

1. Summarize your methods of data analysis. If applicable, discuss any specific techniques, tests, or approaches that you will use to answer your research question.

I will use a systematic approach to summarize the western academic literature on foxes and coyotes. To synthesize publicly available TEK, I will use subjective sampling to locate documentation on coyotes and foxes by searching archives to find pictures, stories, songs, journals, and recordings of coyotes and foxes. Using my lived experience and knowledge of Coast Salish language and culture, I will determine sources that are appropriate for inclusion, and interpret Storyworks to describe interactions between foxes and coyotes with special attention toward seasonality and timelines.

1. Address the ethical issues[[4]](#endnote-4) raised by your thesis work. Include issues such as risks to anyone involved in the research, as well as specific people or groups that might benefit from or be harmed by your thesis work, perhaps depending on your results. List any specific reviews you must complete first (e.g., Human Subjects Review or Animal Use Protocol Form).

Some of the publish stories I will be looking at may not have been collected ethically, this could harm Indigenous communities through improper permissions and or acknowledgement to the original keeper of content.

1. List specific research permits[[5]](#endnote-5) or permissions you need to obtain before you begin collecting data (e.g. landowner permissions, agency permits).

I do not need permits, but to write about certain stories I would need to ask Tribal communities for permission to wake up some of these stories and write about them, I might only get permission to speak about them unrecorded.

1. Reflect on how your positionality as a researcher could affect your results and how you will account for this in the research process[[6]](#endnote-6).

Me being Indigenous and wanting to have a more holistic approach to our collective understanding of the world is already a bias in western academia. Many Tribal communities want to share Storyworks but only when they can be validated by enrolled citizens rather than western academics to ensure proper interpretation and culturally appropriate information sharing. My positionality as an Indigenous researcher provides me with a unique opportunity to ensure culturally appropriate integration of Indigenous Storyworks with western science.

1. Provide at least a rough estimate of the costs associated with conducting your research, if any.  Provide details about each budget item so that the breakdown of the final cost is clear.

The main costs for this work are my tuition and fees. I may need to purchase books and will have expenses related to travel to Tribal historical centers. I plan to attend and present my work at the National Tribal Leaders Climate Summit and the estimated cost for this is $775.

1. Provide a detailed working outline of your thesis.

Thesis Question: How have Cascade Red Fox (*Vulpes vulpes cascadensis*) and Coyote (*Canis latrans*) interacted over time in the Washington Cascade Range?

I. Introduction

1. Introduction to the Cascade red fox (*Vulpes vulpes cascadensis*) and its habitat
2. Introduction to Coyotes (*Canis latrans*) and their expanding range
3. Importance of studying intraguild dynamics in ecological systems
4. Statement of the problem: Understanding the interactions between coyote and Cascade red fox population

II. Literature Review

1. Overview of previous research on coyote and fox interactions
2. Studies on the ecology and behavior of coyotes and Cascade red foxes
3. Historical range and distribution of Cascade red foxes
4. TEK Theoretical frameworks for understanding animal behaviors & intraguild relationships.

III. Methodology & Methods

1. Data collection methods:
	1. Storyworks
		1. Definition
		2. Reasoning (they why)
		3. Description of study area
		4. Description of data collection process
	2. Scat Collection & DNA Analysis
		1. Definition
		2. Reasoning (they why)
		3. Description of study area
		4. Description of data collection process
	3. Community Science
		1. Definition
		2. Reasoning (they why)
		3. Description of study area
		4. Description of data collection process

IV. Results

1. Storyworks
	1. Stories & their locations & contents
2. Scat Collection & DNA Analysis
	1. Analysis of Coyote diet and predation patterns
3. Citizen Science
	1. Map of sightings
4. Overview of coyote and Cascade red fox populations in the study area

V. Discussion

1. Coyote influence on Cascade red fox behavior, reproduction, and population dynamics
2. Interpretation of findings in the context of previous research
3. Implications for conservation and management of Cascade red fox populations
4. Limitations of the study and areas for future research

VI. Conclusion

1. Summary of key findings
2. Reiteration of the importance of understanding intraguild dynamics in mountain ecosystems
3. Final thoughts on the significance of this study for ecology and conservation
4. Policy recommendations for mitigating negative impacts of coyote presence on Cascade red foxes
5. Call to action for further research and conservation efforts in the Cascade Range
6. Provide a specific work plan and a timeline for each of the major tasks in the work plan. Be as realistic and specific as you can at this point, including the deadlines for Spring quarter.

Fall quarter- thesis, poster and frramwork (outline)

Winter Quarter- Research January, February – March start writing introduction, and working through outline to have a rough draft,

Spring quarter- April and May clean up draft into a final, end of May finalize permissions, and June present thesis.

1. Who (if anyone), beyond your MES thesis reader, will support your thesis (in or outside of Evergreen)? Be specific about who they are and in what capacity they will support your thesis. If you are working with an outside agency or expert, be specific about their expectations for your data analysis or publication of results.

I will participate in monthly Cascade red fox coordination meetings with researchers from US Geological Survey (Dr. Sarah Converse), University of Washington (Nate Redon, PhD student), and Cascades Carnivore Project (Dr. Jocelyn Akins).

As a fellow in the 2022-23 Planet Forward, Ilíiaitchik: Indigenous Correspondents Program (ICP) I have two Indigenous mentors who will provide critical feedback on my thesis to ensure traditional protocols are followed and the well-being of Tribal communities and individuals who choose to share information are protected to the fullest extent.

1. Provide the 5 most important references you have used to identify the specific questions and context of your topic, help with issues of research design and analysis, and/or provide a basis for interpretation. Annotate these references with notes on how they relate to/will be helpful for your thesis. For any other sources cited in your prospectus in other answers, provide a complete bibliographic citation here as well.

Cockrell, A. (1998). When Coyote Leaves the Res: Incarnations of the Trickster from Wile E. to Le Guin. *Journal of the Fantastic in the Arts*, *10*(1 (37)), 64–76. <http://www.jstor.org/stable/43308325>

This reading helps with stories collected in the late 1800̓s and early 1900̓s this specifically helps expand time and concept of coyote behavior and area that coyote would have been in to be observed by specific tribes such as Twana, Nisqually, and so forth.

Haeberlin, H., & Boas, F. (1924). Mythology of Puget Sound. *The Journal of American Folklore*, *37*(145/146), 371–438. <https://doi.org/10.2307/535129>

This reading expands areas and extends timelines through collection of stories of coyote and fox with thin Puget sound Tribes. This also refers to Indigenous languages and phonetic spellings that can be connected to specific tribes and or families within a territory.

Hody, J. W. & Kays, R. (2018). Mapping the expansion of coyotes (Canis latrans) across North and Central America. ZooKeys 759: 81–97.

This helps start an initial timeline and area of expansion that western science considers to as a knowing, that can be expanded upon through TEK and Storyworks. It has clear maps and keeps to just coyote in the study.

Lewis, J.C., J.R. Akins, and T. Chestnut. 2022. Status Report for the Cascade Red Fox in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 15+iii pp.

Washington Department of Fish and Wildlife 2022 status report for the Cascade red fox describes the range-wide status of the species and highlights potential threats to their conservation.

Q’um Q’um Xiiem, J. A., Lee-Morgon, J. B. J., & De Santolo, J. (2008). *Indigenous storywork: Educating the heart, mind, body, and spirit.* London: Zed Books LTD.

This book has helped me to understand Storyworks as a methodology, being able to understand songs, dances, stories and how each can be related to a teaching and or keeper of knowledge meant to be passed down for several generations.

1. You are not locked into this title; we want you to identify the main point or topic of your thesis. [↑](#endnote-ref-1)
2. You might discuss a selection of case studies, sampling methods, experimental design, and/or specific hypotheses you will test. You should also address any specialized knowledge or skills that are necessary to complete the research. [↑](#endnote-ref-2)
3. If you are planning to use existing data, explain the specific source, contact information, arrangement with collaborating agencies, and expectations about use of data and final products of your research. If you are planning to gather new data, describe specific methods, time, place, and equipment that will be required. [↑](#endnote-ref-3)
4. If you’re not sure where to start, consult a ‘Code of Ethics’ or other similar document from an academic society in an applicable field of study. [↑](#endnote-ref-4)
5. If you are collecting ANY samples or data, even observational data, on public lands (city, county, state and/or federal) it is your responsibility to find out the permit requirements BEFORE you collect data. Conducting research with tribal members/on tribal lands will have different and additional requirements. [↑](#endnote-ref-5)
6. Your *positionality as a researcher* refers to the fact that one’s “…beliefs, values systems, and moral stances are as fundamentally present and inseparable from the research process as [one]’s physical, virtual, or metaphorical presence when facilitating, participating and/or leading the research project…” (The Weingarten Blog 2017). [↑](#endnote-ref-6)