The Center for Human-Carnivore Coexistence

The Center for Human-Carnivore Coexistence (CHCC) at Colorado State University (CSU) is an academic institution focused on integrating transformative science, education, and outreach to minimize conflict and facilitate coexistence between people and carnivores. This annual report summarizes our research, education, and outreach activities during 2023.
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Team Growth
- Mireille (Ray) Gonzalez officially joined the CHCC Leadership Team as CHCC Co-Director. After successfully defending her PhD, she is now a Research Associate within the Center.
- The CHCC added 5 faculty members, 2 postdoctoral fellows, and 4 Associates in 2023.
- In total, 20 CSU faculty members across multiple departments and colleges were members of the CHCC in 2023.

CHCC Leadership Team
- **Director:** Kevin Crooks, Professor, Department of Fish, Wildlife, and Conservation Biology (FWCB); carnivore ecologist
- **Co-Director:** Jonathan Salerno, Assistant Professor, Human Dimensions of Natural Resources (HDNR); human ecologist
- **Co-Director:** Mireille Gonzalez; Research Associate, Center for Human-Carnivore Coexistence; social psychologist

CHCC Faculty Team
- **Larissa Bailey:** Professor, FWCB; wildlife conservation biologist
- **Meena Balgopal:** Professor, Department of Biology; science education researcher
- **Joel Berger:** Barbara Cox Anthony University Chair in Wildlife Conservation, FWCB; wildlife conservation biologist
- **Sara Bombaci:** Assistant Professor, FWCB; wildlife conservation biologist
- **Stewart Breck:** Research Wildlife Biologist, USDA Wildlife Services; Faculty Affiliate, FWCB; carnivore ecologist
- **Paul Evangelista:** Senior Research Scientist, Natural Resource Ecology Laboratory; landscape ecologist
- **Brian Gerber:** Assistant Unit Leader, Colorado Cooperative Fish and Wildlife Research Unit, FWCB; wildlife ecologist
- **Dana Hoag:** Professor, Department of Agricultural and Resource Economics; agricultural economist
- **Rick Knight:** Emeritus Professor, HDNR; wildlife conservation biologist
- **Mike Manfredo:** Department Head and Professor, HDNR; conservation social scientist
- **Rebecca Niemiec:** Assistant Professor, HDNR; conservation psychologist
- **Barry Noon:** Emeritus Professor, FWCB; wildlife conservation biologist
- **Courtney Schultz:** Associate Professor, Department of Forest and Rangeland Stewardship; political scientist
- **Ken Shockley:** Holmes Rolston III Chair in Environmental Ethics and Philosophy, College of Liberal Arts; environmental philosopher
- **Tara Teel:** Professor, HDNR; conservation psychologist
- **Bastian Thomsen:** Assistant Professor, HDNR; socio-cultural anthropologist
- **George Wittemyer:** Professor, FWCB; wildlife conservation biologist
- **Barb Wolfe:** Associate Professor in the Department of Clinical Sciences in the College of Veterinary Medicine and Biomedical Sciences; veterinarian
- **Robin Young:** Archuleta County Director/Agriculture and Natural Resources Extension Specialist, CSU Extension
- **Veronica Yovovich:** Assistant Professor, FWCB; CSU Extension; wildlife conservation biologist
**CHCC Postdoctoral Fellows and Researchers:**

- **Treana Mayer**: CHCC Postdoctoral Fellow. Microbiology, Immunology, Pathology, advised by S. VandeWoude. Emerging zoonotic disease at the wildlife-public interface; Echinococciosis in canids and people; spillover risk of Highly Pathogenic Avian Influenza.

**CHCC Associates**

- **Santiago Chiquito**: CHCC Associate. Director, Neotropical Innovation. Protection-production systems for nature coexistence.
- **Pratik Desai**: CHCC Associate. PhD Student, HNG University, Patan, India. Human-sloth bear coexistence in Gujarat, India.
- **Nishith Dharaiya**: CHCC Associate. Director, Associate Professor, HNG University, Patan, India; Founder, WSB Research Foundation; Registrar, Center of Excellence for Wildlife and Conservation Studies. Carnivore conflict and coexistence in India.
- **Angélica Diaz**: CHCC Associate. Director. Neotropical Innovation. Community engagement and conservation technology in Colombia.
- **Mark Ditmer**: CHCC Associate. USFS Research Ecologist, Rocky Mountain Research Station, USFS. Spatial modeling of carnivore habitat suitability and conflict hotspots.
- **Seth Wilson**: CHCC Associate. Executive Director, Blackfoot Challenge. Applied practitioner focused on human-carnivore coexistence.
Conflict between humans and carnivores results from the interaction between people and predators. Consequently, solutions to conflict require effective integration of both social and ecological science. A primary goal of the CHCC is to conduct social and ecological research to understand how and where humans and carnivores can coexist and to develop approaches to reduce conflict. We have developed research projects in a variety of systems where coexistence is proving difficult and there is substantial need for interdisciplinary, collaborative efforts to reduce conflict.

RESEARCH PROJECT HIGHLIGHTS

- Rancher sustainability in landscapes with predators, including wolves and grizzly bears in the Rocky Mountain West and jaguars and pumas in Colombia
- Wolf restoration in Colorado
- Mapping risk of wolves killing livestock throughout U.S. wolf range
- Technology development to develop non-lethal tools to prevent livestock losses to carnivores
- Community-based land stewardship and carnivore conservation in Guatemala
- Human-black bear coexistence in developed areas in the Western US
- Sloth bear and leopard conflict in India
- Conflict between carnivores and livestock keepers in East Africa
- Tourism impacts on carnivore-prey interactions in South African food webs
- Combating illegal cheetah trafficking in the Eastern Horn of Africa
- Impacts of scavengers on spread of Chronic Wasting Disease
33 SCIENTIFIC PUBLICATIONS

CHCC researchers published a total of 33 scientific publications on carnivores and coexistence in 2023.


CHCC researchers presented multiple scientific presentations in 2023. Examples include:


**April**: Crooks, K. (2023, April). Center for Human-Carnivore Coexistence. WCNR Dean’s Advisory Council, Fort Collins, CO, United States.


**June**: Salerno, J. (2023, September). Human-wildlife conflicts, changing climate, and adaptation in dryland socio-environmental systems. Invited lecture, Department of Environmental Science, University of Virginia, Charlottesville, VA, United States.


EXTERNAL GIFTS: $1,712,160 (ongoing in 2023)
Private Donor: Philanthropic gift to the Center for Human-Carnivore Coexistence. $1,000,000. PIs K. Crooks, R. Niemiec (2021-2026).
Bohemian Foundation: Centering the voices of BIPOC youth in wildlife conservation in the West: A project-based learning and leadership program. $15,000. PIs A. Lavoie, R. Niemiec, K. Crooks, M. Balgopal, S. Bombaci, Rain Bear Stands Last, R. Frierson, N. Stafford (2021-2023).
Donald Slavik Family Foundation: Fighting illegal trafficking of cheetahs in Somaliland through strategic capacity building in the classroom, field, and courts of law. $100,000. PI P. Evangelista (2022-2024).
Greater Yellowstone Coalition: Interactions between grizzly bears and livestock: a pilot effort to enhance understanding with noninvasive methods. $4,800. PIs S. Breck, M. Hyde. (2023-2024).
Lordi Foundation: Improving the reproductive success in the ferret using new minimally invasive assisted reproductive techniques. $500,000. PIs B. Wolfe, F. Hollinshead (2023-2028).
EXTERNAL GRANTS: $2,680,374 (ongoing in 2023)
USDA National Wildlife Research Center Cooperative Agreement: Non-lethal tool development and evaluation for predator management. $55,000. PIs K. Crooks, S. Breck (2023-2024).
STUDENT EDUCATION AND MENTORING

A key goal of the CHCC is educating and mentoring future leaders in the field of human-carnivore coexistence, including graduate students and undergraduate students from the U.S. and abroad.

STUDENT MENTORING

The CHCC added 4 new graduate students in 2023. In total, 14 graduate students were members of the CHCC in 2023.
GRADUATE STUDENTS


Cassi Camara: PhD Student, HDNR, advised by R. Niemic. Analysis of outreach and messaging strategies regarding wolf reintroduction in Colorado.

Sarah Carroll: PhD Student, HDNR, advised by R. Reid. Human-wildlife interactions to support coexistence in pastoralist communities in East Africa.

Andie Conlon: MS Student, HDNR, advised by J. Salerno. The role of community-based conservation in promoting human-carnivore coexistence in East Africa.


Matt Hyde: PhD Student, GDPE, advised by S. Breck and K. Crooks. Using non-lethal tools to reduce conflict between ranchers and predators in Colombia and the Rocky Mountain West.

Tamara Layden: MS Student, GDPE, advised by S. Bombaci. The role of community-led stewardship in shaping carnivore conservation in the tropics of Guatemala.

Cori Persinger: MA Student, Department of Philosophy, advised by K. McShane and K. Shockley. A critique of animals rights theory from northern indigenous hunting ethics; hunting and environmental values.


Kelly Russo: MS Student, FWCB, advised by G. Wittemyer. Impacts of scavengers on Chronic Wasting Disease spread.


Erin Weingarten: PhD Student, GDPE, advised by A. Lavoie. Teaching racial equity in conservation higher education.

Becca Windell: PhD Student, FWCB, advised by G. Titcomb, L. Bailey, and J. Maimberg. Behavioral responses, transmission hotspots, and disease-predation interactions in Chronic Wasting Disease infected mule deer.

CHCC Graduate Student Research and Outreach Mini-Grant

In March, CHCC announced the recipients of the second annual CHCC Student Research and Outreach Mini-Grants (up to $2000 each).

Tim Helming: Cooperative camera trap monitoring for wolf coexistence on private lands

Matt Hyde: Harnessing hierarchical models to reduce bias in human-carnivore conflict studies

Tamara Layden: The role of community-led stewardship in shaping carnivore conservation in the tropics of Guatemala

Cori Persinger: Ethical dimensions of human-wildlife interactions

Cassandre Venumière-Lefebvre: Promoting human-carnivore coexistence through management and policy

Erin Weingarten: An investigation of justice, equity, diversity, and inclusion in the current U.S. undergraduate and graduate wildlife ecology curriculum

CHCC Undergraduate Research Experience

CHCC instituted the first annual CHCC Undergraduate Research Experience (URE) program. The URE aims to provide applied, social-ecological research experiences and skills to undergraduates, while also engaging and supporting CHCC faculty, graduate students, and partners. In addition to their research, URE students participated in the CHCC Fall lab where they received mentoring and research design support.


Jay Finley: advised by M. Hyde, S. Breck and K. Crooks. Systematic review of fencing to reduce livestock losses on ranchlands;

Lyssa Lini: advised by C. Wells. Evaluating feral cat diets through fecal metabarcoding.

CHCC International Fellows Program

The CHCC International Fellows Program aims to advance the mission of the CHCC by supporting social-ecological science beyond North American systems in important landscapes for coexistence. The Fellows Program provides small grants to support early-career scientists working on coexistence challenges and solutions, while integrating Fellows and their science within the CHCC community.

Pratik Desai: PhD student, HNG University, Patan, India. Receiving CHCC mentorship from S. Breck, A. Giordiano, J. Salerno. Human-sloth bear coexistence in Gujarat, India.

Elizabeth Ruiz Elejalde: MS student, Javeriana University Bogota. Receiving CHCC mentorship from M. Hyde. Community ecology and mammal conservation in the Colombian Llanos.

TEACHING

CHCC faculty and students also incorporated human-carnivore coexistence topics into their coursework at CSU. Examples in 2023 include:

- **FEBRUARY** | Crooks, K. Socio-ecological scientific insights into Colorado wolf restoration. Guest lecture, FW472 Issues in Animal Conservation and Management.
- **FEBRUARY** | Yovovich, V. Presentation on human-mountain lion conflict history and prevention to an 8th grade class in coastal California.
- **MARCH** | Venumière-Lefebvre, C. Predators and coexistence. Guest lecture, NR300 Biological Diversity.
- **SEPTEMBER** | Crooks, K. Connectivity and coexistence in fragmented landscapes. Guest lecture, ECOL505 Foundations of Ecology.
- **OCTOBER** | Crooks, K. Moderated debate and presented lecture on Colorado wolf restoration in his course FW455 Principles of Conservation Biology.
- **OCTOBER** | Crooks, K. Wolf reintroduction to Colorado. Guest lecture, ESS501 Principles of Ecosystem Sustainability.
- **OCTOBER** | Crooks, K. Wolf reintroduction to Colorado. Guest lecture, FW469 Large Mammal Ecology and Conservation.
- **OCTOBER** | Crooks, K. Wolf reintroduction to Colorado. CSU Student Chapter of the Rocky Mountain Elk Foundation.
- **OCTOBER** | Crooks, K. Wolf reintroduction to Colorado. CSU Zoology Club.
- **OCTOBER** | Gonzalez, M. A social science perspective of wolf reintroduction in Colorado. Guest lecture, FW455 Conservation Biology.
- **NOVEMBER** | Bombaci, S. The impacts of human-wildlife conflict for marginalized communities and developing nations. Module and GIS lab in FW310 Mapping Diverse Perspectives in Conservation.
A primary goal for the CHCC is to transform social and ecological science to real-world action to facilitate coexistence and minimize conflict around carnivores, including direct conflict between carnivores and people and social conflict among people about carnivores. Ultimately, through our outreach and engagement we strive to reduce impacts to both people and predators.
FEBRUARY
V. Yovovich participated in a strategic planning meeting with the Steering Committee of the Central Coast Rangeland Coalition, an organization that convenes rangeland stakeholders to share information on science-based rangeland management and conservation practices.

S. Breck spoke to local communities in Aspen and Carbondale, Colorado, to discuss strategies to reduce conflict with black bears, focused on reducing human food sources.

MARCH
R. Young held a workshop in Gunnison for livestock producers to learn about wolf restoration and management in Colorado.

MAY
C. Camara continued her presentations at national and international conferences to enhance understanding of wolves and promote local and communication strategies regarding wolf conservation.

APRIL
The Wolf Conflict Reduction Fund supported an outreach effort with ranchers in Jackson County in northern Colorado. Funds were used to purchase trail cameras for ranchers to monitor their calving pastures, concurrent with the installation of fencing and flagging by Colorado Parks and Wildlife to protect cattle from potential conflict with wolves.
JUNE
With support from the Riverstyx Foundation, S. Breck continued collaborations with Oregon rancher Cameron Krebs to develop non-lethal tools to reduce livestock predation by carnivores. The project included technology development in collaboration with John Mizia, Director for the CSU Rapid Prototyping Lab, with support of high school summer interns through a CSU work-based learning program in engineering wolves.

R. Knight took a two-week pack trip in the Carpathian Mountains of Romania to learn about strategies of sheep and cow pastoralists to coexist with high densities of brown bears and wolves.

AUGUST
P. Evangelista and R. Tesfai led a successful training of federal and regional judges, prosecutors, and investigators in Somaliland focused on international and national wildlife laws on poaching, capturing, and trafficking of cheetah and other wildlife. The training was held in collaboration with the Natural Resource Conservation Network, Somaliland Supreme Court, and Hargeisa University School of Law.

SEPTEMBER
CHCC hosted our first Dean’s Transdisciplinary Award workshop at CSU. The objectives of the workshop were to: 1) engage the team members in Science of Team Science training; 2) begin developing transdisciplinary research questions, teams, and proposals regarding human-wildlife coexistence; and 3) initiate an annual campus-wide experiential education event for undergraduates: the CSU Transdisciplinary Handprint Challenge Conference.

A. Giordano visited Jackson Wild and Yellowstone National Park, where he connected with filmmakers on the development of new storytelling ideas rooted in human-wildlife coexistence and innovation.

OCTOBER
The Wolf Conflict Reduction Fund supported a series of engagement events, led by CSU Extension, focused on knowledge transfer and peer-to-peer learning with livestock producers regarding the deployment of non-lethal conflict reduction tools in likely wolf reintroduction areas in Colorado. Attending this event were leadership and ranchers from the Blackfoot Challenge, a Montana NGO with deep experience using conflict reduction approaches to prevent livestock losses while living and ranching with wolves and other large carnivores.

DECEMBER
C. Camara partnered with the Adelphi consultancy as one of their carnivore communication experts to support the European Union Platform on Coexistence between People and Large Carnivores. The project has a heavy focus on outreach and youth engagement.

V. Yovovich visited Casanare, Colombia to meet with ranchers to discuss human-carnivore coexistence in Colombia. She also met with the Panthera Puma Program, Panthera Colombia, and the Panthera Program Director of Latin America to discuss future research and conservation priorities and collaboration opportunities.
SELECT MEDIA COVERAGE


DeLoss, J. October 17, 2023. Countdown to coexistence: CSU working to support Colorado livestock producers as wolves reenter the state. CSU Source.


Schmelzer, E. December 3, 2023. The wolves are coming to Colorado, and the state has stockpiled explosives and deterrents. How are ranchers preparing? The Denver Post.

ADAILY Reports. December 5, 2023. Colorado’s gray wolf reintroduction begins this month. AGDAILY.


CHCC AND THE MEDIA

Media coverage of our research and education efforts has been extensive. The office of University Communications at CSU conducted an analysis of earned media coverage of the human-carnivore coexistence featuring CSU in 2023. The search reported:


787 million readers, viewers, and listeners for potential reach.

$7.3 million in advertising equivalency.
CHCC 2024 GOALS

RESEARCH

Enhance transdisciplinary research on human-carnivore coexistence by strengthening collaborations across disciplines and academic units within CSU, with support from the Dean’s Fund for Transdisciplinary Approaches to Solve Environmental Wicked Problems.

Develop and test new technology and tools for reducing human-carnivore conflict, including continued collaboration with Oregon rancher Cameron Krebs and the CSU Rapid Prototyping Lab.

Investigate social outcomes of stakeholder and public engagement, including social conflict, social learning, trust, and acceptability of management options regarding human-carnivore coexistence.

Investigate the behavior and ecology of large carnivores in relation to conflict and coexistence with people.
EDUCATION
Mentor postdoctoral fellows and graduate students on the social-ecological science related to human-carnivore coexistence.

Support graduate students via CHCC Student Research and Outreach Mini-Grants.

Engage undergraduate students in human-carnivore coexistence research or outreach, including via coursework and Undergraduate Research Experience.

Advance development of an international education and outreach program centered on human-carnivore coexistence, including via CHCC International Fellows Program.

OUTREACH
Advance partnership with CSU Extension to continue community-based outreach regarding conflict reduction with wolves and other carnivores in Colorado.

Implement technology and tools for reducing human-carnivore conflict.

Facilitate peer-to-peer learning and knowledge transfer among livestock producers regarding sustainable ranching in landscape with predators.

Disseminate social and ecological science related to human-carnivore coexistence to the general public, practitioners, and policy makers.

Develop events that bring diverse stakeholders together and elevate voices of traditionally marginalized groups to promote human-carnivore coexistence.

FINANCIAL
Pursue goal of ensuring long-term financial sustainability of the Center for Human-Carnivore Coexistence, including securing endowed funds.
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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