

DR. KEVIN CROOKS AND DR. REBECCA NIEMIEC

2020 ANNUAL REPORT

COLORADO WOLF RESTORATION

Research, Education, & Outreach



WARNER COLLEGE
OF NATURAL RESOURCES
COLORADO STATE UNIVERSITY



THE CENTER FOR
HUMAN-CARNIVORE COEXISTENCE

The Center for Human-Carnivore Coexistence

The Center for Human-Carnivore Coexistence at Colorado State University is an academic institution focused on integrating transformative science, education, and outreach to minimize conflict and facilitate coexistence between humans and carnivores. We have developed projects in a variety of systems globally where coexistence is proving difficult, and there is substantial need for novel approaches that integrate social and ecological science.

The 2020 Ballot Initiative for Wolf Reintroduction in Colorado

In 2020, the CHCC engaged in a complex and controversial case study of human-carnivore coexistence in Colorado: the Fall 2020 ballot initiative mandating the reintroduction of gray wolves to the state. We developed and disseminated science-based information to educate the public and inform policy regarding the wolf issue with the ultimate goal of reducing conflict and promoting coexistence between humans and wolves should they be fully restored to Colorado. This annual report summarizes our research, education, and outreach activities on Colorado wolf restoration during 2020.



THE CENTER FOR
HUMAN-CARNIVORE COEXISTENCE



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2020 ACTIVITIES

Our interdisciplinary team engaged in the following activities regarding Colorado wolf restoration in 2020: 1) social and ecological research; 2) student education and mentoring; 3) public education and outreach; and 4) stakeholder engagement.

A group of cowboys on horseback in a field with mountains in the background. The scene is set during a golden hour, with the sun low on the horizon, casting a warm glow over the landscape. The cowboys are wearing traditional western attire, including wide-brimmed hats and jeans. They are gathered around a metal corral where several horses are being managed. The background features a range of rugged mountains under a sky filled with scattered, white clouds. The overall atmosphere is one of a busy day of ranch work in a beautiful, natural setting.

◇ SOCIAL AND ECOLOGICAL RESEARCH ◇

A primary goal of the CHCC is to conduct social and ecological science that is then translated to real-world action to facilitate coexistence and minimize conflict around carnivores, including wolves.

RESEARCH HIGHLIGHTS

EARLY ACHIEVEMENTS

In February 2020, CHCC faculty organized a research seminar at CSU on human-carnivore coexistence by Dr. Neil Carter, University of Michigan. Dr. Carter engaged with CHCC faculty and students to discuss the science and practice of human-carnivore coexistence.

In April, the CHCC was officially approved by CSU. We launched an official CHCC website, Twitter account, email list, and YouTube channel.

ACADEMIC PAPERS

In total, CHCC faculty published 12 scientific papers on human-carnivore coexistence in 2020. Those focused on wolves specifically included:

- In April, CHCC faculty Jon Salerno and colleagues published a scientific paper on sociopolitical identity and opinions on wolf management in Oregon.
 - Scientific knowledge gained from the study provides insight into wolf reintroduction to Colorado.
- In May, CHCC faculty and students, led by Rebecca Niemiec, published a paper in the scientific journal PeerJ reviewing our summer 2019 public opinion survey and analysis of media coverage on Colorado wolf restoration.
 - Our paper has been viewed by over 3,000 people and survey findings have been featured by over 50 news articles. Our findings helped inform dialogue regarding the proposed ballot initiative.
- In August, Dr. Niemiec, Ph.D. student Ray Gonzalez, and colleagues published a scientific paper on the influence of message framing on public beliefs and behaviors related to reintroduction of wolves to Colorado.
 - Findings provide insight on the effectiveness of messaging to influence public attitudes and actions towards wolves.



COLLABORATIVE RESEARCH

CHCC has developed partnerships with the following organizations to develop, test, and implement innovative field methods and economic incentives to minimize livestock depredation and allow ranchers to better coexist with carnivores, including wolves in the West.

- CSU Extension
- CSU Center for Collaborative Conservation
- USDA National Wildlife Research Center
- Western Landowners Alliance
- The Blackfoot Challenge
- Defenders of Wildlife

Our collaborative research will guide approaches to reduce economic impacts to ranchers and enhance tolerance of wolves and other predators.

A photograph of two wolves standing in a snowy forest. The wolves are positioned in the center of the frame, looking towards the right. They have thick, grey and brown fur. The background is a blurred forest with snow-covered trees and branches. The lighting is soft, suggesting a winter day.

◇ STUDENT EDUCATION AND MENTORING ◇

Educating and mentoring future leaders in the field of human-carnivore coexistence, including postdoctoral researchers, graduate students, and undergraduate students from the US and abroad, is a key goal of the CHCC.

STUDENT EDUCATION AND MENTORING HIGHLIGHTS

ADVISING STUDENTS 2 POST-DOC FELLOWS • 2 PH.D. • 2 MASTER'S • 6 UNDERGRAD • 1 HIGH SCHOOL
Students involved in research on wolf restoration in Colorado advised by Dr. Niemiec and Dr. Crooks



One undergraduate student successfully defended her undergraduate honors thesis in Fall 2020, which was focused on evaluating the CHCC's educational efforts.

CHCC faculty actively incorporated the Colorado wolf issue into additional courses via lectures, discussions, debates, and student research projects. Courses featuring the wolf topic included FW455 Conservation Biology (Dr. Crooks); FW260 Principles of Wildlife Management (Dr. Crooks, guest lecture); and NR 400 Public Communication for Natural Resources (Dr. Niemiec).



curriculum
integration

ADVANCING UNDERSTANDING



CHCC faculty (Dr. Breck, Dr. Crooks, Dr. Schultz) taught a graduate-level seminar on Social-Ecological Approaches to Human-Carnivore Coexistence. This course advanced understanding of interdisciplinary approaches to minimize conflict and promote coexistence between humans and carnivores, focused on wolf restoration to Colorado.



SOCIAL NETWORKING

Dr. Niemiec engaged undergraduate students in multiple classes across CSU in a scientific study exploring how to encourage people to share science-based information about wolves through their social network. Specifically, student participants shared scientific information about wolves with friends and family via email, text, or social media.



Additional CHCC faculty and students also engaged in research, education, and outreach regarding wolves. Overall, these efforts help achieve our goal at the CHCC of student education, mentoring, and capacity building regarding the science and practice of human-carnivore coexistence.





◇ PUBLIC EDUCATION AND OUTREACH ◇

The potential restoration of wolves to Colorado is highly contentious and misinformation is widespread. A primary goal for the CHCC is to educate the public and inform science-based policy regarding the wolf issue and to facilitate more productive, informed discussion about wolf reintroduction and management.

2020 HIGHLIGHT TIMELINE

PUBLIC EDUCATION & OUTREACH EFFORTS

FEBRUARY CHCC collaborated with CSU Extension and CSU Center for Collaborative Conservation to hold a half-day workshop in Grand Junction on wolf education. About 20 Extension agents from across Colorado attended to discuss information needs to educate Colorado citizens regarding potential wolf restoration. Outcomes from the event informed the development of educational material on wolves.

JUNE CHCC collaborated with CSU Extension and CSU Center for Collaborative Conservation to convene a two-day virtual workshop with Extension agents statewide. The workshop included sessions on: 1) Q&A on wolf educational material; 2) out-of-state experts discussing ranching with wolves; 3) management tools to minimize livestock depredation; 4) how to have dialogue with the public regarding the controversial subject of wolves. The workshop was evaluated and informed by pre- and post-surveys of Extension agents to gain feedback and assess impact. Post-surveys indicated that Extension agents who attended the workshop reported greater knowledge in sharing scientific information about wolves with their constituents.

JUNE CHCC, in collaboration with CSU Extension and CSU Center for Collaborative Conservation, published “The Colorado Wolves” installment of our new “People and Predator Series.” These educational materials review the science related to wolf reintroduction and include 31 FAQs and 12 Information Sheets available as official publications through CSU Extension. These materials have been shared widely in newspaper coverage, radio, and social media. Since they were first published, the CHCC website has been visited by over 8400 users in over 12,000 sessions across 88 countries (through 12/31/2020). Tim Ferriss, an author and podcaster with an audience of 8 million people, also included our wolf educational materials in his weekly newsletter.

AUGUST Dr. Niemiec sent out links to the People and Predator Series to Colorado residents to help disseminate the wolf educational materials and conduct an experiment on which messaging tactics are most effective for encouraging people to engage with the CHCC website. In total, 9,340 people were contacted, including 8,000 via mail, 420 via online platforms, 230 via CSU classes, and 690 additional people contacted via CSU students. Overall, this led to 548 additional people reading our People and Predator Series. Results from the experiment on which messaging was most effective are currently being analyzed and prepared for publication.

SEPTEMBER

2020

CHCC collaborated with CSU Center for Collaborative Conservation and the Institute of Science and Policy at the Denver Museum of Nature and Science to organize a special five-part webinar series, titled “Wolves in Colorado: Science and Stories.” Webinars topics included:

- 1) September 24: The Science of Restoring Wolves to Colorado;
- 2) October 1: Media Coverage and Public Perspectives on Wolves;
- 3) October 8: Community Perspectives and Conflict over Wolves;
- 4) October 15: The Values and Costs of Wolves;
- 5) October 22: The Experience of Living With Wolves.

Attendance ranged from 303-439 participants for each webinar, with 70-820 views of series episodes on the DMNS YouTube channel. Post-surveys indicated that 95.4% of participants believed that webinars answered “a great deal,” “a lot,” or “a moderate amount” of their questions.

OCTOBER Dr. Niemiec and Dr. Crooks published an article in The Conversation about the need for participatory decision-making to reduce social conflict regarding wolves in Colorado. The article has received widespread attention, including 13,661 reads, published by 38 outlets, including Salon, Adventure Journal, and U.S. News & World Report (through 12/31/2020). In the month since publication, it was the fourth most read article of all 212 Conversation articles ever produced from CSU, helping to inform public education and policy regarding Colorado wolves.

OCTOBER Brielle Manzolillo (Schultz masters student) published an essay on the Denver Museum of Nature and Science-Institute for Science and Policy “Perspectives” page titled A Path Forward for Wolves: Lessons from Past Introductions. This essay advances public education and policy regarding Colorado wolves by exploring past experiences in other states where wolves have been restored.

OCTOBER Ray Gonzalez and Matt Collins (Niemiec graduate students) published an essay on the Denver Museum of Nature and Science-Institute for Science and Policy “Perspectives” page titled Breaking Down Barriers and Reducing Conflict Over Wolves in Colorado. This essay advances public education and policy on approaches to minimize conflict regarding wolf restoration in Colorado.

OCTOBER CHCC worked with the Denver Zoo to host a two-part webinar series on wolf restoration to Colorado: 1) October 14: Wolf Restoration in Colorado: What Can We Learn From Yellowstone (with Dr. Doug Smith, Yellowstone Wolf Biologist); 2) October 21: Their Voice is Ours: Indigenous Perspectives on the Wolf Nation (with Rain Bear Stands Last and other leaders from the Global Indigenous Council). 145 people attended the webinar with Dr. Doug Smith, with approximately 400 viewing the webinar afterwards. 88 people attended the webinar with the Global Indigenous Council, with approximately 100 viewing the webinar afterwards. Post-surveys of webinars indicated that 85.3% of participants believed that webinars answered “a great deal,” “a lot,” or “a moderate amount” of their questions.

DECEMBER CHCC commenced a partnership with the International Wolf Center in Ely, Minnesota. Collaborative opportunities include joint webinars and media articles about wolves and research on effectiveness of such educational efforts.

[MORE >>>](#)



INVITED TALKS

Dr. Niemiec and Dr. Crooks delivered over 15 invited talks on how science can inform the topic of wolf restoration to Colorado, including presentations for the Denver Museum of Nature and Science, Western Colorado University's Center for Public Lands, Museum of Boulder, Rotary Club of Fort Collins Civility Seminar, Rotary Club of Fort Collins Members Meeting, Betty Ford Alpine Gardens, Grand County Libraries, Pathways Human Dimensions Conference, Larimer County Environmental Advisory Board, and a virtual Town Hall hosted by Colorado State Representatives and Senators.



MEDIA COVERAGE

Media coverage of our educational efforts has been extensive, accomplishing a primary CHCC goal for 2020. The office of University Communications at CSU conducted an analysis of earned media coverage of the wolf restoration ballot initiative featuring CSU in 2020. The search reported 676 stories from January 1 – December 31, 2020, with a reach of > 316 million readers, viewers, and listeners.



ADVERTISING EQUIVALENCY

The advertising equivalency for CSU totaled \$587,327. Outlets featuring our work included The New York Times, Washington Post, Reuters, Yahoo News, Daily Mail UK, MSN, National Geographic, Sierra Magazine, Denver Post, National Public Radio, Colorado Public Radio, CBS Denver, Fox31 News, KCNC, KUNC, and KOA Radio.



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◆ STAKEHOLDER ENGAGEMENT ◆

Another primary goal for the CHCC is to design, implement, and experimentally evaluate stakeholder engagement strategies to reduce social conflict among people about predators, including wolves.

STAKEHOLDER ENGAGEMENT HIGHLIGHTS



FEBRUARY

CHCC hosted a two-day workshop in Glenwood Springs with 31 key stakeholders in Colorado focused on exploring the question of how to reduce social conflict over wolf restoration to the state.

We wrote a report on perspectives related to wolf restoration shared in the workshop, which was approved by all workshop attendees. We shared findings with key decision-makers in Colorado via media. Further, Niemiec graduate students Ray Gonzalez and Matt Collins conducted interviews with stakeholders and wrote up results in a report.



MARCH

Four CHCC proposals were accepted for the CSU Center for Collaborative Conservation Fellows Program, including by Stewart Breck (CHCC faculty), Brielle Manzollilo (Schultz PhD student), Matt Collins (Niemiec MA student), and Ray Gonzalez (Niemiec PhD student).

This two-year program, focused on “People and Predators,” is funding Fellows to collaborate with stakeholders on the wolf issue in Colorado and the West. The goal of the program is to develop a network of faculty, students, and community partners to advance coexistence between people and wolves.



OCTOBER

CHCC developed a policy brief summarizing social science research on how to reduce social conflict over wolf management. The brief was co-authored by over 20 leading social and ecological scientists working on wolf management as well as leaders from Native American nations.

The brief was shared widely with policy-makers, including the Directors of Colorado Parks and Wildlife and the Department of Natural Resources as well as the Governor’s Office. The brief was also featured in media.



◇ **EVALUATION** ◇

Fall 2020 Wolf Webinar Series

Evaluation of CHCC Fall 2020 Education Webinar Series on Wolf Restoration

Mireille Gonzalez, Ph.D. Student, Human Dimensions of Natural Resources Department
Rebecca Niemiec, Assistant Professor, Human Dimensions of Natural Resources Department
Anna Baize, Undergraduate Student, Fish, Wildlife, and Conservation Biology Department
Jenna Linenberg, Undergraduate Student, Ecosystem Science and Sustainability Department
Rebecca Rugg, Undergraduate Student, Ecosystem Science and Sustainability Department

Evaluation Approach

To evaluate the effectiveness of the Fall 2020 education webinar series on wolf restoration, our research team conducted a series of pre- and post- webinar surveys of attendees. The evaluation had the following objectives: 1) to assess the types of individuals who attended the webinars (e.g., demographics, attitudes towards wolves) in order to gain an understanding of the audience for CHCC outreach efforts; 2) to examine how attendees perceived the webinars and what they learned; and 3) to examine if attendees' knowledge, attitudes, beliefs, and behavioral intentions related to wolf restoration changed as a result of the webinars.

Results

Who attended our webinars?

Overall, we obtained pre-survey responses from 406 webinar attendees and post-survey responses from 177 webinar attendees. Of these, 337 pre-surveys and 143 post-surveys were from attendees of at least one of the webinars from the five-part webinar series with the Denver Museum of Nature and Science. The remaining 69 pre-surveys and 34

post-surveys were from attendees of at least one of the webinars from the two-part webinar series with the Denver Zoo.

Survey respondents were mostly female (71%) and residents of the Front Range (77%). The majority of respondents self-identified as wildlife advocates (76%) and environmentalists (70%). Approximately 36% of respondents identified as scientists or researchers, 13% identified as hunters, and 6% identified as government officials in pre-surveys. Fewer respondents identified as ranchers (3%) or journalists (2%). Of the 406 pre-webinar responses, 88% reported a slightly positive to extremely positive attitude towards wolves and 73% indicated they slightly to strongly approved of wolf reintroduction.

What did attendees think of and learn from the webinars?

The majority of respondents provided feedback in post-surveys that they found the webinars useful and informative. When asked, "To what extent did the webinar(s) answer your questions related to wolf reintroduction and management," the average response among attendees of the Denver Museum of Nature and Science series was "a lot" (a mean of 4.09 measured on a 5 point scale). Among attendees of the Denver Zoo series, the average response to this question was 3.62 on the same scale (between "a moderate amount" and "a lot"). No participants answered "1-not at all" for either series. When asked what they learned from the webinar, many participants discussed how they gained a more well-rounded perspective of wolf reintroduction, including the complexities, costs, benefits, and concerns surrounding wolf reintroduction. Twenty-five percent of respondents mentioned specifically learning more about ranchers' perspectives, which is noteworthy because participants were primarily Front Range residents and considered themselves environmentalists or wildlife advocates.

? What did participants learn from the webinars?

"I really liked hearing from the ranchers and the Native American man. I was completely unfamiliar with their positions and learned a lot from their participation. I have a much greater appreciation and empathy for ranchers even though I don't necessarily agree with ranching animals in general due to my ethical beliefs."

"[I learned about] the complexity of the issue. It is so much more than just releasing a pack of wolves."

"Even though wolf introduction is controversial, [I learned that] many concerns can be addressed amicably if all sides are willing to meet and develop mutual respect for one another's views"

The post-survey also asked participants the question: "Do you believe that you learned enough at this webinar to make an informed decision about wolf reintroduction? Why or why not?" In response, 70% of participants specifically answered "yes," while only 4% said "no". When elaborating on why they answered "yes," one respondent said: "I have learned enough to make an informed decision primarily because of the excellent presentations by those with perspectives on both sides of the question and those with experiences of which the panelists could knowledgeably express."

Did attendees' knowledge, attitudes, beliefs, and behavioral intentions change after the webinars?

The final primary objective of our evaluation was to assess if there were any changes in participants' knowledge, attitudes, beliefs, and behavioral intentions related to wolves and wolf restoration before and after attending the webinar(s). In our pre- and post-surveys, we therefore asked the same questions about these perceptions to measure potential changes.

We found that between the pre- and post-surveys, there was a statistically significant increase in participants' confidence in discussing wolf reintroduction and management with those who share their opinion and those who have a different opinion on the matter (Figure 1).

Additionally, there was a significant increase in participants' reported knowledge of the science and diverse perspectives related to wolf reintroduction and management (Figure 2). Respondents' attitudes towards wolves and approval of wolf reintroduction increased slightly between pre- and post-surveys, but this increase was not statistically significant.

Conclusions

Overall, our evaluation found that the webinar series was well received by attendees. Most attendees reported that the webinars helped answer their questions and that they had learned enough to make an informed decision about wolf reintroduction.

Additionally, respondents' self-reported understanding of the science and diverse perspectives related to wolf reintroduction increased after the webinars. Our evaluation suggests that next steps could focus on reaching more diverse audiences, including more rural residents and those opposed to wolf restoration.

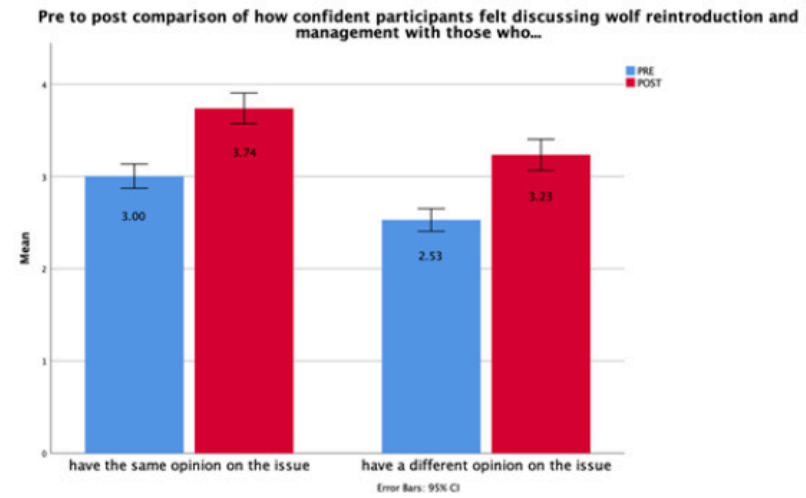


Figure 1. Mean (and Confidence Intervals of) pre- and post-responses to the two survey items assessing confidence discussing wolf reintroduction among attendees of the Denver Museum of Nature and Science webinar series.

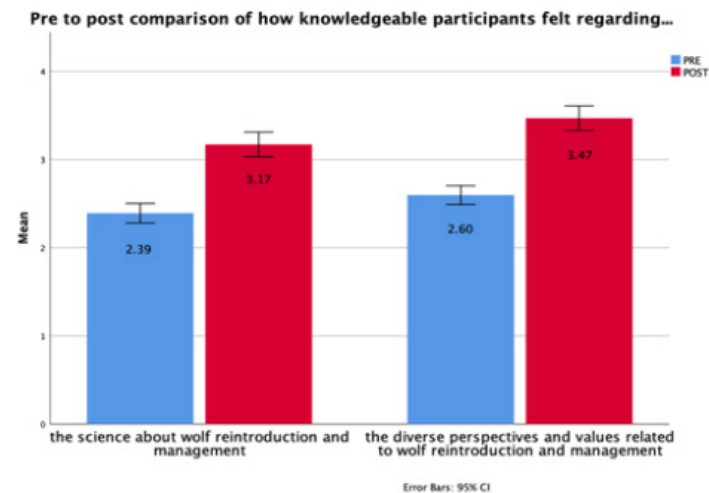


Figure 2. Mean (and Confidence Intervals of) pre- and post-responses to the two survey items assessing self-reported knowledge of the science about and diverse perspectives on wolf reintroduction management among attendees of the Denver Museum of Nature and Science webinar series



◇ EVALUATION ◇

Summer 2020 CSU Extension Workshop on Wolves

Evaluation of Summer 2020 CSU Extension Workshop on Wolves

Mireille Gonzalez, Ph.D. Student, Human Dimensions of Natural Resources Department
Rebecca Niemiec, Assistant Professor, Human Dimensions of Natural Resources Department
Evaluation Approach

Evaluation Approach

To measure the effectiveness of the June 2020 CSU Extension workshop, we conducted surveys of extension agents about their knowledge, attitudes, and beliefs about providing wolf education before and after the workshop.

We focus here on two evaluation objectives:
1) understanding extension agents' reactions towards the Extension workshop and the People and Predator Series wolf educational materials;
2) determining if the workshop and the wolf educational materials increased extension agents' knowledge in discussing the science related to wolf reintroduction and management with their communities.

Results

A total of 16 out of 26 respondents who completed the post-surveys attended the workshop. When discussing what they learned from the workshop, the majority of attendees valued the guest speakers, including ranchers in other states, sharing their experience of living with wolves (69%).

Agents also appreciated learning more about non-lethal and other management approaches to reduce wolf and livestock conflict (63%). A total of 17 post-survey respondents read the People and Predator information sheets. Approximately 70% of respondents reported that the materials fully or moderately met their needs. Additionally, 79% of respondents viewed the educational materials and the workshop as very or moderately inclusive.

We also found that between the pre- and post-surveys, there was a statistically significant increase in participants' self-reported knowledge in sharing scientific information about wolf reintroduction and management with their community. Specifically, there was a 1.7 point increase on a 7 point scale in extension agents' self-reported knowledge.
Conclusions and Next Steps

Overall, our evaluation found that extension agents generally appreciated the wolf education

? What did extension agents think of the workshop and educational materials?

“The information sheets are very informative and an excellent resource for the public leading up to the November election. Even if the ballot initiative fails, these resources will continue to be educational, especially if the wolf relocates on its own to Colorado. I especially appreciate the expertise and depth of resources that were used in putting these together. Well done!”

“Each session [of the extension workshop] had something different to offer and I really appreciated all the input from agents and presenters.”

efforts. Continued inclusive engagement with CSU Extension will be critical moving forward to enable the CHCC to reach more rural ranching communities in the state.



CHCC 2021 GOALS

Stakeholder Engagement

Our team will continue to advance wolf restoration to Colorado, particularly by informing stakeholder engagement efforts to minimize conflict around the issue. This will include continued dialogue with stakeholders and policy makers and the development of reports, policy briefs, and scientific papers regarding effective stakeholder engagement.

Produce Maps

Our team is developing predictive maps of wolf habitat suitability and potential areas of human conflict to inform wolf reintroduction to Colorado. These maps will be published in scientific journals and shared with agencies directing wolf reintroduction, including Colorado Parks and Wildlife.

Statewide Public Surveys

We plan to conduct a follow-up survey of public opinion on wolf reintroduction to gain a more in-depth understanding of the drivers of voting patterns on Ballot Proposition 114. We also plan to conduct statewide mail and online surveys of the Colorado public and messaging experiments regarding carnivore management, including wolves. Our surveys will examine public support for various non-lethal and lethal strategies for reducing human-carnivore conflict and public willingness to engage in proactive behaviors to minimize conflict.



Educational Outreach

We will continue to develop and disseminate educational information on the science related to human-carnivore coexistence, including wolves and other predators. This will include development of new installments of our CSU Extension “People and Predator Series”, potentially on mountain lions, black bears, and/or coyotes.



Non-Lethal Tools

We will continue to advance our collaborative research and outreach agenda to minimize conflict and facilitate coexistence between ranchers and predators, including wolves, in Colorado and the West. We will conduct field evaluations and workshops regarding non-lethal tools to prevent depredation, including novel approaches such as range riding, electric fencing, and livestock carcass management. We also plan to conduct social science research to evaluate the impact of these non-lethal tools, as well as compensation and financial incentives, at enhancing tolerance of predators in Western rural communities.



Promoting Ranching Coexistence

We will advance knowledge exchange and demonstration sites to promote ranching coexistence. We will strengthen our partnership with the Montana-based NGO, the Blackfoot Challenge, to learn from their successful ranching coexistence model and to transfer aspects of their approach to Colorado. We will develop exchange programs for ranchers, landowners, researchers, and students from Colorado to visit the Blackfoot Challenge system and, in turn, for ranchers and staff from the Blackfoot Challenge to visit Colorado to help with knowledge transfer. Our ultimate goal is to develop similar ranching coexistence demonstration sites in Colorado. The sites will be community-driven and devoted to long-term research to develop best management practices that enhance economic and social sustainability of ranchers while allowing for sustainable carnivore populations. The sites will also serve as education and outreach centers that encourage exchange of knowledge among practitioners and development of tools to minimize direct conflict with carnivores and social conflict among stakeholders.

JOIN US!

Join us in building a new era for human-carnivore coexistence, ensuring that humans and carnivores can live together with fewer impacts to both people and predators.

For more information, visit:

<https://sites.warnercnr.colostate.edu/centerforhumancarnivorecoexistence/>

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