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LIVING AMONG WILDLIFE: ELEVATING HUMAN-WILDLIFE INTERACTIONS AND COEXISTENCE

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**LIVING AMONG WILDLIFE:
ELEVATING HUMAN-WILDLIFE INTERACTIONS AND COEXISTENCE**

By

BRIDGET REBECCA MURPHY

Bachelor of Arts, James Madison University, Harrisonburg, Virginia, 2022

Portfolio

presented in partial fulfillment of the requirements for the degree of

**Master of Science
in Environmental Studies**

The University of Montana Missoula, MT

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Table of Contents

1. General Introduction
2. Introduction to Part One
3. Curriculum/Educational Program; Cougar Conservation and Coexistence and a Nonfiction Essay Concerning Personal Interactions and Stigmatized Fear with Mountain Lions
4. Introduction to Part Two
5. Internship: Rattlesnake Creek Watershed Group Wildlife Interaction and Coexistence Guide for the Neighborhood
6. Reflection as Educational and Communication Outreach Coordinator Intern for RCWG
7. Introduction to Part Three Creative Nonfiction/Research Essay: Agricultural Ecosystems and Wildlife Coexistence Maryland | More Than the Land, the Water Too
8. Concluding Statements

General Introduction

I have grown up among anglers, outdoorsmen and hunters my entire life. It's not a surprise that I too became one, the only woman in my family to truly take up all these hobbies with a passion. For a long time, I thought I simply loved nature. I thought I loved being outdoors and the feeling of reward when I'd harvest a deer or fish – but as I grew and matured, I realized there was a lot more beauty and strength to the connection I had with the wildlife of my home state and that of any state I lived in. In undergraduate college, I didn't believe in myself enough to pursue an environmental science or wildlife biology degree – I thought I was incapable of acquiring those degrees and settled for my other passion, writing and media. I continued to work outdoors at the local arboretum, volunteer on local farms and participate in environmental clubs but I yearned for more – a true education in the field.

When I was offered the opportunity to pursue a master's degree, I immediately landed upon University of Montana's Environmental Studies program. The interdisciplinary nature, with a specific environmental writing path, sparked my interest from the moment I found it. Again, I didn't think that I'd be accepted to the program, I didn't think that I could hold that high of a degree. I have never been strong in math or science, just decent at writing, so I wasn't sure I'd be able to keep up with the work and my peers. I was proven wrong once more, and moved to Missoula soon after I received the news of my acceptance. The landscape here is one that I have never been among, roaring mountains and shiny ice caps – but more specifically in my eye, large carnivores, hefty mammals and extreme hunters and anglers traversing millions of acres of public lands. I thought I knew who I was in nature among wildlife, but when I stepped foot in the rivers to fish and took my first hike up a mountain to hunt – I was extremely humbled. It made me rethink my entire existence among wildlife – because so many people from my hometown

would consistently make comments that *now* I was in real wilderness, among *real* wildlife.

While part of that is true, there is a vast difference between wildlife in Montana and Maryland and the intensity of the landscapes – the wildlife and land there is just as majestic, powerful, and deserving of our attention. I pondered a lot about the perceptions of wildlife in different places, ways humans interact with them and their roles throughout each state.

So, as my work began in the Environmental Studies program I ventured in with an open mind – but some core groundings. I had done some writing before in undergrad about my feelings toward the human-nature divide – the way that many humans see themselves as separate from or above nature and other living things on Earth rather than a part of it. After a semester of learning, both in class and in nature, my writing honed in further on this human-nature divide. To me, I see humans as part of nature – as we are mammals, animals, part of the food chain, biological beings no higher than others on our planet. We have simply constructed this false narrative around us within our societies, minds and media that embeds this division between us and nature, between us and wildlife. Humans have been managing, stewarding, living off and within landscapes for thousands of years. As time and technology evolved, a lot of people began to view nature and wildlife sightings as part of a vacation, a ‘getaway’ from our daily lives. I have been one of those people many times before too. But I imagined a world where that wasn’t the case – what would it look like today if we *hadn’t* thought that way if we *reconnected* with our world and the life around us – rather than being so divided.

Specifically, I pondered about wildlife and humans interacting, coexisting, and conflicting. During my time in Montana, I have had the chance to participate in two hunting seasons for elk, whitetail deer and mule deer. It has been one of the hardest things I have done, physically and mentally. I’m not used to the pressure of large carnivores in the area, climbing

mountains to stalk animals and harvesting my animal on a cliffside before having to laboriously bring it home. My time here has given me a deeper passion for communicating the misunderstandings, fears and conflict that large carnivores and large landscapes have with people who are unfamiliar with the area. To everyone that I knew back home on the east coast, I was *risking my life* to go hunting in these landscapes, or even to go camping and hiking with the possibility that I *could* run into a bear or mountain lion. I grew an intense fear and paranoia of these animals, and of being in the wilderness, that I had never known before. In my writing and work as an EVST student I dug deep into why that might be and found a passion for a project on mountain lion conservation and education. I wanted to deeply learn about the animal and advocate for the protection of its species, because during the time I was so afraid of it – I was blinded to learning about the species itself, or of any large carnivorous animal for that matter. When I gave it a chance, I learned the incredible importance that the animal has on an ecosystem, the beauty and strength it holds in nature and the extreme rarity it is to encounter one in a malicious situation.

Part of my work in my portfolio is aimed at uncovering, clarifying, and de-escalating the stereotypes and stigmatization that large mammals and carnivorous animals have in our society. I understand that as people of the West who have lived among these animals for so long, there may be less stigmatization that these animals are *bad* or *purely vicious* here – but it still lingers strongly in parts of the country where they are not as present or equally educated about these animals. My hope is to share my work about mountain lions specifically, why we should work to conserve their species despite their lack of being endangered, why it's important to understand their species and how that connects to human interactions with them. I included this and wrote about it in my own way in this portfolio because in a general less-scientifically voiced tone it

could help open the eyes of those who are fearful, who don't see the need to help the animal succeed in nature or who have lost hope in the connection that we have to wildlife.

Further, this connects to another piece in my portfolio about coexistence between humans and wildlife – specifically for a community in Missoula that faces that daily, the Rattlesnake area. When I moved to Missoula, I had a lot of learning to do as an outdoorswoman – how to properly store trash outside, how to safely hike and recreate in nature, and how to be environmentally aware of my trace. But when I moved to a neighborhood on the outskirts of Missoula, called the Rattlesnake, I was faced with another scale of coexistence and conflict mitigation with wildlife. The Rattlesnake neighborhood borders the Rattlesnake recreation area which is connected to the Rattlesnake Wilderness – a vast mountain range of designated wilderness, beaming with wildlife and habitat. These animals (deer, bears, cougars, fish, elk, etc) don't know the boundary as a restrictive barrier, many of them venture near and throughout the neighborhood and it's up to the community members to live respectfully and responsibly to avoid conflict and poor interactions between human and wildlife. So, I worked with a nonprofit in the area to gain a better insight into the activities in the area, how the health of the watershed impacted wildlife and people of the area and to better understand how people can responsibly live among this wild area.

Through my time living there and working with the group, I realized there were more small things in daily living that people could do to benefit this relationship than I had thought; like salting the streets less in winter to avoid runoff into the creek which impacted local fish and fauna negatively, or avoiding bird feeders and deer attractants because the chain effect it could have on bringing a predatory lion into the area. Through all of this learning, I found a passion to create a guide for the neighborhood and surrounding area community members on tips and

lessons to understand effective, safe, responsible coexistence tactics for humans and wildlife of the area. I wanted to create a resource that people can go to, for different animals of the area like elk, deer, bears, fish, cougars, squirrels, etc. for advice to lessen conflict. This is another part of my portfolio combined with a reflection of my time in the nonprofit as an intern and as a Rattlesnake community member.

Lastly, as I tried to find my footing in this vast world of large and small mammals of Montana, I pondered my family's home in Maryland. It's one of my favorite places in nature. Obviously, I feel this way because of my connection to the place – the memories I have there, the love and joy I share with the people and animals there, and the beauty of the nature I have seen there. I realized that is key to the work I am doing in this portfolio as well. I wrote an introduction to this third section of my portfolio, to acknowledge that this place and the wildlife-human interactions there are very different from those in Montana. Each place will require different interactions, conflict mitigation and knowledge, and I think it's important to acknowledge that scale with an example from Maryland in my portfolio. To encourage people to care about wildlife, about nature and about lessening the divide between that and humans – they must be reminded of *their place*. Place-based learning, experiences and interactions are a firm root in my belief system of how we can change the world to be a better, healthier environment. People will care more if they are connected to the situation if it's their home and their wildlife and nature that is at stake. The Great Lakes Stewardship Initiative wrote that, "Educators who used place-based education consistently report that their students have become increasingly engaged and enthusiastic about learning."¹

¹ "The Power of Place-Based Education." *Great Lakes Stewardship Initiative*.

So, with this in mind I focused my last project of my portfolio on Maryland's agricultural interactions with wildlife. I grew up on a piece of land that was partially farmed, and my family lives on one currently that sits along the shoreline of the Chesapeake Bay – which is the largest estuary in the United States. Managing farmland and wildlife conflict is something that people across the globe must face if they work in this field – whether they are trying to separate wildlife from their farm landscape or allow integration. I've witnessed that on my family's farm and on other farms I have worked on in Virginia and Montana. Specifically, I aim to focus on ways that farmers of the eastern shore of Maryland can integrate regenerative agriculture to help the habitat and landscapes, along with acknowledging other tactics often implemented. The wildlife on land is one aspect there – but the larger aspect is the aquatic animals and marine life that is impacted by agricultural runoff into the Chesapeake Bay and other waterways. The Chesapeake Bay Program wrote, "According to 2022 estimates from the Bay Program, agriculture contributes 48% of the nitrogen load entering the Bay. It's estimated that 27% of the phosphorus load and 9% of the sediment load are from agriculture."²

A huge part of my life has been interacting with land animals, but also those of the Chesapeake Bay. It teems with life, blue crabs, fish, shrimp, porpoises, turtles, rays and more. To me, this wildlife is just as important to recognize in my portfolio work because so much of the world's population relies on these animals for livelihoods and for sustenance. To continue doing that, we need to strengthen the health of their environment and species numbers and effectively coexist without detrimental conflict to one species or the other.

² "Agricultural Runoff." *Chesapeake Bay*, www.chesapeakebay.net/issues/threats-to-the-bay/agricultural-runoff.

Conclusively, I hope that my work can offer an array of perspectives into the human-wildlife divide, provide insight into ways that interactions can be positive and remind people of the important connection we have *with nature* rather than the separation we have created *apart from it*. Throughout my portfolio there is research and academic grounding, but there is also a lot of creative writing and personal narrative. I chose to write in my own voice, rather than academically report my findings because it's one of my main goals as a writer in the environmental field to make information more accessible to the public. I came into this program hoping to learn and be able to share that knowledge with others, in a way that everyone can understand. This may not be the typical portfolio, and I hope that's true – because I want to open a doorway to more accessible, relatable environmental writing. To me, living in a natural rhythm with the world around us means knowing how our lives impact the wildlife and natural systems around us and improving what we can do with the way we negatively impact that or enable conflict. I hope to take a shallow dive into the vast network of relationships our species hold.

Introduction to Part One

The following section has two concurring parts that are intertwined in a few ways for me as a student, a writer and a conservationist. The first part is a short curriculum covering four different lessons to target community engagement with mountain lion conservation and education of the species. This piece was originally created a semester-long project for an Environmental Education course with Fletcher Brown at the University of Montana in the second semester of my first year in graduate school. Throughout the semester we assessed the differing ways of education practices, whether it be lectures or interactive class activities to portray information to students. Ultimately, we learned that a great way to educate is to be interactive with the classroom and allow their minds to come to conclusions with assistance of the instructor — rather than lecturing constant information to them. From the original creation of the project, I have revised the lesson plans for this final portfolio and clarified the audience and adaptations that are possible for the work. The idea for this specific topic for the curriculum was inspired by an essay I was writing at the same time for a different class, about my fear and learning of mountain lions.

This essay is the second part of the first section of my portfolio. They may not seem clearly intertwined, because one is an education curriculum and one is a personal informative essay, but to me they are deeply connected. I was writing the personal essay about my experience of moving from the east coast, where cougars are not present, to Montana — where I was direly afraid of large carnivorous animals in the woods, and so was my entire family on the east coast. As I worked through the essay, learned more about mountain lions, and ultimately broke down my fears and stigmas against the species — I longed for a greater resource for education on the

species, the need for conservation of them and a resource that can help more than just me feel comfortable in the wilderness among the species. I hope that my connection between the two pieces can portray the need for more accessible resources about cougar conservation in the West and East Coast – and the need for breaking down stigmas against large carnivores.

Cougar Conservation and Species Education Program

Bridget Murphy
University of Montana
Fall 2023

Introduction

Mission

Our program aims to inform and show high school students and community members in the Rattlesnake community how to understand and coexist with Mountain Lions through conservation efforts and place-based activities and events. [This program can be adapted to places outside of the Rattlesnake area and outside of Montana as a whole.]

Vision

We envision a community where all members have a meaningful understanding of the large carnivorous species around the area, have access to safety and risk management resources and make thoughtful choices to benefit the health of the cougar species, while reducing conflicts between carnivore and human.

Philosophy

The Cougar Conservation and Species Education program is rooted in the philosophies of constructivism and cognitive pluralism. These philosophies fit with the ideas and standards of the program because of the multiple ways of thinking and learning that are necessary to develop full understanding of the topic. Cognitive pluralism is the view that different individuals learn and experience knowledge through different structures and informational architectures. Constructivism is the home-base for a lot of environmental education, as it is often demonstrated in learning through the act of doing. Specifically with this program, it is founded in different ways of knowing like environmental education practices, place-based knowledge and different structures for audiences to learn with and activities in the outdoors.

It is important to consider both philosophies in terms of this project specifically because the audience is known in terms of ages and other demographics. The program invites community members and students alike to participate, and with such a variety of participants it is important to consider that learning for each of them may be different.

Furthermore, the principles of educational philosophy that I have described here as the layout for this program are grounded in the learning cycle. As seen throughout the lesson plans, the learning cycle components of engagement, exploration, explanation, elaboration and evaluation are crucial to my fully developed program. Through engagement, we begin as educators and facilitators to prod the questions rooted in our work. These questions will begin to get audiences and students thinking critically about what they are about to work with. Exploration is a time in each lesson to understand the knowledge they bring to the table, and share different sources of understanding. Further, explanation is the point for the leader or facilitator to take clarity of the lesson and make it accessible for the audience members. Evaluation then is the time for the new knowledge to sink in with the participants and instructors alike, and assess if there are missing points. And finally, after the group has begun to understand their grip of the new information and experience they have taken part in, elaboration is the final chance for the instructor to work with the students in terms of cementing that knowledge into a real grounded base for them to feel comfortable referring to.

This program is designed to engage community members within the mindset of mountain lions of Western Montana, especially near Missoula – although it can easily be adapted to meet other geographically relevant communities, who may or may not have cougars present, once connections with local experts are made. It is aimed at helping community members gain

awareness of the species conservation practices that are present in America elsewhere today, the importance of coexistence between human and cougar and why there is a current demand for helping the stability of the species. The contents of this curriculum are appropriate for high school-aged students and older generations alike.

Scope and Sequence

In alignment with the length of the program, roughly four sessions/1 week, the scope of the program is narrow. With the goal being to educate, engage and interact with local adults and high school community members about living among cougars and enhancing their conservation – it’s important to remember that this is not an entire educational curriculum. This project is meant to serve as a guide to begin discussions, conservations, and place-based awareness among adults within the realm of these large carnivores of the area. It is ordered in a way that grounds them with knowledge on the species, to better understand the animal and its habits, before leading into the heart of the program – species risks and conservation. The program builds on itself and encourages participants to think critically on their own understandings and experiences with wildlife policy and mountain lions of the area specifically. With professionals who are well-versed as co-leaders for each lesson’s topic, the participants can clarify questions, ground their knowledge and move forward as a collective.

Assessment

To ensure that the program is accomplishing the objectives throughout the week that it is active, assessment will be a continuous method throughout the course. Because of the nature of the program, for adults who voluntarily register to learn and engage with the materials for four days, there won’t be the classic summative assessments as seen in schools like quizzes or tests. The two major forms of assessment that are used in educational programs and curriculums are called formative and summative assessment. Formative assessment is a looser form of analyzing progress of students, through tools like observations, questions, listening, feedback forms, surveys, and worksheets. Summative assessments are usually more high stakes, like tests and quizzes to seriously judge the efficacy of the presentation of information. The goal of any type of assessment, however, is to gain insight into the success of lesson plans, instructor formatting and participation in the course. I hope to also use assessment methods in this program as ways to become better informed on weak areas of the program and be able to strengthen those through constructive criticism.

In terms of this project specifically, the manner of the work requires less typical summative assessment measures and more often includes formative assessment throughout the program. One of the main reasons for this is the audience. The participants in this program will most likely be local adults who are eager to learn about the species that they live among or have heard of. They are not in school, so testing seems inappropriate, as the main goal of this work is to leave them feeling capable of engagement in the topic. I will conduct a survey at the end of the course, that is more of a summative style assignment, to gain that crucial feedback and insight on the overall effectiveness of the program. However, the main assessment focus of this program will be throughout each lesson. I plan to be a stellar observer, prodding questions at groups as they discuss, observing what they remark in their journals, asking for follow up feedback after each lesson and taking key notes on how they are responding to the information. Through these subtle, but important, assessment practices I will be able to understand adjustments necessary

and strengthen the program itself. Specifically, I plan to hand out journals at the beginning of lesson one that participants can use for the course to aid these processes. Assessments can be based on sharing their observations from their notes, between partners through discussion of the notes and through online submissions of feedback that they noted in their books.

Appendix A. Survey Questions for Follow-up Assessment

- Name and Email
- Reason you participated in the course
- What were your key takeaways from the course?
- How did the course impact your knowledge on the species?
- Did any activities stand out to you? Why?
- Were there any parts of the course that could use improving?
- Other suggestions or feedback?

Extensions/Adaptations

While this original document is meant for the Rattlesnake area and the surrounding city of Missoula, Montana my hopes are much vaster for this project. This idea came to me first as an out-of-stater who had never lived among cougars, who suddenly was hearing about them just down the road from my home in Missoula. I was so scared and uninformed that the fear overwhelmed me and any understanding I could have of the animal. The purpose of this program is to grow awareness of the species, their habits, and their ecological importance – but also to help citizens understand the roles humans play in their existence and how we can minimize their deaths and conflicts ultimately. This program will be adaptable to any other city or rural area that has cougars present or hasn't had them in decades. The Mountain Lion Foundation stated that, "Mountain lions used to be found throughout the United States, but due to bounty hunts in the early 1900s and threats such as persecution, trophy hunting, poaching, retaliation in response to livestock depredation, kitten orphaning, poisoning and habitat loss and fragmentation, mountain lions are now only found in 15 western states, and the genetically isolated Florida panther remains in the East."³ I believe that if this program is adapted and used in places with and without the carnivores present, it is beneficial just the same because ultimately more people will care about the conservation, revitalization, and rehabilitation of the species across North America. Throughout the lessons there are brackets with adaptable information or placeholders for elements that would most likely have to be adjusted for other places beside Missoula.

³ "About Mountain Lions." *Mountain Lion Foundation*, 22 Aug. 2023.

Lesson 1 out of 4

Title: *The Situation of the Species*

Audience: community members of the Rattlesnake area (high school to adults)

[local community members between high school to adult age]

Teacher Name: Bridget Murphy {or staff of group conducting program} + a local wildlife biologist

Unit Essential Question: What do we know about the species? What makes the species unique? What has happened over time with the species and how has that been debated?

Lesson Objectives:

Students will be able to:

- identify the current situation of cougars in Montana [whatever state this is being conducted in, to continue place-based education]
- label up to three key characteristics of the species
- explain at least two debates surrounding the prominence of human-lion conflict in today's world

Materials Needed: Lecture space, projector, seating for audience, laptop – hand out journals to all audience members, for note-taking purposes throughout the series

Materials Available for Use: <https://mountainlion.org/about-mountain-lions/#:~:text=Mountain%20lions%20used%20to%20be,now%20only%20found%20in%2015>

This website is written by the Mountain Lion Foundation – a nonprofit devoted to conserving the species and educating the public. The ‘About Mountain Lions’ page is a great resource of information on biology and behavior, evolution, specializations/senses, threats, and the ecological role of mountain lions.

Time Needed: Roughly an hour

Lesson Outline:

Engagement: Initiate conversation and self-reflection with the essential questions: What do we know about the species? What is happening now with the species?

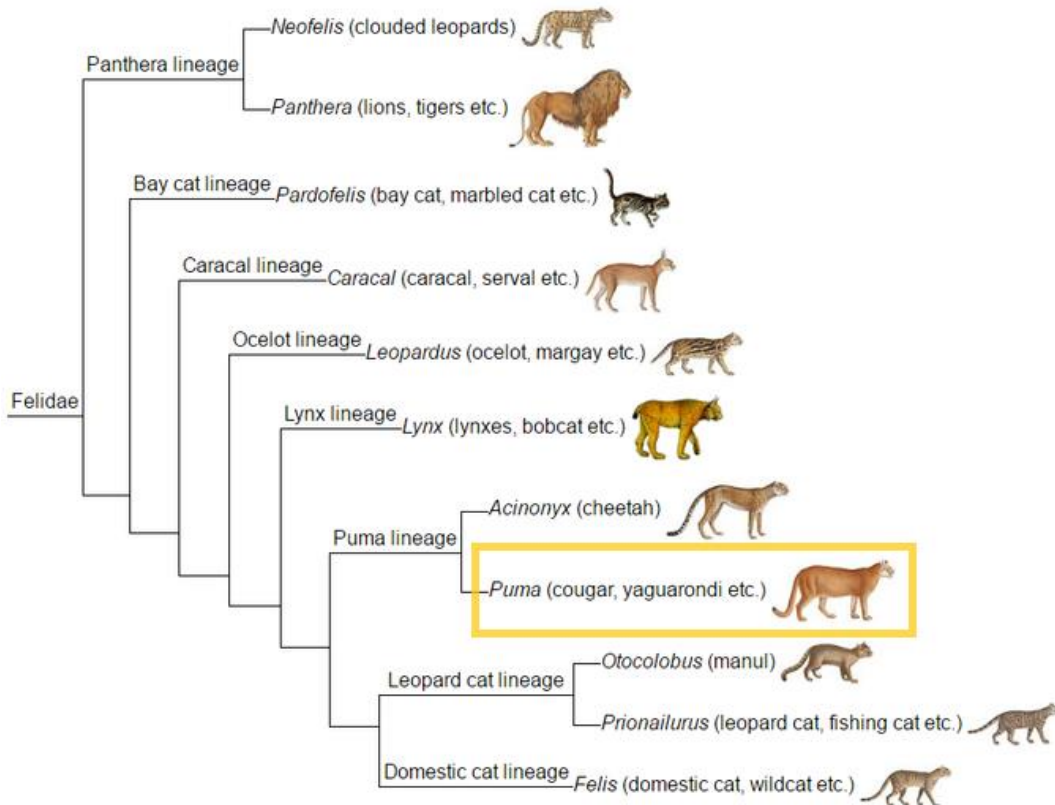
They will take time with their journal designated to do a free write on these questions to generate their own thoughts. Then, think -pair- share. So, partners can discuss what they were able to put on the page.

Exploration: Provide an overview (most likely through PowerPoint) on state policy, hunting, regulations, and species # to explore the urgency of mountain lion conservation. Then discuss as a group what they have experienced or witnessed in terms of knowing these things. Then, the wildlife biologist asks what they know about the species and prompts them to discuss among groups of 2-3 and share. Then go through the accuracy of their knowledge and clarify questions.

Elaborate: Ask the room at large, what they think are ways to beneficially move forward for the species and humans alike? Discuss at large about why they believe so many people feel dissociated or threatened by the species. Self-reflect with a five minute free write on how they have historically perceived cougars in their lifetimes.

Extension: Tell the background of cougars in America, the folklore and the science of the species – like the original range of the species across North America, the life cycle of cougars and the interactions they’ve had with humans over time. This will most likely be through PowerPoint, led by the guest speaker who is an expert in the field. This is to understand the reality of fear.

Materials Available for Use:



This chart can be used for the lesson to portray evolution of the species. It is the property of the Mountain Lion Foundation. There is more information on the ‘evolution’ tab under the ‘about mountain lions’ section of their website. <https://mountainlion.org/about-mountain-lions/#!/evolution>

The Montana Field Guide by the MT FWP is great for species understanding: <https://fieldguide.mt.gov/speciesDetail.aspx?elcode=AMAJH04010>

Assessment: Throughout the lesson, they will have taken notes and asked questions in their journals through free writes and group discussion outlining the objectives. These will be put toward summative assessment at the end of the course. Throughout all of the group conversations and free time, observations should be noted on the engagement and responses of participants. Additionally, prompt the participants to answer the objectives in their notes (without telling them that they are objectives) to close out the lesson. This will be submitted at the end of the course in a survey.

Summary of Lesson: The goal is to understand the stakes for the species in today's society and develop grounding knowledge before the rest of the program. The students should be able to recognize the current situation, understand the animal on a basic level and internalize debates on why human-lion conflict is so pertinent in today's world.

Lesson 2 out of 4

Title: *Tracking and Sign: Species Understanding*

Audience: community members of the Rattlesnake area (high school to adults)

[local community members between high school to adult age]

Teacher Name: Bridget Murphy {or staff of group conducting program} + a Crew Leader at Swan Valley Connections

[or any wildlife tracking organization in the area]

Unit Essential Question: How can you identify cougar activity and habitat? What landscape and habitat do they prefer, why? What does this mean for human conflict, in terms of how these carnivores move and think?

Lesson Objectives:

Students will be able to:

- identify cougar and other carnivore sign/tracks in nature
- label key characteristics of the species habitat
- explain a few insights on how the mind of local carnivores (including cougars) works

[If this is happening in an area where large carnivores aren't present, the wildlife tracker will bring up examples of signs that they would leave. They can focus on smaller carnivores like snakes or foxes as well.]

Materials Needed: Partnership with the Swan Valley Connection group should provide everything [or a different wildlife tracking organization/group of experts] Audience members will need to be dressed appropriately for the weather and for the hiking/tracking conditions. Participants will need their notebook and pencil to take notes throughout the day's lesson.

Time Needed: an afternoon (~3-5 hours)

Lesson Outline:

1. **Exploration:** Begin a group discussion on what participants have experienced or heard of in terms of carnivores in ecosystems. Give time to do a small free write about this before the tracking begins. Go on walk with the wildlife group, conduct tracking and sign event.
2. **Elaborate:** Guide will explain terms about the tracks and wildlife. The event will ensue, with the guide leading the way with their expertise of the area. Questions are to be asked on the spot or marked in their journals for post-walk discussion. This discussion after the walk will focus on their experience, new understandings they gained or any confirmed or changed knowledge.
3. **Presentation:** Provide an overview on the different species in the area, common interactions between them – discuss the food chain and carnivore significance in the ecosystem. Discuss the complex

narratives around animal-human interactions and question what the class believes to have encouraged this to the status it is today.

Materials Available for Use: The Mountain Lion Foundation describes coexistence and the brief history of how humans have lived among cougars forever. On their 'coexistence' tab information can be found to support the lesson and discussion. <https://mountainlion.org/coexistence/>

Assessment: As they have discussed, they will have taken notes. I will be prodding questions throughout, surrounding the outlining the objectives. By the end of the program, we will go over our observations and notes, and see what the audience members have to contribute.

Summary: To understand the species on a deeper level, the ecological impact wildlife has on the environment and on one another. [This could also be a guided walk on a trail by a parks service or other trained professional in wildlife if there isn't a wildlife tracking organization available for commitment.]

Lesson 3 out of 4

Title: *Breaking the Stigma on Large Carnivorous Mammals*

Audience: community members of the Rattlesnake area (high school to adults)

[local community members between high school to adult age]

Teacher Name: Bridget Murphy {or staff of group conducting program} + a Crew Leader at Bear Smart Missoula

[or an expert on bears or large mammals]

Unit Essential Question: How have these animals interacted with humans in Montana within the last few decades into today? What has caused problems for human-carnivore interactions?

Lesson Objectives:

Students will be able to:

- identify current conflicts between humans and carnivorous large mammals in Montana [or their home state this is taking place in]
- label key concepts surrounding human-carnivore conflict
- explain a few solutions to the issue pertaining to the Missoula [chosen area] area

Materials Needed: trail or park near town [to create place-based education]

Time Needed: 3 hours roughly

Lesson Outline:

1. **Presentation:** Give statistical sheets out to the audience for them to discuss in groups (documented encounters and locations and results, documented euthanizations, documented factors in human-wildlife conflict).
2. **Explain:** As a group we'll go over their thoughts and explanations to the topics they discussed, as well as more information specific to the Rattlesnake area (if provided by the FWP sector for the area) [or their local historic wildlife of the area]. Questions the instructor can ask the audience: What have your experiences been with large mammals in populated places? How have you seen the public respond to interactions with these animals in populated places?
3. **Elaborate:** Have the audience name the different roles/stakeholders involved in bear and cougar management of the area, go through each and role play POV on the situation and species.

Roles they can and should name: Community members, Fish and Game Officers, Government Officials, Educators, Mountain Lions, Bears, Hunters

Purpose: For the class to brainstorm what each role would be thinking in the situation of "what is controlling the species management today and how does that impact their activity in the area"

For example: Bears may be relocated in the situation of a disturbance in the neighborhood. Mountain lions will likely be euthanized in the situation of a disturbance in the neighborhood – why? Because their species behavior to return to the kill site. What makes this possible? FWP officers and regulations placed on them by the government officials.

Materials Available for Use: The Montana FWP Guidebook created called “Montana Mountain Lion Monitoring and Management Strategy”

https://fwp.mt.gov/binaries/content/assets/fwpcconservation/wildlife-reports/mountain-lion/mountain-lion-monitoring-and-management-strategy_final_adopted-1.pdf

4. **Extension:** Have the group break off again once more information is provided about the stakeholders of the situation and find a common ground that could be worked off of for the destigmatizing of “dangerous cougars”. For instance – is there a wildlife species in the area that is prioritized in the public eye (like whitetail deer or red foxes)?

Assessment: As they have discussed and taken notes, we will go over what the audience members have to contribute and recap key points if they are missing things. Also prod a recap on the objectives as questions for the audience to discuss.

Summary: To understand where historically fear is rooted, the reality of it and how it plays onto different animal groups. Recognize the scale of the situation that the species are in, and how that requires community engagement for conservation efforts to soar.

Lesson 4 out of 4

Title: *Community Activism and Cougar Engagement*

Audience: community members of the Rattlesnake area (high school to adults)

Teacher Name: Bridget Murphy {or staff of group conducting program} + an employee/advocate at the Mountain Lion Foundation [this will be applicable across the U.S. because this organization is based in California – but this lesson will be held remotely with someone from here]

Unit Essential Question: What conservation practices have been implemented with wildlife of the West? How can those be used for cougar conservation and education and rehabilitation of the species? How can community members engage actively as cougar advocates?

Lesson Objectives:

Students will be able to:

- identify at least two ways they can advocate for mountain lion conservation
- understand at least two ways that they can support the rehabilitation of the species
- be able to clearly state at least one way to share their knowledge from the program about mountain lions with others

Lesson Outline:

Engage: Ask audience their knowledge of: What conservation practices have been implemented with wildlife of the West? How can those be used for cougar conservation and education? How can community members engage actively as cougar advocates?

Materials Available for Use: The Mountain Lion Foundation provides a brief history of recent regulations in the conservation and hunting of cougars in the West under the ‘foundation’s mission and history’ tab. <https://mountainlion.org/about-mlf/>

Exploration: Conduct a lesson on Zoom with an MLF organizer. They will prompt audience members to brainstorm their knowledge about wildlife conservation practices and those specific to cougars and other large carnivorous species of the West. [Even if this is being performed in the east, it is good to understand the situation of the species in the west, as that is where they are active currently.] This can be performed in breakout rooms if the group is bigger than 5 participants. Following this activity, participants will share their knowledge and again be asked to clarify it further.

Explain: As a group their thoughts in the brainstorms will be further clarified and dissected, leaning on the MLF advocate to add knowledge and insight. The instructor will provide examples of advocacy and conservation work for the species that community members can work with – specifically some from MLF’s work already. The brainstorm can happen when breakout rooms reconvene together as one, and one person per group can lead discussion on what was shared.

Extension: The audience will name things they believe could realistically be implemented in the area around the Rattlesnake next to Missoula, Montana [or whatever specific place this occurs in]. They will discuss their other knowledge from the previous lessons in terms of conflicts and find what could become resolved through these conservation tactics. This can be facilitated by a ‘popcorn’ style activity where one person volunteers to share ideas, and chooses another to keep it going – instructors can be included. This will create less talking over each other on the zoom setting.

Final Lesson Follow-Up Assessment: Send out a google survey at the end of the program, after the last lesson. This is a great resource for the instructor’s to get feedback, see what the participants liked/disliked, learn the ways different activities and discussions were effective and understand how to adapt it for future use. The survey should be around 5-10 questions long and the questions can rely on formative feedback from throughout the program. Use prompts for participants to reflect on journal entries and leave a space for their additional comments at the end of the survey.

Summary: To understand what role community members can play in the cougar conservation realm today and how it can be enacted in different communities, especially the Rattlesnake area beside Missoula, MT [or whatever specific place this occurs in]. Recognize the scale of the impact, from small to large to be able to understand that individual efforts do make a difference for the species.

Concluding Statements

This educational program/curriculum, Cougar Conservation and Species Education, was created from a place of great passion for coexistence between humans and animals. Popular trends within media like wildlife documentaries, wildlife lessons, etc. often focus on ‘popular’ animal species within them – like the mighty African Lion, the majestic Dolphin or the beautiful American symbol that is the Bald Eagle. While those types of lessons and education on wildlife and their ecosystems are very important to understanding the environment around us – I find it even more important to highlight the species that aren’t as popular in mainstream work, but just as important and worthy of information sharing in communities. The mountain lion, cougar, puma, or catamount is one of those species in my opinion. Because of the silent-moving, hidden nature of the large mammal, who also happens to be a strong carnivorous cat with sharp features, I think it’s often forgotten or brushed over in education systems; but ultimately the large cat is a keystone species, that used to roam most of America.⁴

My hope is that this program be adjusted for a short educational week offered to local communities across North America so that more people are exposed to this information and begin to foster more care for this vital species. Adult learners have the capacity to enact this change, take the responsibility and action to share the information and donate to organizations that support this mission. The program is just as important to teach younger generations as well, but would require a separate curriculum of lessons to meet their understanding. I hope to enact changes in behavior – whether that be within places where cougars aren’t present anymore and the participants can foster work to start efforts in rehabilitation or places where there’s a cougar family in each forest. In terms of funding, I do not foresee too many challenges. The local organizations would be volunteering staff or crew leads to help facilitate the lessons – as part of community outreach. Additionally, there are public spaces like public library rooms that can be booked for free to use for presentations as well as parks, etc.. This can be funded through the Mountain Lion Foundation potentially if there is need for it – but it should not be necessary for the curriculum to be implemented.

Personally, the creation of these lesson plans and curriculum has taught me a lot. There is a lot of work and organization that goes into a curriculum such as this, but it is important work for communities to engage with. I believe that this can be a strong resource for community members to connect with the cougar species that often remains out of their sight, but crucial to the ecosystem around them (in Missoula).

⁴ “Science & Conservation.” *The Cougar Fund*, 20 Nov. 2022, cougarfund.org/our-work/science-conservation/#:~:text=Conservation%20biologists%20consider%20cougars%20to,low%20densities%20on%20the%20landscape.

Mountain Lions and Me, and You – A Personal Essay
Reconciling with Stigmatized Fear

Bridget Murphy
University of Montana
Fall 2023

In rural stretches of Maryland where I have spent most of my life, Mountain Lions – also known as *Puma concolor*, cougars, pumas, and panthers – were not present in our stretches of wilderness, nor were they part of our common wildlife education. Once, there was a puma about an hour away from us in a forested neighborhood that someone snapped photos of with their iPhone. It was just wandering around a yard and the picture circulated across Facebook and email chains for months afterward. I remember gazing at the immense cat on my parent’s phones, starstruck that an animal like that could be in Maryland – where white tail deer, Bald Eagles and blue crabs were some of our most interesting animals. Most likely, the animal had somehow wandered into this new place and was harmless to people – but it shook our little state for weeks because we had a *deadly animal amongst us*.

Mountain Lions are considered a keystone species, which means other species and ecosystem functions rely on them in their habitat. They manage prey species populations and in turn that impacts the plant population and ecosystem function. More than prey species impacts, other predators in the area, like bears or foxes, are also influenced by them and their movements/territories.

The Mountain Lion Foundation describes the cougars impact like this, “By protecting sufficient habitat for mountain lions, we can indirectly aid in the recovery of other species of concern like the Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), ocelot (*Leopardus pardalis*), and more. Even more common species like mule deer (*Odocoileus hemionus*), bobcats (*Lynx rufus*), foxes, migratory birds, and scavengers benefit from the presence of mountain lions. Carrion left behind from mountain lions spreads nutrients through the ecosystem, ultimately strengthening entire communities, while improving the overall health and resiliency of an

ecosystem. Nutrients from the remains of a lion's prey are released back into the environment, enriching soils and plant communities, eventually creating locations where animals like elk (*Cervus canadensis*) and deer more frequently forage.”⁵

When I decided to move to Montana for graduate school, my family and friends were worried for me. We talked about my new degree I'd pursue sometimes, but we often discussed what to do *when (not if)* I come up on a grizzly or a puma on a trail and the awe of emotions everyone felt that I'd be in such a *wild* state.

I first lived in a small apartment, where wildlife was not commonly seen beyond the straggling whitetail deer, for about six months. The occasional black bear would scavenge through the trash cans in the Fall, but we never came face to face with it. We were offered the chance to move into a neighborhood home, rather than our tiny apartment, about 10 minutes away and took it. It was a dreamy 0.23 acres, just down the road from a little cafe, with a view of roaring mountains at almost all angles. My mom, with her keen mind, quickly did some research on the area and filled the rest of the family in on what the new place *was really like*.

“Tell them about what’s around the neighborhood, Bridget,” my mom prodded. I explained the mountains once more, trying to avoid the real answer everyone wanted.

“Well, what else? Animals?” She waited for my response.

“Yeah, yanno there’s a lot of deer and some bears throughout the area,” I said.

My grandparents and elderly aunts already began to whisper, *bears? Oh no... I could never*.

⁵ Foundation, Mountain Lion. “Mountain Lions: A Crucial Species for Biodiversity.” *ArcGIS StoryMaps*, Esri, 29 June 2021, storymaps.arcgis.com/stories/fa8dd05e49304258a169f218b66e77c4.

“Well, bears AND mountain lions!” She dropped the bomb. “She’s moving to a neighborhood where a dog *was just killed* last week in someone’s yard.”

It was true, and I was definitely a little scared about that, but I knew my grandparents would only hear that and it’s very unlikely to happen in the first place.

Gasps, worried eyes, and headshaking shuttered across my grandparents and other relatives’ faces. “Are you sure you want to move there? Why would you do that? *Are you going to be okay?*” They echoed. We discussed it for quite a while.

Eventually, it was all I could think about Montana too – the scary, huge, deadly, malicious wildlife that would surround me silently in the woods. Once we got to our new home, I was pretty damn paranoid. The incredible landscape beckoned me to explore it, but fear of the wild beasts filled my mind every time we ventured on trails. My partner insisted that we were fine, we had bear spray, and the animals were more scared of us than we were of them. I would nod in affirmation to his calming bids, then continue to grip the bear spray tighter each step. One time, I even accidentally sprayed it above me when hiking a steep incline in an isolated place – the cap was off because I had seen bear sign and got scared. I slipped, so a puff of my canister filled the air and I quickly ran away to avoid the cloud. I keep the cap on now, but sometimes worry I won’t have time to remove it in a moment of need.

Most people I have spoken with about the wildlife in the West have said they have never seen a cougar in the wild here, and they don’t want to. At first I wondered why, since bears are often seen here. I learned that mountain lions hunt stealthily, without being seen or heard, usually breaking the neck of their prey from behind with their two inch canines and weight. They are not meant to be seen. That’s a required skill for their hunt to be successful. In a way, I thought it was

beautiful the way they make themselves so elusive. In another way, it was a surreal reminder that I was the prey out there, not the predator. So, I clapped loud on trails, checked behind my shoulder every hundred feet or so and often hollered a strong, “HEYYYYY I AM HERE. I AM WALKING!! STAY WHERE YOU ARE!!” I had never experienced this feeling in the woods before during my years in Maryland.

The Mountain Lion Foundation [MLF], a nonprofit in California devoted to preserving the species, states that, “Top carnivores help maintain the plants and animals within their range. Mountain lions keep deer herds on the move so that they do not overgraze in any particular area. This behavioral change results in less erosion along riverbanks and increases habitat for other species like songbirds. Ecosystems with lions are healthier, more sustainable, and contain a richer balance of nature.” The animal has habits, particular prey they enjoy, and ultimately is a positive animal to have around – so I shouldn’t have been overly worried about them as I walked on popular trails in Missoula.

To my worried Maryland family and friends though, the wildlife in Montana were vicious big animals, waiting for me to wander into their wooded home and pointy teeth. As I educated myself more on the species, I learned that even then, mountain lions – the reigning carnivore in their habitat ranges – hunt mostly deer and other ungulates (large hooved mammals), along with some other small wildlife.⁶ MLF’s website has a page to address common questions about the species and they answer the question of how likely it is to encounter a lion clearly: “Human encounters with mountain lions are rare and the risk of an attack is infinitely small. You are more

⁶ Christian, Logan. “Mountain Lion Minutes – Why Advocate for Mountain Lions?” *Mountain Lion Foundation*, 21 Oct. 2021, mountainlion.org/2021/10/21/mountain-lion-minutes-why-advocate-for-mountain-lions/.

likely to drown in your bathtub, be killed by a pet dog, or hit by lightning. If lions had any natural urge to hunt people, there would be attacks every single day. Instead, they avoid us.”

Realistically, a cougar would almost never target me.

After some time away from my hometown paranoia of large carnivores, and some time researching the species, I tried to calm my worried family members and in turn calm myself. I realized I had dissolved some of my own fears after spending some time in the wilderness there and dedicating time to truly learn about the species and the ecosystem functions.

“The dog that was killed in the neighborhood I’m moving to was left outside for a few hours at night,” I told them. “On the outskirts of the neighborhood, where it borders The Rattlesnake Wilderness Mountain range. It’s an area designated by the state as relatively untouched by human machines and disruption, to preserve its *wildness*. It is the *animal’s home* that *people border*. It’s sad, but the guy shouldn’t have left his dog out late at night and I’ll be cautious,” I said.

They nodded, pursed their lips and shared glances. “Okay Bridget, well... You be safe out there.”

Then, my grandpa leaned over to my dad, “You need to set her up with a handgun or sawed-off shotgun before she heads back. I’m not having no damn mountain lion kill my granddaughter.”

I love how grandparents “whisper.”

“They don’t want me Pop pop, they usually don’t go after humans. Just have to be cautious.

Really, I’ll be careful. I’ll be just fine. ”

I tried to use my new knowledge and settle his worries, but I doubt it really worked.

As a deer hunter myself, I actively participate in my carnivorousness as a human. In Maryland, I silently wait for the deer to step in front of my camouflaged stand in the woods before I take them. In Montana, I hike to their habitats, stalk hoof tracks and silently, slowly position myself for the taking when I find them.

As I began to wander the ridges of Montana public hunting lands, for my first hunting season there, the intensity of these hunts quickly came to my attention. My body was strained, sore and weak after a day of trying to find the right deer to take. We'd hike miles up nearly-vertical mountain faces to reach a ridgeline that we'd then walk across. There, the view was unobstructed of clear patches where we'd potentially be able to spot a deer herd. My first season hunting I was able to harvest a small mule deer and my partner harvested a large white tail buck. It was a great reward for the miles of work we put on, and it fed us for the following year.

I came to deeply respect the mountains there, the wildlife and the other hunters who crossed this terrain daily. It reminded me of the strength these cougars must have, to persistently climb and venture for their food. I was embodying them, in human form, the best I could. Think like a cougar, get the prize.

The transition between East Coast and Western hunting culture was drastic, not just in the style of hunting and skills they each require but in the permitting and popularity. When I was 13-years-old I took the basic Hunter's Education Course required for a license in Maryland. It was a one week series of in-person classes to familiarize me with basic weapon-handling skills and hunting knowledge.

10 years later that same certification allowed me to buy tags for hunting deer (mule and white-tail, antlerless and antlered) in Montana. My partner and I were legally ready to explore what Montana's public land offered, and ready to learn what the hunt requires here.

I've hunted on my parent's private property since I was a little girl, surrounded by the deciduous woods. My brother and father taught me everything that I know. We'd choose which stand (either in the tree or in a ground-blind) that we wanted to hunt, ride out to it on the four-wheeler, then stealthily walk in to sit for the rest of the hunt. Then, we'd drag the harvest out of the woods and drive it to the butcher. It was experiences like these that were foundational to my childhood and ultimately, to who I am today. I cherish this style of hunting just as much as I do the western style. I learned so many things about my place in nature and the ways that nature/wildlife interact with each other. There's nothing quite like the experience you get hunting this way — sitting in the still deciduous woods, listening to squirrels chitter and leap in the leaves, smelling the bark of the trees around you and using every sense to spot an animal around you.

The dark early mornings on the public lands of Montana, where the crunch of our footsteps in the icy snow was the only sound to echo through the valley, felt like a different world. My carnivore paranoia came back heavily. Constantly, I'd glance backward with my flashlight shaking as we inched up the trails, to make sure a hungry puma or bear wasn't stalking us. Thinking like a cougar doesn't exactly help when all I could think of myself those mornings were, *I probably look like a slow walking, struggling animal... juicy meal for a hungry animal.*

I knew by then that I needed to calm down with my reluctance to be outdoors, because of the low probability of an encounter — but I also knew that hiking on these remote trails was not the same as the popular ones in Missoula, the city we lived near in Montana. Again, I was reminded in the

quiet echo of the morning that this was *their* territory, *their* home. I was physically putting myself in competition with the lions of the area, to kill and eat their deer.

I continued to hunt throughout the season, asking locals for tips and tricks if they'd share them. I quickly learned that the hunters out here in the West are going for a lot more things than just deer. Personally, I've only ever hunted whitetail deer, mule deer and some waterfowl like ducks or geese — but in Montana there are permits for elk, moose, black bears, wolves, pronghorn antelope and *ding ding ding* — mountain lions.

Funnily enough, I now own a handgun for protection when I'm hunting in the woods in Montana. It will soothe my grandpa's mind, but realistically it's for other wildlife than cougars like wolf packs, potential surprise encounters with bears or territorial moose/large animals. After hearing the wolves howling in the dark on early hikes during my second season of hunting this year, having a grizzly walk up 30 yards from us in the woods and seeing moose tracks around us on trails – it's better to be safe than sorry. But never, would I imagine, I'll have to use it on a cougar – and if for some reason I do, it's still not a cause to not care for their species population and health.

When I learned that Mountain Lions could be, and very often are, hunted in Montana and surrounding states like Utah specifically, I was a little confused - I didn't know they were an animal of desire to hunt. I learned that some hunters take these cats for meat to grill up, and a lot of others who take them for trophies. Usually, hounds are used in puma hunting. They chase the cat up into a tree where the hunter can take a shot. Then the 90-175lb lifeless cat topples down through the branches to the hunter's feet.

Each person who participates in the sport of hunting has their own reasoning, motives, and ethical lens— whether it be to provide food for their family, hang something taxidermized on their wall to show off some hard work or to upkeep a tradition they’ve been fond of. To each their own, if that is what a hunter desires in their life then so be it.

But, what I find interesting is that when I have brought up the topic of mountain lion trophy hunting to some hunting buddies they often reply with the same false anecdote. The common response that I’ve heard is that it keeps the animal scared of humans, it maintains the population and it encourages them not to get close to civilized areas. While it’s true that the sport of hunting plays a key role in population conservation, species numbers and habitat health – I’m not sure the cougar population is in need of that.

There is data out there that shows the North American lion population *does not need* to be kept ‘in check’ because it is not nearly where it used to be, number-wise and territory-wise. The Mountain Lion Foundation stated, “Lion population estimates are highly subjective, variable, and widely viewed as inaccurate. Quota setting rarely reflects the actual status of lion populations. For example, Drs. John Laundre and Tim Clark once reported that hunting quotas in one part of their study area in Idaho were set at their highest levels at a time when research showed that the mountain lion population was at a low point. They concluded that “none of these management approaches offers much security for the long term survival of puma populations, yet they are variously institutionalized in state management programs.”⁷ They

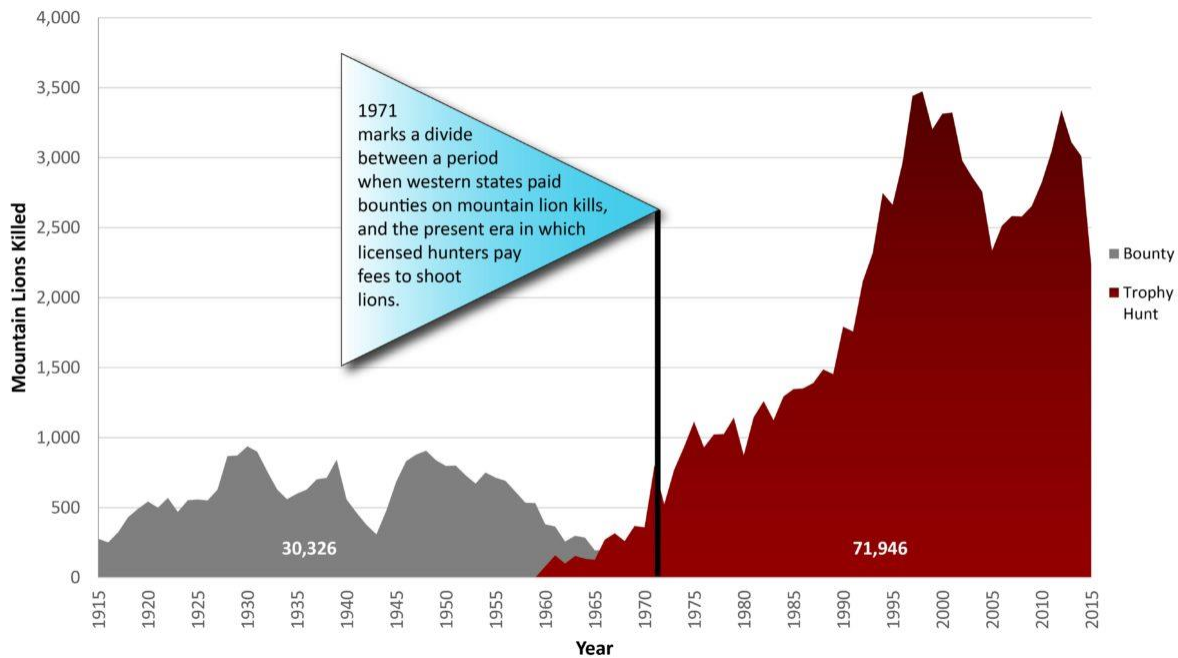
⁷ Christian, Logan. “Mountain Lion Minutes – Why Advocate for Mountain Lions?” *Mountain Lion Foundation*, 21 Oct. 2021, mountainlion.org/2021/10/21/mountain-lion-minutes-why-advocate-for-mountain-lions/.

used to range across most of the United States, just decades ago, but have lost about 60% of their habitat range over time.

Also, the Mountain Lion Foundation stated on their website that, “An overwhelming number of studies have clearly demonstrated that sport hunting of lions not only does not increase the public’s safety, it also does not reduce depredation on livestock or other domestic animals, and in fact appears to be responsible for the increase in human/lion conflicts in regions where lion mortality is excessive.”

As trophy hunting continues to persist, and fear of the animal pervades lion-less places, the beautiful intensity and importance of the species could be lost. I’m not saying it needs to end, but maybe a new lens should be looked through in terms of mountain lion hunting licenses. In Utah, a bill was just signed in March of this year to allow year-long hunting and trapping of cougars and all the hunter needs is a regular hunting license, no special permit. It’s a tragic loss for animal-rights groups and conservation work for the species, because the animal won’t get a break from being hunted – there’s not a specific season anymore and they’ll always be at risk in the state for over-harvesting. Apparently, there wasn’t proper reasoning for the bill’s approval – The Salt Lake Tribune stated, “[The cougar provisions] were added on the legislative session’s 43rd day with no discussion or explanation other than the claim that cougar populations are rising despite significant increases in cougar deaths in recent years.” There were complaints about the bill from hunting groups, conservationists and scientists alike – but ultimately the bill was enacted in May 2023 and the cougars are at risk of over-hunting.

This is a diagram created by the Mountain Lion Foundation shows the change of mountain lion harvests over the years:



8

A lot of people don't see it as a pressing issue, because the International Union for Conservation of Nature deemed mountain lions of "Least Concern" for endangerment threats since there is a 'large' population in the Western U.S. and Canada. However, what about that 60% loss of their initial North American range and the fact hunting quotas are being raised in certain states?

As a student, I learned of the concept of human-carnivore conflict. It sounded complex, unique and intriguing – a topic of necessity to discuss. I went to work, researching exactly what it is, who's impacted by it and why I hadn't heard of it more. As I understand it, it's when interactions

⁸ "About Mountain Lions." *Mountain Lion Foundation*, 22 Aug. 2023, mountainlion.org/about-mountain-lions/#!threats.

between person and animal result in negative results like property loss, the way either man or animal live, and even life being lost. World Wildlife put it this way, “These encounters not only result in suffering for both people and wildlife immediately impacted by the conflict.”

The majority of the results were scholarly articles, not general-public friendly, so there’s one reason it’s not generally discussed at a coffee table. But that’s a problem in itself isn’t it? How do we expect the general public to understand and be empathetic to this animal and how we interact with it – if they can’t easily read about it? Maybe this is why people don’t want to discuss the cougars, because of the conflict and complicated relationships between man and beast – because of the differing views and ways of management that can lead to hours long discussions, because the public can’t easily digest data about the importance of the animal and its population levels.

To reduce the conflict, and amplify coexistence, new and effective ways have to be identified, implemented, monitored and managed by land owners and response teams. Montana Fish, Wildlife and Parks (FWP) reported that, “Mountain lion attacks on humans in Montana are extremely rare. The only fatal mountain lion attack in modern times was that of a 5-year old boy killed near Evaro, on the Flathead Indian Reservation, in September of 1989. Several nonfatal attacks have also occurred in the state and, like elsewhere, overwhelmingly involved children (Beier 1991).”⁹

Since instances of human-lion encounters are so rare, the main problem in Montana is lion-livestock encounters or even lion-dog encounters. Current responses to mountain lions in or

⁹ donald451. “Mountain Lion on Mbp 2,2.” *Tonymacx86.Com*, tonymacx86.com, 30 Jan. 2013, www.tonymacx86.com/threads/mountain-lion-on-mbp-2-2.87732/.

around a civilized area are usually lethal to the mountain lion, since relocation efforts are not often taken into consideration because there is data to believe that it is ineffective¹⁰ – the cougar will likely return. Landowners may kill an attacking or lingering lion near livestock or dogs, and if there is an encounter or sighting in a dense area the lion can be tracked and euthanized. Further, Montana hunting doesn't allow female mountain lions with spotted cubs to be taken, but if they are for some reason, FWP will have to often track down and euthanize the helpless cubs as well, unless a zoo takes responsibility for them.

On one hand my puma-enamored heart wants to believe there must be a better way to deal with the problem, rather than “humanely euthanizing” *or* killing any ‘problem’ cat – but I understand the complexity of the relationship cougars and humans have to balance, and things aren't that easy. Ultimately, I think it's important to *try* to at least understand these animals on a deeper level, educate our communities on their important role in ecosystems and *try* to manage interactions in a less harmful way.

One night, while writing this piece, my partner saw me scrolling and laughed to himself with a little smirk.

“And what exactly is so funny?” I stopped clicking.

“You're so interested in carnivores now, but just a few months ago you were terrified of them every time we went in the woods.”

¹⁰ Writer, Barbara BruceStaff. “Relocation Is Not an Option for Any Mountain Lion.” *White Mountain Independent*, 13 Aug. 2021, www.wmicentral.com/news/latest_news/relocation-is-not-an-option-for-any-mountain-lion/article_32589233-66ce-5c5b-a78c-442c94975c92.html.

If he wasn't right on the nose. I started to wonder *why* I was suddenly so intrigued by a group of wildlife that I tried *not* to think about for so long, and honestly still held some fear for.

“Well, I mean it just makes so much more sense now though,” I reasoned. “I was probably, and am still a little, so scared of these animals because *I never lived among them* and I was *barely educated on them* or their *importance to the environment*.”

If it took me all of this time and wild experiences in different states, what would it take for the world to care about a lion species beyond that of the mighty African Lion that we all know and love?

There have always been many types of lions, some have gone extinct thousands of years ago, some are endangered today and some are living now in hopes of never getting to either of those points. I hope the mountain lion, *Puma concolour*, is one of the safe ones – and the public can learn to love their importance and beauty in North America like I do.

I can't wait to send this to my family and friends on the East Coast.

Lesson One: Humans, carnivores, and the North American king of the wild.

Introduction to Part Two

The following section has two concurring parts that are connected through my semester as an intern for the Rattlesnake Creek Watershed Group during my first year as a graduate student at the University of Montana. For one semester (January through May) I was a communications intern for this nonprofit located in Missoula, MT. I applied for this role because I was a new member in the Rattlesnake neighborhood, I love communicating clearly for the public for environmental organizations and I thought their work was interesting. Throughout the semester I put together monthly newsletters, posted to their Facebook about events and wildlife sightings in the area and worked with the team to strengthen the nonprofit's platform.

The first part of this section is a result of my time with the nonprofit and will hopefully be used by RCWG within the Missoula community through their website or in print. It is a 'coexistence guide' for members of the Rattlesnake community. With so much information online about different ways to interact with wildlife and ecosystems around us, I thought it would be helpful for community members in that area to have one solid accessible resource that generally covers a lot of wildlife-human advice. It is a resource that I wish I had when I moved to the area, because I was confused on the larger impact, I had on that ecosystem beyond seeing the deer around and bear-safe trash cans. There is more to pay attention to there, like fish in the creek, small critters like squirrels, cougars in the nature beyond the neighborhood and more. It has been revised significantly from the original draft, with clear citations of sources and plain language that is comprehensible. I hope this can be a helpful resource to curious Missoulians.

The second part of this section is a reflection on my time as a communications intern for RCWG. I think this is important for my work in the portfolio because I discuss the way that this internship opened my eyes to the extent of human-wildlife interactions in this community. It

gave me a chance to embed myself further in the community and learn more about the landscape and animals around me — which ties into the drive for the theme in this portfolio. I hope this reflection clarifies what I have learned as a student, conservationist, intern and Missoula resident.

Guide to Coexistence with Wildlife in the Rattlesnake area of Missoula, Montana

Bridget Murphy
University of Montana
Fall 2023

Human-Wildlife Coexistence Guide for the Rattlesnake Area of Missoula County

The Rattlesnake neighborhoods of Missoula County are well-known for their access to the close roaring mountains, trails, the Rattlesnake Creek watershed and many more outdoor adventures. Past the populated community, the Rattlesnake recreation area borders the neighborhood and connects to the Rattlesnake Wilderness, which stretches for over 32,000 acres. Along with the incredible access to this beautiful wilderness, comes a parallel access for the dozens of wildlife species living in the surrounding nature to the community as well.

If you're familiar with the area, you've most likely encountered or heard of some of this wildlife throughout the neighborhood. The 'urban' or otherwise unafraid deer, roam between homes and yards for shelter and scavenging for their meals of grass, shrubs, flowers and more. You might see a hefty doe, strolling through with her two new speckled fawns; or, you might see two bucks with velvet still on their antlers sleeping under the tree in your yard. Early the next morning, or later that night, you could take out the trash and glimpse a black bear in your neighbors yard foraging. The bunnies, squirrels and other little critters aren't out by then, so you slowly walk back inside with silence filling the air.

This, of course, is just an illustration – but just as real an example as any other for the Rattlesnake area. While you may not likely see a massive bull elk in your yard, or catch sight of a lingering mountain lion in your tree, they are around and deserve just as much attention from the residents of the area.

So, there's a lot to know about the wildlife, habitat and population density of this area if you plan on interacting with it or living within the boundaries – because how we live as humans greatly impacts our environment and its wildlife, and we want to create or foster as little conflict with the local animals as possible.

Here, we'll share some safety tips, conflict resolution ideas and preventive measures that could be enacted in the Rattlesnake area to ensure the wildlife and residents are coexisting peacefully and safely. Each section relates to the variety of wildlife within that category.

Ungulates

There are a few ungulates (or hooved mammals) that roam Western Montana. Within the neighborhoods itself, the most common ungulates are white-tailed deer, or *Odocoileus virginianus*, and mule deer, or *Odocoileus hemionus*.

These deer species are widespread across Montana and North America. Mule deer have a natural habitat of “arid, rocky environments typical of many parts of the American west. [And] in many places their range overlaps that of the white-tailed deer,” (U.S. National Park Service). On the other hand, while white-tail often do overlap with mule deer habitat in Montana, they also enjoy hardwoods, croplands and bushlands to thrive on.

In the Rattlesnake community though, they are just as common as seeing a squirrel in a tree. These deer have become part of the community: they roam the streets and sleep in yards. They are a prime reminder to the residents of the area that we are bordering wilderness, with no border, and the animals can venture wherever they'd like – neighborhood or not. So, what can residents do to ensure that our lifestyle habits don't conflict or cause issues with the way of the deer and ungulates of the neighborhood? Well, here are few tips:

- **Don't feed the deer or leave any type of grain, salt lick or attractant that isn't part of the natural landscape.** Feeding the deer in a dense neighborhood like that of the Rattlesnake can cause more than a few problems for the residents and the deer alike. When the deer become reliant on human intervention for their food, they can succumb to habituation and lose their instinctive fear of humans and other animals. Not only is it negative to the relationship between human and wildlife, but it can lead to acts of aggression from the deer from lack of fear – like charging or stomping. They are beautiful animals, but it's important to remember they are also over 100lbs with sharp hooves and occasionally large antlers – they are not to be played with: they are wild.

Another reason that habituation is a negative for the neighborhood, is the creation of repetitive habits and sleeping arrangements for deer. The predators of the area may be attracted to these things for their food source, which can lead them into the neighborhood and put humans at threat as well.

- **Garden Wisely, Use Deer Repellants, Fencing and Avoid Certain Plants.** Feeding deer can be intentional like leaving salt licks out, or it can certainly be unintentional. Gardening is a habit many of us love and enjoy spending time doing, but it's important to remember the issue many of us face – deer like to eat a lot of things! With the use of deer repellents on prized shrubs or flowers, that can deter the deer from using them as a food source (such as Lavender, rosemary, oregano, thyme, catmint, garlic, and chives). If you'd like to avoid the use of those overall, then try out some four foot high (or higher) fencing around prime areas to add a bit more protection.

Finally, it's important to consider what you plant too. If you're worried about the deer eating your plants with deterrent or fencing, then try to switch out some attractants! You can avoid planting "forbs, flowers and fruits" (FWC) that deer prefer.

- **Don't Interfere with Fawns!** As these packs of deer grow in the neighborhood, it's not uncommon to see newborn fawns (or deer within their first year of life) wandering as well. In the early months of their lives, the momma deer often leaves them on their own in a familiar spot for stretches of time to avoid alerting predators of their presence. They will be checked on by their mother and their instincts of staying still are natural! Human interference can lead to injury of the fawn, or injury of the person if the protective mother is around. Feeding these babies can lead to death of the fawn as well, because their diet is very specific as a newborn deer.

These animals are wild and they have instincts and habits to protect them. Creating habituation in fawns and young deer is the same as older deer. Instilling a lack of fear in

fawns often continues into their adulthood which poses the same risks as a habituated adult deer.

There's one more notable ungulate of the area that is worthy of mentioning – a prominent and majestic Montana animal, the North American elk, or *Cervus elaphus*. To some biologists there are six subspecies, two of which are now extinct. They can range from 500-900 lbs and feed predominantly on grasses. While they may not roam the neighborhoods of the Rattlesnake, they are certainly nearby. Each winter, a large portion of the neighboring Mount Jumbo mountain is closed off to the public to ensure protection of an elk herd that calls that area home for a stretch of each year. Here are some tips to ensure their safety and yours during that time:

- **Be aware of the regulations and rules for the area at all times.**
- **If human activity is allowed on the mountain, be aware of your surroundings and give these animals space.**
- **If the mountain is closed for public access, adhere to the guidelines and do NOT enter!**
- **When entering after the herd has left, be aware of lingering youth and carcasses that may be active feed sights for predators. Contact FWP if you see something that needs to be addressed, do not try to interfere on your own.**

Sources cited in this section:

[National Park Service](#)

[National Resource Enterprises - University of Mississippi](#)

[Florida Fish and Wildlife Conservation Commission](#)

[Rocky Mountain Elk Foundation](#)

[Planet Natural](#)

Large Carnivorous and Omnivorous Mammals

Let's talk about the big ones - literally! Western Montana is well-known for it's bear habitat, for both grizzlies and black bears. As we see on many posters, billboards and notices – it's bear country. Grizzlies and black bears are both omnivorous mammals, meaning they eat plants and meat. The majority of their diet relies on berries and plants that they can forage in the wilderness, but they will feed on carcasses and small game as well if the opportunity presents itself. They very rarely would target humans, as the scent of activity of humans usually scares them off. So here are a few tips to keep your home and family bear-safe in the Rattlesnake area:

- **Store All Bear Attractants and Garbage Properly!** While it's rare (but possible) to see a grizzly bear in the neighborhood, it is more likely to have black bears foraging for grub along the blocks. These bears are extremely smart and have a sense of smell about seven times greater than that of a bloodhound's. While their target food may be berries and fruits, they will target human food and waste that is left outdoors like trashcans and a recently-used grill. It's just as important as not feeding deer populations, to not feed or allow feeding to bear populations of the area.

The National Park System said it best, "A single taste of human food or trash is enough to turn a wild bear into a food-conditioned bear ... Bears that seek human food have not forgotten how to forage naturally – human food simply has much more energy (fat,

calories, etc.) than their natural foods so they can spend much less time foraging and pack on more pounds when eating human food.”

Inhibiting bears from targeting human food, rather than their natural food sources that are healthier for their bodies and habits, is a crucial part of coexisting with them in the Rattlesnake area. It also ensures that bears don't become habituated, just like deer can be, and lose their fear of humans – which could be dangerous for the humans and animals of the area, as they are very strong mammals and if something were to go poorly they would most likely have to be euthanized or relocated. So, let's keep us all safe, wildlife and humans alike!

As released in RCWG's September newsletter – there are plenty of resources at the disposal of Rattlesnake residents to help keep the neighborhood safe. This includes resources to help with disposal of excess fruit and attractants through the neighborhood. Here was the announcement released, in case you missed it:

“Trash haulers Republic (406-543-3157) and Grizzly (406-541-7171) offer fantastic deals on bear-resistant trash cans. For fruit picking or gleaning help, contact Great Bear Foundation (<http://greatbear.org/projects/#bearsandapples>, 406-829-9378). More on Missoula Bear Smart efforts: <https://missoulabears.org/bear-smart-missoula/>”

- **Recreate Safely, Avoid Interactions and Be Bear Aware!** You've probably heard this a million times if you live in Montana, or even if you're visiting – but there's a good reason for that, especially in the Rattlesnake area. With the abundance of trails, biking paths, swimming holes and outdoor adventures woven through this community and the surrounding wilderness, it's important to remember that just because there's people around it doesn't mean that the animals are not. They called this place home first, and they didn't simply disappear because big neighborhoods were built – they just moved. Here are some tips:
 - Read posted alerts of activity in the area.
 - Carry bear spray at all times.
 - Travel in groups and make a lot of noise.
 - Avoid cubs and try to never be between them and their mother.
 - Know the differences between black bears and grizzlies.

The other, less discussed, large carnivorous animal of Montana is the mountain lion – otherwise known as *Puma concolor*, cougar, catamount or puma. These animals roam the mountainous landscapes of many states across the U.S. and are very present in the wilderness of western Montana too. They aren't discussed as much in terms of interactions with humans because they rarely ever target humans and are often unseen by us, since their main prey are ungulates (hooved animals like deer and elk). Their incredible skills in stealthy moves, cunning minds and quick reflexes make them a powerful carnivore in their habitats. Encountering cougars in the wild is extremely rare but if you do: make a lot of noise to scare the animal off if it sees you (otherwise alter your route if unseen), group together as one and make yourself big and if you are physically in contact with the animal fight back and hold your ground. Otherwise, the other

likely interactions you have with mountain lions of our area are from a distance and it's important that we consider the coexistence factor with them as well – and know what we can do to be a better part of the human-carnivore relationship.

- **Don't leave wildlife food sources out – especially deer attractants.** Mountain lions will habitually return to an area, even urban, if they have determined a consistent food source is there. Feeding deer and other wildlife can lead to mountain lions in the area. The Mountain Lion Foundation said, “Food sources that attract wildlife include pet food, uncovered compost piles, exposed gardens, dirty barbeque grills and non-native plants that provide preferential forage for deer.”
- **Avoid leaving pets or children for long periods of time alone or outside late at night.** Small children could be potential targets for a hungry cougar, so it's important to watch them and be with them closely on trails and outdoors. Cougars hunt mainly at dawn, dusk and after dark so if you have cats or dogs that need to be let out at those times, be aware and brief. On the other hand, if you have outdoor animals like chickens or livestock who stay outside, proper protective fencing and barriers will need to be in place to keep them safe. According to MLF, lions can jump more than 15 feet high so it's important to remember this in the fencing process. This will keep the animals safe but also the cougars safe, because if they make a kill in a populated area they may end up being euthanized.
- **There are deterrents!** Farmers and ranchers often head toward the electric fencing aisle for their deterrent needs to protect livestock – but as a homeowner or renter in the Rattlesnake area, you may not need this much. Motion-activated lights around your house or sprinklers can deter the cats if they are lingering around your space and it is not harmful.

As many of you know, the Rattlesnake community is vast and serves a large portion of Missoula for housing. A key to reacting to wildlife-human interactions, being preventative of conflict and encouraging coexistence is communication. Speaking with neighbors, local officials and being aware of the activity in the area or new ways to be beneficially impactful on the ecosystem are great ways to be involved. There's always more to learn and things to be aware of in your community and beyond!

Sources cited in this section:

[National Park Service \(2\)](#)

[USDA Forest Service](#)

[Mountain Lion Foundation](#)

Small Herbivorous Mammals

In this category, we're talking about the rabbits and squirrels of the Rattlesnake area. These critters are small but populous and impactful to the immediate and distant ecosystems. Some of these tips tie into the other categories, so if you notice, try to ponder on the connection and recognize the circle of life and balance of action that our amazing habitat around us provides and requires.

Squirrels are one of the closest proximity interactions that humans have with wildlife daily in urban areas or residential neighborhoods. They may not often be thought of as “wildlife” because they can be seen as nuisances or pests, but they are active wildlife around us and are crucial to

the ecosystem. These animals serve not only as a food source for large carnivores, but also as seed-dispersal critters who can help with reforestation and forest health through the spread of fungal spores. Here are a few things you can do to encourage coexistence and healthy habitat for you and the squirrels:

- **Don't hang bird feeders or squirrel food.** This ties in with the food being a deer attractant as well, and ultimately a possible lion attractant. The squirrels have plenty of other natural food sources throughout the area, so avoiding this can allow their natural life cycle to run through.
- **Discourage contact with your home, to avoid conflict within your walls.** Squirrels can be seen as a nuisance animal because of the possible interactions if the squirrel gets inside your home. They react with a lot of damage usually, trying to escape, and there are a few ways to avoid getting to this point in the first place. Cut back tree limbs that touch your house, breaking the resources they could be using. Regularly check your home for holes or access points, especially in attics. If the animal continues to cause damage to your goods, although unlikely, consider seeking help with humane relocation.

Bunnies or rabbits are the other critters we deal with commonly in the yards of the Rattlesnake area. These guys are just as important for Montana ecosystems as they serve as common prey for predators like wolves, foxes, cougars and carnivorous birds. When their populations are healthy, so are the predator populations – and in turn livestock or pets will be less targeted if the predators' natural food source is present. Here are some tips for coexistence with these cute critters in our area who often feed on grassy plants and find habitat with coverage:

- **Protect your grassy plants, veggies and tree trunks with wire mesh.** Rabbits can jump around four feet high, so if you're creating a boundary around plants or veggies remember to include that metric in the width of your wire mesh. You can also avoid planting these rabbit-attracting plants in the first place, if possible. On the other hand, rabbits can feed on the base of some tree trunks and wire mesh is just as effective a barrier if it's wrapped around the feeding area.
- **Watch out for nests and be aware of what's living in your yard.** If you find that bunnies have nested in your yard or the surrounding area, there are few things you can do to effectively coexist and allow them to survive and move along. First, don't bother the babies if they are alone – mothers only visit about twice a day so they are most likely fine. Then, make sure that pets or leashed dogs out and about are not interacting with or attacking the nests. The rabbits will leave when they are grown and healthy. Lastly, if you're aware of a nest present in the yard that you may mow – check for their presence before mowing!

Sources cited in this section:

[National Park Service](#)

[USDA Forest Service](#)

[Forest Preserve District Willcounty \(2\)](#)

Aquatic Life

Not that one category outstands the other – but this one is very critical for Rattlesnake community members and visitors to pay attention to! These are the wildlife (or marine life) that

are not seen on our streets, but below water. The Rattlesnake Creek runs through the neighborhood and up far into the Rattlesnake Wilderness and creates a vast watershed that our community and all of the wildlife rely on. For the watershed and creek itself to be healthy, the aquatic life within it must also be supported and healthy. Healthy urban creeks can, “help drain stormwater, reducing the impacts of flooding and preventing soil erosion. It also gives wildlife a place to live, with even the smallest streams providing a home for native fish.” Mainly, for our area this means native and non-native trout habitat can be supported to strengthen the ecosystem and watershed. Here are some tips on how to coexist with the fish of the neighborhood:

- **Recognizing plant life presence and encouraging native plant species growth.** Native plant life can help filter the water that rushes through, lessen erosion of the riparian buffers of the creek and strengthen food sources for the fish. Weeds can be harmful if they overpower these plants in the area, so organizing or joining planned weed-picking in the community can be helpful (although it’s important to remember not to over-pick to avoid causing erosion).
- **Watch for waste or toxic substances from your home/yard that can wash into the watershed.** Toxic pesticides, car-soaps or street salt can all wash from our yards into the drainage system or creek itself so it’s important to consider what you use in your space that could have a larger natural effect. In terms of leaf piles, try to reuse them as compost for your gardens or dispose of them in other manners – as they can also wash away and clog the waterways. Avoid building rock dams that block fish passage including in places like Greenough Park.

Sources cited in this section:

[Good Living](#)

In the end — we are not perfect and we will make ‘mistakes’ or the animals will. But, with these tools and the knowledge in our minds we can try our best to better the community – both wildlife and human – within the Rattlesnake area. Coexistence not only benefits us and the animals, but the land and life cycles of the ecosystem. It is beneficial to the balance of nature and our lifestyles. Conflict results in loss of life, habitat or more on either end of the spectrum – wildlife or man. So, as the animals we are, it’s important to restore this healthy relationship in our area and act beneficially to the place we call home, because we aren’t alone.

INTERNSHIP REFLECTION: Educational and Media Outreach Intern at RCWG

The Rattlesnake Creek Watershed group (RCWG) is a nonprofit run by a group of roughly four to six people near Missoula, Montana in the ‘Rattlesnake area’. Their main efforts focus on preserving and restoring the Rattlesnake Creek Watershed, promoting community relation and understanding of the watershed and wilderness area and promoting educational opportunities and announcements surrounding life in the Rattlesnake considering the coexistence and conflict potential with the large wildlife populations of the area. This is a screenshot from their webpage:

Our Mission

The mission of the Rattlesnake Creek Watershed Group is twofold:

- To protect, preserve, and restore the Rattlesnake Creek Watershed through community outreach, education, science, and stewardship.
- To promote and foster appreciation and respect for the unique qualities of the Rattlesnake Creek watershed for Rattlesnake residents and for the broader Missoula community

Our Vision

We envision a Rattlesnake Creek Watershed where:

- Rattlesnake Creek and its tributaries are clean and naturally flowing, with sufficient water quality and quantity to support its functions. The creek supports healthy fish populations, including bull trout. Riparian communities flourish. Other native plant communities are healthy and support diverse wildlife habitats and species.
- Humans and native wildlife safely share the landscape with minimal conflict. Human recreational uses are balanced with the needs of wildlife habitat, agricultural land, water quality, and with each other.
- Residents are informed, knowledgeable, and engaged. Residents and the broader community develop, deepen, and celebrate relationship to the watershed. The history of the watershed is known and honored.

11

My internship at the Rattlesnake Creek Watershed Group, as their communications and media engagement assistant, was extremely beneficial to my graduate school experience and to developing my understanding of nonprofit work. My work with the organization entailed using

¹¹ <https://rcwg.squarespace.com/mission>

my skills in publicizing relative content, engaging with community members through newsletters and event announcements, handling of social media accounts, generating new ideas and structures for their marketing and enabling accessibility to community members on local wildlife alerts and ways to properly interact with and around animals.

Through this internship, I found a specific interest of my own in the latter – living among wildlife and how to coexist with minimal conflict. The Rattlesnake community neighborhoods are situated at the foot of the Rattlesnake Recreational Area that is the border of the Rattlesnake Wilderness – which is all forest service managed land. It's a very unique situation for so many people to be living against this Wilderness, and especially considering that the city of Missoula is only just a few miles beyond the neighborhoods. Because the Rattlesnake community borders such wild terrain, there is a lot of wildlife activity in the area and recreational alerts as well (such as mountain closures, or trail encounters).

When I started my internship with RCWG, I was also searching for a new place to call home in the Missoula area. I happened upon a new lease in the Rattlesnake area at relatively the same time I began my work, so my new life in the Upper Rattlesnake coincided with reporting to the public about it through active nonprofit work. Immediately, the relationships I built with the RCWG board members were incredibly beneficial to my life there and to my work of understanding the Rattlesnake Wilderness and Rattlesnake Creek Watershed. The watershed stretches through the tip of the Wilderness at McCleod Peak down to where it connects with the Clark Fork River in Missoula at 3,200 feet. It impacts local flora, fauna, invertebrates, plant life, human water consumption, fishery ecosystems and much more. The education surrounding this watershed is vast and the relationships I made through RCWG helped me become a better community member and ecological contributor in the end.

The discussions with the team members were honest and passionate. I shared with them my skills and background in media, and that I lacked skills in science and ecological knowledge – but that I was willing and hoping to learn through my time with them. They [Nancy Siegel, Nancy Heil, Beth Judy and Matt Trentman] were willing to work with me and help provide me with informational brochures, articles and resources for me to learn about the work I'd be publicizing and creating with them. Matt is an expert in aquatic ecology, so I looked to him for knowledge on the local ecosystem to better understand it. Nancy Heil was my main source of contact, however, because she led me to my priorities for projects at RCWG. With her long experience as a teacher, communicator and founder of RCWG she was a prime source of support during my time with the organization.

I met weekly with Nancy Heil, and we all exchanged emails on a chain to discuss RCWG future plans, events and to-dos. Unfortunately, I couldn't attend any of the RCWG board meetings this semester because my afternoon classes were often during the time the other members could get together to figure out the plan for each month concerning RCWG's agenda and goals. However, in my weekly meetings with Nancy we specifically discussed my roles in the organization for the week, what the others accomplished in the monthly board meeting and how I could continue to aid in accomplishing the tasks at hand. I have learned that nonprofit work does not require a huge team of employees like I imagined, but more importantly it requires a team of truly dedicated, hard-working individuals who are passionate about the work. The group who runs this nonprofit is pretty small, and the workload is very high to manage event creation, publicizing/community outreach, volunteer work and much more. I am very grateful to have gotten to see the behind the scenes processes intertwined within this, and know now that it

is possible to accomplish great things with small numbers – you just have to be dedicated and hardworking.

A few connections were drawn from my work as a graduate student in my Environmental Studies classes at the University of Montana to the work I completed within my internship. During my Ethics and Restoration course from my first semester at UM, we went in depth on one of our field trips at a restoration site into the damage riparian systems often encounter with erosion and blockages. We overlooked gorges that had been completely eroded by acres, because of the lack of support of riparian vegetation that was meant for the area and lack of human action when the problem began. This knowledge and hands-on experience was applicable to my understanding of how the upkeep and restoration of Rattlesnake Creek Watershed was vital to the health of the area because of the vast ecological and environmental principles that play into it – and why it is so important to RCWG’s mission. A lot of people and animals rely on the watershed, without it there would be catastrophic ecological impacts. RCWG holds a few volunteer events when it’s warmer out (so not during my internship time unfortunately) to plant healthy-riparian vegetation and weed out the invasive or potentially harmful plants. Practices such as this are ways to get the community engaged in caring deeply about the health of the watershed, and to take care of a vital resource around the area. I hope to take part in these events, even past the timeline of my internship. These relationships and the knowledge I have begun to gain through my work with RCWG are not something I aim to stop growing once my internship is over – it’s something important to me to keep up with in my life here now.

I also had a connection to my Environmental Education (EE) course that I am taking this Spring semester to my work at the internship, but this instance proved a bit more challenging. I felt intrigued to be a part of this Rattlesnake community, both as an intern at RCWG and a

community resident, where I often posted announcements on bear safety and some mountain lion sightings. However, it wasn't often that the mountain lion information was expanded upon. If there was a sighting or interaction near the area, we'd announce it to the public to keep them aware – but we didn't further expand upon the reasoning, the species itself and how to coexist with them specifically. So, I wanted to create a curriculum/education program for my EE course that would be able to benefit RCWG, but also play into my own interests in the environmental education realm. I began to create a Cougar (mountain lion) Conservation and Education program meant for Rattlesnake residents and Missoula community members alike. It was a challenge because I am not very knowledgeable about the area yet to be able to fill in all of the information that was necessary to the program's creation. I wasn't sure what the community *needed* because I hadn't been a part of it for too long and I am not a wildlife biologist. But, I worked with my supervisor, Nancy Heil, to determine the aspects that could be beneficial to the community: cougar explanation to understand the species, policies around cougars as a whole, when conflicts arise (hunting, conflict with humans from poor habits like deer feeding, etc.), and cougar conservation practices for community members to engage with. We agreed that there were many programs and groups in the area that promote bear awareness, but not much attention solely on mountain lions. So, together we worked through the focus of the program and I worked with my education professor (Fletcher Brown, who also lives in the Rattlesnake area) to ensure that my program could be effective in the area as well. It is going to be an adaptable program that is put to use in my final portfolio for my Master's, so it's great that I started this vision with firsthand experience at RCWG.

The impact this organization made on me definitely changed my worldview because it helped me to understand how small nonprofits work. Each person, out of the ~six, has specific

duties to perform each month. But, more importantly, the people are not alone in their tasks or work. In order for the tasks at hand to get accomplished, like the monthly newsletter for example, we all had to work together and rely on each other to get the work completed and shared with the community. Some board members wrote articles or took photos for the newsletter, others made edits to the newsletter draft that I created and sent out. We all worked together each month to ensure that the newsletter and information we were sharing with the public aligned with key principles to RCWG. It was truly inspiring to see that these people can dedicate this much time in their weekly lives to a volunteer-based nonprofit organization, because they are that dedicated to the mission of the group. While my major responsibility each month was to organize and layout the monthly newsletter through MailChimp, I relied completely on the other board members to send the information and articles needed to fill out the piece. I relied on their keen eye to edit my drafts before I sent it out to the general public and through this I really recognized their care for the matter, the presentation of information and the accessibility of it to the public.

If I were to do this internship again, I would make sure that I had a lesser class schedule to be able to be a part of the monthly board meetings. I was able to grasp an understanding of how small nonprofits run, but I wish I was able to make it to the monthly board meetings to get an in person experience. While I met weekly with Nancy Heil, to discuss the roles I was needed in each week and be informed on updates within the organization for the month, it wasn't the same as being with the group all at once. However, life cannot always play out how we want so I am grateful for the opportunity I had with RCWG to at least be a part of their creative process.

I would highly recommend this internship with the Rattlesnake Creek Watershed Group and any other internship/work with them for that matter. As they continue to grow in the area, I

am sure there will be more opportunities for students to help and they are always looking for another dedicated team member. The importance of their mission, to educate the community about their surroundings and foster appreciation and real hands-on connections with the watershed is vital to the area. Their work, like the work of the watershed itself, doesn't just impact the Rattlesnake community – but the Missoula area as a whole. I believe that working with them has made me develop a greater understanding of the area, the people, the wildlife and the nature around me. It has grounded me in my life here in Missoula with a better understanding of purposeful volunteer work and a deeper understanding of the nature around me too.

Introduction to Part Three

The following section of this portfolio changes lens on the wildlife-human interactions of the world. No longer will I look at the interactions, conflicts and coexistence between Montana residents and the wildlife surrounding them – like large carnivores and omnivores – but I will take a dive into where I grew up, and the wildlife and marine life that lives there. In Maryland, on the East Coast, where my family’s farm sits on the shoreline of the Eastern Chesapeake Bay I have experienced a connection with wildlife since I was a child.

The wildlife and marine life there is not the same as Montana – there are no large carnivores beyond the Bald Eagle and there are rarely any black bears in the area at all. The animals and marine life we interact with most are the white tail deer, the rabbits, red foxes, raccoons, coyotes (occasionally), blue crabs, striped bass, shrimp, oysters, eagles, cranes, and more. It’s a ranging habitat throughout Maryland, but my focus will be on the wetland habitat, bordered by deciduous forests – where agriculture and human activities impact more than the species on land, but those in the water as well.

To me, it’s important to bring this narrative into my research and discussion for this portfolio because it broadens my work (in a small way) to address the complication of these wildlife-human interactions. The relationship, management methods, safety guidelines and coexistence cycles differ so broadly in every place across the states – and across the world. It would be foolish to assume that my work and learning in Western Montana can be applied to landscapes like Maryland, or other places that do not demand the same methods of interaction and conflict mitigation at all.

I believe that is one of the great, difficult parts of wildlife-human coexistence – each place is different, the habitats and animals and people are specific to the landscape and

environment of lifestyles. I am only beginning to touch on the scale of this by inserting the piece below, on Maryland agricultural interactions with the wildlife and landscapes there. To cover the entirety of scale on this topic would require years of research, writing and experience. I hope to incorporate this work in my home area because I don't know where I'll end up working with wildlife throughout my entire career. I may be using my knowledge on the East Coast, the MidWest or the mountains of Montana out West. It's important to me that I begin to understand the scale, in a way that connects with my passion for place, wildlife/marine life and future work. The earlier parts of my portfolio do not clearly connect with this piece – beyond that they are questioning the interaction framework and coexistence cycles between wildlife and humans across places.

More Than the Land, the Water Too

Bridget Murphy

University of Montana

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My high school in rural Maryland sat among three corn fields – the type for deer feed, not humans. Our house sat on the top of a hill, past two horse farms, with two fields ahead of the front door that a local farmer rented for crop production. While the farmed fields weren't necessarily mass-produced, they were certainly industrialized — with machinery often running through them and plows clawing at the dirt. The lands looked dry and dead in most seasons. When I think back now, I realize that most likely those fields were laden with pesticides and harmful chemicals to keep up with production needs of the area. I'm not sure if the fields around my high school or ahead of my home endured pest pressures heavily but there were plenty of whitetail deer in the area that often bedded in the woodlines. Although they were there, the corn continued to grow each year, and so did the hay.

I have gained intimate experiences on healthy farms over the years and now, I realize there has been one thing missing consistently in any farm environment I've ever worked on – wildlife. Out of the six farms I have worked on, only one had animals and they were not wild – they were livestock, which “are the domesticated animals raised in an agricultural setting to provide labor and produce diversified products for consumption such as meat, eggs, milk, fur, leather, and wool.” When farms incorporate such animals like sheep, cows or pigs they are not considered wildlife within agricultural ecosystems because they are raised for human purposes and live among people daily. When I pose the thought that no wildlife has been interactive with the agricultural landscapes I have witnessed, I am referring to the definition of wildlife such as: “undomesticated animal species, [and] has come to include all organisms that grow or live wild in an area without being introduced by humans.”

Many people would read this and laugh, because of course there isn't wildlife on farms – then the production of food would be tarnished by the hungry animals. But, as I have begun to

dig further into the field of agroecology and grasp a better understanding of the ecological purposes that different wildlife pose I believe that doesn't always have to be the case. Wildlife can be managed in many different ways on an agricultural landscape – whether it be complete restriction of the animals, partial integration through different agricultural practices or full integration in the creation of a 'naturally functioning' landscape that produces food as well.

Specifically, I will focus on my home as a teen and into the present day – the eastern shore of Maryland, where agriculture doesn't only affect wildlife on land but hundreds of species of marine life in the surrounding Chesapeake Bay as well. I believe that there are a few key ways farmers can integrate coexistence into their work along the Chesapeake Bay and strengthen the health of the surrounding marine life – without damage to their crops. Agricultural-wildlife interaction is a complex arena, as management and conflict changes drastically per state and even per county – but I hope to scratch the surface in providing outlets for Chesapeake Bay agriculturists.



As humans, we each have different personal relations to food but ultimately we all rely on it indefinitely. In Maryland, there's a very high reliance on the seafood industry that harvests catch daily throughout the Chesapeake Bay. It's part of the livelihood in the state, especially the Eastern Shore. The people depend on the watermen and women to get out, harvest and supply food from the water. Other animals are no different – Dependent upon each ecosystem that an animal inhabits, animals must adapt to find ways to fuel themselves as well. A wildlife informational article said, "In any given habitat, herbivores forage for plants and carnivores forage for other animals to eat them. To get food successfully, an animal has to adapt to its

surroundings. Animals that live in a forest have different ways of finding food when compared to an animal that lives in a desert. Animals have adapted themselves according to how much and what kind of food is available.”¹² Humans have also adapted over the years to accommodate for their food demand and losses that have been encountered – farmers usually at the forefront of work in meeting those goals in the last century or two.

With almost 900 million acres of farmland in America (as of 2022) and 2 million acres in Maryland alone, animals are now surrounded with plentiful fields of juicy plants that could fuel them. Modern agriculture occupies what was their home on land. For the Chesapeake Bay animals, their homes may not have been replaced by farms but there are plenty of interactions for them as well. The Chesapeake Bay Program stated that, “The [the Chesapeake Bay Watershed] is home to more than 83,000 farms that take up almost 30% of the land—from the dairy farms of Pennsylvania to the chicken and poultry farms of the Delmarva region.”

Each summer when my dad mows two small fields ahead of our house, to help the farmer who manages them, it’s a heyday for the local egrets (a long-legged wading bird, about half the size of an average blue heron). Dozens of them wobble along in the grass behind his tractor, gulping hundreds of frogs that are newly visible among the cut grass. It’s quite a sight. In this way, their habitat has been taken along the shoreline to create these fields but the farmland has provided a food source that is plentiful and consistent with the farming process. They don’t come after our corn, but they definitely won’t miss any of the frogs. It’s a mutual relationship that has benefitted both us, the animals and the land.

¹² *Prey Animals / Definition, Characteristics & Examples - Video & Lesson ...*, [study.com/learn/lesson/prey-characteristics-examples.html](https://www.study.com/learn/lesson/prey-characteristics-examples.html). Accessed 7 Dec. 2023.

Essentially this is the basis of impact for wildlife and agriculture; if the land is managed well the soil health, water quality and plant diversity support wildlife and ultimately marine life. The bits of crop stubble left in the fields at our home each year, provide habitat for the frogs and for birds to nest which ultimately benefits the food chain. The deer also have extra food sources to make it through the winter from the leftover crop residue if they can't find much elsewhere. The agricultural water run-off could be cleaner with less nutrient density to poison the waterways. But before we get into the solutions for Maryland farmers to support land and water biodiversity and health among their crop systems – let's acknowledge the restrictive side of the agricultural realm here.

Some farmers want to deter any interactions on their fields with wildlife like deer or birds because of the potential crop damage when it's growing season – so what are their options to prohibit but not completely restrict wildlife? They have a few, beyond completely fencing out wildlife. These are some of the main techniques I've learned and witnessed in person: planting things that are less attractive to the local fauna and bear species, using non-lethal (or lethal) projectiles to instill fear in the animals and electric or barbed fencing in hopes of creating a barrier. The fencing must be sturdy enough to withstand varying weather throughout seasons and potential flooding if it's along the shorelines.

In Maryland, the weather may not be as drastic or harsh as other places in the country but there are plenty of harsh snow or thunderstorms that can barrel through. Another factor that is Chesapeake Bay-specific is the wind speeds that farms and properties along the Chesapeake Bay encounter. WeatherSpark reported, "The windier part of the year lasts for 7.0 months, from October 9 to May 8, with average wind speeds of more than 8.1 miles per hour. The windiest month of the year in Chesapeake Beach is February, with an average hourly wind speed of 9.9

miles per hour.” And personally, I’ve experienced winds at my family’s farm that sits on the eastern side of the Chesapeake Bay, that reached 20 mph – so it can be intense.

Depending on the type of fence and length, the price of this tactic can also vary widely. On a basic standard though, the average farm fencing can cost between \$2-\$20 per linear foot so it can add up quickly – and it might not be fully effective unless it’s electrified. Fencing also must be over 7-feet tall, to keep the extraordinarily high-jumping deer from making their way in too.

In terms of non-lethal and lethal projectiles to shoot at the animals and instill fear, it’s roughly the same premise that some people rely on to enforce loosening of hunting regulations on large carnivores like mountain lions. I have been a hunter my entire life and have certainly witnessed some places where deer don’t seem worried for one second when I’m present – and others when they run at the sound of my breath. Some animals will become skittish from hunting or projectiles that ‘instill fear’, but it’s not reliable at all and ultimately, it’s unethical. Mountain lions won’t get scared by adding more hunters, just like bears and deer ultimately won’t stop being nuisance to farmers because there is steady food there. “In some studies, nuisance behavior stopped for up to 30 days following aversive conditioning with projectiles. In at least two studies, however, over 90 percent of bears returned to general nuisance behavior elsewhere. Far fewer abandoned it altogether.” So these outlets to pushing out wildlife could be useless in a lot of places.

The Chesapeake Bay is the largest estuary in America and is full of wildlife that support the health of the water ecosystem and the lives of thousands of Americans. The Chesapeake Bay Program stated that, “The Chesapeake Bay watershed spans more than 64,000 square miles,

encompassing parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia and West Virginia—and the entire District of Columbia. More than 18 million people live in the Chesapeake Bay watershed.” With this size of watershed, agricultural land interacts deeply with the water and shoreline ecosystems and wildlife. For years, a target of environmental protection in ecosystems has been the density of nutrients in agricultural water runoff into waterways. For the Chesapeake Bay and its animal residents, this has been a prime focus for solving human-wildlife conflict to encourage coexistence.

Agricultural water runoff is extremely nutrient dense because it often carries “soil and sediment, fertilizers and pesticides, and nutrient-rich animal manure.” When these materials, toxins and fertilizers are pushed into waterways a prime problem is the consumption of oxygen in the water that spurs from algae growth. It leaves less oxygen for the marine life and threatens their livelihoods, which ultimately threatens the entire watershed ecosystem. The Chesapeake Bay is home to “an impressive diversity of flora and fauna including 348 species of finfish, 173 species of shellfish” who coexist for miles under the brackish tides. It’s important to consider this type of wildlife in coexistence ideology with animals around us because they greatly impact the health of the watershed that thousands of people rely on, the seafood industry workers who make their pay from harvesting and selling their catch, those that consume the seafood around the country and the health of the surrounding ecosystems and environments that they border.

So, let’s turn to the ‘naturally functioning’ systems. This involves partial or full animal integration in the farm system. An article through Mother Earth News states that, “Farming with the wild is not a novel concept. Nineteenth and 20th-century American literature is replete with prophetic and philosophical writing that attempt to reconcile and redirect a civilization bent on

the isolation or elimination of wildness from the broader culture.” Through modern day sustainability movements, homestead popularity and agroecological priorities with wilderness in mind the movement has only continued to grow. “No farm can be ‘too wild’. Rather, a key management question will be whether a farm is ‘wild enough.’ In other words, has the agricultural operation optimized the natural services of a healthy ecosystem that allow it to prosper?”

These practices and maintenance habits for farmland will take time to adjust and learn for farmers, but the prospects for the health of the land and its surrounding species are incredible – while still being able to satisfy the human diet. If after all, farmers are stewards of the land, shouldn’t they be looking for ways to manage their systems that take care of that land and species that inhabit it as well? One of the most fascinating techniques I witnessed this year on a farm that I consider partial integration, is border creation of shrubs, trees or other native plants to create habitat and food sources for the wildlife instead of the crop fields – to distract them. My family’s farm land has had it implemented for decades, when the previous landowners grew hedgerows of trees and shrubs between each field. Now, they tower dozens of feet tall and about 20 feet thick between each field as a habitat for the animals. And often, when I hunt there, the deer find comfort among those trees – it’s like a wild apartment complex.

A piece from the University of Missouri states that its “A transition zone composed of a variety of plants including grasses, forbs and shrubs provides important habitat components for wildlife ... The habitat provided in wider areas provides a better chance for wildlife to reproduce and survive.” It’s a fascinating way to let the wildlife have their home still but nudge the direction of their food consumption to the natural foliage rather than the farmed produce.

When thinking about all of the different ways to incorporate wildlife in farms, it's crucial to consider the domino or ripple effect and circle of life that nature adheres to, some call it the dynamic equilibrium.¹³ The phenomena rely on the facts that, "A food web with many species seemingly provides more alternative pathways, so each predator has alternative prey species. Pest outbreaks [seem] more frequent in agricultural systems, which are [often] [biologically] simpler and less diverse." With more potential habitats for prey and predator species alike, the more diverse an ecosystem will become – predators taking care of excess prey and prey taking care of excess pests and weeds.

Full integration of wildlife on a farm ecosystem is a facet of regenerative agriculture. Generally, the idea behind it is to capitalize on the natural rhythm of nature; it is, "is applying context-specific, non-prescriptive techniques to landscapes; the aim being to reboot the functionality, maximizing the conversion of sunlight into plant energy and growth, driving the formation of deep, healthy, carbon-rich and organic-matter-rich soils, enhancing water retention, increasing the nutritional quality in both plant- and animal-derived products and promoting biodiversity all the way up the trophic levels. In a regenerative system, all living things are afforded the respect they deserve." It's an incredible way to transform an agricultural landscape into a fully functioning biodiverse ecosystem. Through practices like animal integration (livestock and wild/native), cover cropping, perennial focus and limited disturbance (less tractors, tilling or human disruption) the land can begin to recover and start to function. As conservationist Jake Fiennes said, "Nature is random, but it is wonderfully organized." It takes time for the landscape

¹³ "Dynamic Equilibrium." *Wikipedia*, Wikimedia Foundation, 24 Aug. 2023, en.wikipedia.org/wiki/Dynamic_equilibrium.

to adjust and complement each other with food production but it's not impossible – it just requires patience and attention, because each agricultural ecosystem is different. Some amazing benefits of this practice includes: carbon sequestration from healthier soils, increased crop yields, resilience to climate instability, fire and flood resiliency, higher nutrient content in food because of higher soil organic matter, increased biodiversity and biological activity, natural pest suppression from animals, improved watersheds, reduced erosion, better health and vitality for farming communities and more habitat for wildlife.

A specific way to manage a farm with, and not apart from, the wild is by creating wetland habitats – especially among Maryland's coastal farms. Drainage ponds, grassed waterways and water impoundments (field reservoirs of water) can offer crucial habitat for birds and other creatures. This is where Maryland farmers (specifically those along the Bay) have begun to excel over the past few years. Once again, the Chesapeake Bay Program reported on the topic. They stated, "Many farmers in the watershed have pivoted to practices like regenerative agriculture that help keep these pollutants in the ground and out of the Bay. Regenerative agriculture is nothing new, and many Chesapeake farmers have been practicing some form of it for decades, but overall, it has only recently grown in popularity." Farms that have recently adopted it or spread the word are those "in areas that are suffering from impaired streams and rivers." The practice includes: reduced tillage, cover crops, crop rotation, composting and livestock integration. For others, it also includes the creation of natural water-filtering habitats.

Ducks Unlimited, a nonprofit dedicated to the conservation of wetlands, created a program a few years back to encourage farmers to do their part to ensure a clean Bay and watershed. Their focus was on the agricultural runoff that was entering the Choptank River, which is "a major tributary of the Chesapeake Bay and the largest river on the Delmarva

Peninsula. Running for 71 miles (114 km), it rises in Kent County, Delaware, runs through Caroline County, Maryland, and forms much of the border between Talbot County, Maryland, on the north, and Caroline County and Dorchester County on the east and south.” They created the Choptank Watershed Wetland Restoration Program, which aimed at converting 90 acres of farmland to moist soil habitat to help with filtering of agricultural water runoff and wildlife support – my family’s farm ended up converting 12 acres through this program.

The process was amazing to be a part of and changed the perspectives of farmers throughout the entirety of the area – and it’s a great example of what wildlife-farmer coexistence could be throughout the state, with proper education and communication between restorationists and farmers. Two impoundments and a 10-foot-deep, 40-foot-wide pond on the edge of one of the fields filled with water, served as filters for the agricultural runoff of the farm. We supplied a few hundred native fish hatchlings to the pond and watched the magic happen. Within the time since starting that habitat, eagles have entered the area more frequently to prey on the fish. The fish population is still strong and has led tons of smaller organisms like tadpoles, lizards, and I’m sure millions of macrobiotic life into the area as well. The land is healthier because of the extra fertilization it’s seeing, the animals are functioning once more in a place that used to be their native habitat before the fields – and the corn production adjacent to the pond is just as steadily. The plants within the water filter nutrients and the life cycle is much stronger for the land, the wildlife and ultimately the marine life who receive the leftover water from the farm.

Wildlife were ultimately on the land before the farmers were, so I don’t see why we must completely push them out of their ecosystems to create a new one in Maryland – when after all,

the land is used to their touch and the animals in the Chesapeake Bay are helpless to what we do on the land. Along with growing polyculture agricultural systems (more than one crop at a time in a plot), incorporating or allowing animals to participate in the ecosystem can grow biodiversity as well. It can also support the restoration of the land, which ultimately can lead to a healthier life cycle for the surrounding ecosystems as well – as seen through the Ducks Unlimited program.

Once the right management process is found for each farm, it's possible to benefit the wildlife, the land and the consumer. Humans face a dilemma that more and more people are acknowledging these days – standing with or apart from nature. It's often referred to as the Human-Nature Divide; it's based on a general basis of these thoughts, "What happens when we perceive ourselves either as separate from or as a part of nature? Where our society stands, we already consider ourselves as separate from nature. For most of history, humans have acted as conquerors of nature." The impact that's been drawn from this way of thinking is correlated with the ruthless slaughter of animals in early days of hunting when it was about mass-killing rather than ethics at all, clear-cutting of forests and mass depletion of resources. When there's a divide between the way we see ourselves as humans, it's thought to be easier to wreak destruction on the nature surrounding us – including wildlife.

The wildlife-farmer divide simply contributes to human-wildlife conflict and the human-nature divide as a whole – so its important farmers begin to consider ways they can lessen this gap and be a more integrated part of the land's life. The first step to moving toward acceptance of these practices is understanding that, "the indigenous landscape is a constantly changing system composed of plants, animals, insects, microorganisms, and soils. Plants are not isolated entities, but participants in a system constantly in flux," and it's our duty as humans to respect

and nurture that – by avoiding furthering the divide. If Marylanders want to continue their way of life, the health of the Chesapeake Bay and its inhabitants relies partially on the health of the water runoff that joins with the tides. It's time the state considers the benefits to regenerative agriculture, using the land with purpose to promote health of all aspects and appreciating the natural landscapes capabilities for solving human-made dilemmas.

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Concluding Remarks

As I have completed the pieces in this portfolio, I have learned about the incredible depth of relationship, interactions, history, conflict and coexistence between humans and wildlife. I set out to cover three varying topics that are part of the relationship and interaction between the two worlds of civilization and nature. I wanted to understand the dynamics at a deeper level and be able to address concerns and fascinations within the community of my home in Maryland and my home in Missoula. Place-based writing, experience and knowledge grounded my work and I believe it will ground the success in interactions with wildlife that encourage coexistence between them and humans.

At first, I prepared to write in a completely academic manner – to report statistics, share data and lay out what the current situation of human-wildlife interactions are for people in Missoula and farmers in Maryland. I quickly began to struggle with this and remembered the reason I set out for graduate school within the Environmental Studies program at the University of Montana. My goal was to learn ways of sharing knowledge and experiences in environmental work and spheres to the public in an easily digestible way. Purely academic and scientific writing is what stood as such an intense barrier between me and working in the environmental field for so many years, and it's what discouraged me from pursuing a degree within that work in undergraduate college. I went with what I knew best and felt most comfortable with, media, journalism and creative writing and I found a true passion for writing in different ways to express my voice. EVST was the steppingstone for my creative voice and mind to enter this dynamic and incredibly vital field of work because I felt like it would be a place for me to work within my own sphere and mesh well with others.

Throughout this portfolio, I leaned strongly into the side of myself that wants this knowledge and data to get out to the public in a way that *they want to read, that is intriguing – in a way I wish I had had in my early years of higher education*. My work with the mountain lion education program felt strong, for use in schools and communities to strengthen a bond with the elusive species. It also lacked personal touch, that so many readers and active people alike connect easier with – so I wrote the personal essay along with it. I believe that part of educating others and fostering that passion for the environment and wildlife begins with a connection to place and to stories as well.

Again, I used this narrative aspect throughout the coexistence guide for the Rattlesnake area and the agricultural reflection for Marylanders. I learned that these interactions with wildlife are surrounding us all daily, whether we see a deer or animal in our yard or not. Our worlds are combined and integrated with each other in a way that most people cannot begin to describe. I care deeply about this connection between our species and wildlife, the protection of land for habitat and the widespread education and love that can spark in communities. These pieces in my portfolio, to me, epitomize the complexities of this world I discuss. It expands vastly beyond these topics, of course, just as every scientific and social field does. However, I hope that my work in this chips away at that barrier between so many general folk in communities and the scientific/data-filled world of environmentalists and wildlife biologists. There are so many ways that humans of any career path, societal class or place of living can benefit the community we share with wild animals. I look forward to continuing my growth of knowledge within this field as I move past the EVST program and yearn for more interactions with writing in this manner – for the public, for the wildlife and for a greater calling in natural coexistence.