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 2022.
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In 2022, our interdisciplinary team of social and ecological scientists engaged in the following activities regarding human-carnivore coexistence: 1) restructured and expanded our CHCC team; 2) social-ecological research; 3) student education and mentoring; 4) outreach and engagement.
CHCC Team

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: Kevin Jablonski, Rangeland Livestock Systems Extension Specialist, Assistant Professor, Department of Animal Sciences; range agroecologist

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
Paul Evangelista: Senior Research Scientist, Natural Resource Ecology Laboratory; landscape ecologist
Dana Hoag: Professor, Department of Agricultural and Resource Economics; agricultural economist
Rick Knight: Emeritus Professor, HDNR; wildlife conservation biologist
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; social scientist
George Wittemyer: Professor, FWCB; wildlife conservation biologist

CHCC Postdoctoral Fellows

Ben Ghasemi (2021-Present): CHCC Postdoctoral Fellow/Project Manager. HDNR, advised by R. Niemiec. Conservation social science and human-carnivore coexistence in the Western U.S.

CHCC Researchers and Associates

Mark Ditmer: CHCC Associate, USFS Research Ecologist, Rocky Mountain Research Station, USFS. Spatial modeling of carnivore habitat suitability and conflict hotspots.

2022 Progress

• Formed New Leadership Structure
  -In 2022, the CHCC formed a new leadership team, including a Director and two Co-Directors.

• Team Growth
  -The CHCC added three faculty members, one postdoctoral fellow, and four Researchers/Associates in 2022.
  -CHCC helped develop a new tenure-track faculty position in Human-Wildlife Conflict and Coexistence, with an Extension component. Dr. Veronica Yovovich was hired for the position and will start in Spring 2023.
  -In total, 18 CSU faculty members across multiple departments and colleges were members of the CHCC in 2022.
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
- Impact of human-induced forest fires on carnivore communities in Brazil
- Community-based land stewardship and carnivore conservation in Guatemala
- Urban black bear conflict in the Western US
- Polar bears and energy development in Alaska’s North Slope
- Conflict between lions 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
- Disease transmission between wild felids, domestic cats, and humans
- Impacts of scavengers on spread of Chronic Wasting Disease
25 SCIENTIFIC PUBLICATIONS

CHCC researchers published a total of 25 scientific publications on carnivores and coexistence in 2022.


CHCC researchers presented multiple scientific presentations in 2022. Examples include:

**February:** Lasky, M. Does fear of humans drive wildlife interactions in African food webs? Front Range Student Ecology Symposium, CSU, Fort Collins, CO.

**April:** CHCC undergraduate research assistants presented posters from their work at the CSU Celebrate Undergraduate Research Symposium (CURC).


**May:** Lasky, M. & Bombaci, S. Can humans induce changes in wildlife behavior and predator-prey co-occurrence? A case study in South Africa. Fish, Wildlife, and Conservation Biology Departmental Seminar Series, CSU, Fort Collins, CO.

**May:** Camara, C. Media Mayhem! A media analysis of wolf reintroduction in Colorado. Pathways: Human Dimensions of Wildlife, Bremerton, WA.

**May:** Gonzalez, M. Characterizing social conflict over wolf reintroduction in Colorado. Pathways: Human Dimensions of Wildlife, Bremerton, WA.

**May:** Heid, T. Key characteristics of global cheetah (Acinonyx jubatus) trade research: A systematic map. Pathways: Human Dimensions of Wildlife, Bremerton, WA.

**May:** CHCC hosted Dr. Katie McShane (Professor, CSU Department of Philosophy) for her CSU seminar: Value Frameworks in Environmental Ethics.

**May:** J. Berger delivered the Inaugural Everest Address on Wildlife and Climate at Everest Base Camp (17,600'). His focus was on climate-induced and human stressors for wildlife, including conflicts with snow leopards and Tibetan foxes.

**June:** Salerno, J. Why people matter for wildlife conservation. Wildlife Ecology, Rocky Mountain Biological Laboratory, Gothic, CO.

**June:** Gonzalez, M. Normative influencers on planned voting and collective actions related to wolf reintroduction. Society for Environmental Populations & Conservation Psychology, Virtual.

**July:** Ghasemi, B. Conservation scholars’ (polarized) perspectives on the morality of trophy hunting. North American Congress for Conservation Biology, Reno, NV.

**July:** Hyde, M & Boron, V. Estimating jaguar survival and abundance using camera trap data and tourists’ photos. Association for Tropical Biology, Cartagena, Colombia.

**August:** Shockley, K. Lessons from Leopold: Gathering perspectives for knowledge and right. Plenary for the American Fisheries Society, Spokane, WA.

**October:** CHCC helped sponsor and host Dr. Kristi Karanth (Chief Conservation Scientist & Director at India’s Centre for Wildlife Studies) for her CSU seminar: Living with Wildlife: Insights from 24 years of Science, Conservation & Education.

**October:** Camara, C. Mastering media: Lessons from Colorado’s wolf reintroduction on navigating media. The International Wolf Symposium, Minneapolis, MN.

**October:** Crooks, K. Conference Plenary: Colorado wolf research, education, and outreach. The International Wolf Symposium, Minneapolis, MN.

**November:** Tricorache, P. The illegal online trade of cheetah. Convention in International Trade of Endangered Species of Endangered Fauna and Flora (CITES) 19th Conference of the Parties, Panama City, Panama.

**November:** Venumiere-Lefebvre, C. The right cans help protect black bears? Graduate Student Showcase, CSU, Fort Collins, CO.

**November:** Persinger, C. Hunting ethics. Graduate Student Showcase, CSU, Fort Collins, CO.

**November:** Hyde, M. Tourism promotes coexistence with jaguars on ranchlands: Jaguar population growth and habituation in Colombia. Graduate Student Showcase, CSU, Fort Collins, CO.

**November:** A. Conlon defended her M.S. titled “Exploring the relationship between Northern Colorado science teachers’ environmental and pedagogical value orientations and their implementation of place-based education.”

**November:** Crooks, K. Human-carnivore coexistence: A global one health challenge. One Health Day Celebration & Research Showcase, CSU, Fort Collins, CO.
These funds will advance our human-carnivore coexistence research, education, and outreach efforts. Funding sources have included a mixture of gifts from private foundations and donors, external grants from governmental agencies and non-governmental organizations, and internal CSU funds.

**EXTERNAL GIFTS: $1,212,000 (ongoing in 2022)**

Private Donor: Philanthropic Gift to the Center for Human-Carnivore Coexistence. $1,000,000. PIs K. Crooks, R. Niemiec (2021-2026).


Donald Slavik Family Foundation: Fighting illegal trafficking of cheetahs in Somaliland through strategic capacity building in the classroom, field, and courts of law. $50,000. PI P. Evangelista (2022-2023).

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).

**EXTERNAL GRANTS: $2,491,374 (ongoing in 2022)**


USDA Western Sustainable Agriculture Research and Education (SARE): Training Colorado educators about sustainable coexistence between ranchers and wolves. $100,000. PIs: D. Hoag, S. Breck, K. Crooks (2021-2022).


**INTERNAL CSU FUNDS: $500,000 (ongoing in 2022)**

CSU 50% match to $1M philanthropic gift: CSU Provost; Office of Vice President for Research; Warner College of Natural Resources; Department of Fish, Wildlife, and Conservation Biology; One Health Institute. $500,000 (2021-2026)


**COLLABORATORS, ADMINISTERED OUTSIDE CSU: $1,238,255 (ongoing in 2022)**

USDA National Resource Conservation Service Conservation Innovation Grant (CIG): Landowner collaborative strategies for nonlethal predator control. $888,255. PI: S. Breck; Collaborators USDA, Western Landowners Alliance; administered external to CSU. (2020-2023).

USDA Western Sustainable Agriculture Research and Education (SARE): Landowner collaborative strategies for nonlethal predator control. $350,000. PI: S. Breck; Collaborators: Montana State University, Utah State University, Western Landowners Alliance; administered external to CSU. (2022-2024).
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.

The CHCC added two new graduate students in 2022. In total, 12 graduate students were members of the CHCC in 2022.
GRADUATE STUDENTS

Cassi Camara: PhD Student, HDNR, advised by R. Niemiec. 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.

Mireille Gonzalez: PhD Student, HDNR, advised by R. Niemiec. Public and stakeholder attitudes towards wolf conservation and potential reintroduction in Colorado.


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-based land stewardship in shaping carnivore conservation in the tropics of Guatemala.

Cori Persinger: MA Student, Department of Philosophy, advised by Dr. Katie McShane and Dr. Ken 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 S. Bombaci. Teaching racial equity in conservation higher education.

STUDENT AWARDS

M. Hyde awarded $5000 WCNR Y Cross Ranch Scholarship.

M. Hyde awarded $13,000 Panthera Kaplan Graduate Award for his work reducing conflict between ranchers and jaguars in Colombia.

M. Hyde awarded $400 Global Impact Award from the CSU Office of International Programs for his work using camera trap data and tourists’ photos to model abundance and survival of jaguars in Colombia.

T. Layden awarded NSF GRFP fellowship for her work on community-based land stewardship in shaping carnivore conservation in the tropics of Guatemala.

T. Layden awarded $7500 through the CSU Center for Collaborative Conservation Fellowship Program for her work on community-based land stewardship in shaping carnivore conservation in the tropics of Guatemala.

TEACHING

CHCC faculty and students also incorporated human-carnivore coexistence topics into their coursework at CSU. Examples in 2022 include:

- **APRIL** | Crooks, K. Conflict reduction with Colorado wolves. Guest Lecture, Field Wildlife Studies (FW375)
- **OCTOBER** | Hyde, M. Reducing livestock loss and conflict on ranchlands. Guest Lecture, Conservation Biology (FW455)
- **OCTOBER** | Venumiere-Lefebvre, C. Reducing human-bear garbage-related conflict in Durango, CO. Guest Lecture, Principles of Conservation Biology (FW455)
- **OCTOBER** | K. Crooks moderated debate and presented lecture on Colorado wolf restoration in his course Principles of Conservation Biology (FW455)
- **NOVEMBER** | S. Bombaci and M. Pardo taught module on diverse perspectives in human-wildlife conflict in their course Mapping Diverse Perspectives in Conservation (FW310)
- **NOVEMBER** | Crooks, K. Colorado wolf reintroduction: How did we get here and what happens next? Guest Lecture, Principles of Ecosystem Sustainability (ESS501)

Ken Shockley served as Director of the Mountain Campus Program in Environmental Humanities. He also teaches PHIL565 Seminar in Environmental Philosophy: Environmental Harm.
OUTREACH AND ENGAGEMENT

A primary goal for the CHCC is to translate 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

MAY
Undergraduate thesis by A. Dienstbier (mentored by M. Balgopal) used photographs from K-12 wildlife camera outreach project in the Fort Collins Poudre School District to create a chapter book for elementary students, written in both English and Spanish. The book, self-published through Lulu eBooks, includes camera trap photographs and stories about urban carnivores, including coyotes, bobcats, foxes, raccoons, and skunks.

AUGUST
R. Niemiec met with the Missoula Bear Smart Working Group to discuss opportunities for collaboration and integration with social science into the Missoula Human-Bear Conflict Management Plan.

APRIL
CHCC convened a 1-day workshop at the CSU Spur Campus in Denver to facilitate coordination and collaboration among the Colorado Conflict Reduction Group, focused on finding common ground and real-world solutions to promote conflict reduction about wolves in Colorado. 31 individuals participated, representing 17 organizations, including state and federal agencies, environmental NGOs, academic institutions, and livestock producers.

K. Crooks served as an expert panelist for 2nd grade student presentations at the STEM Lab School in Northglenn, CO. Students presented Problem-Based Learning solutions as to how people and wolves can coexist with less conflict in Colorado.

JUNE
S. Breck served on an External Review Board for a Colorado Parks and Wildlife grant program to distribute $1 million to local communities to reduce conflict with black bears in cities, focused on limiting the availability of human food sources.

S. Breck served on the Theodore Roosevelt Genius Award Selection Committee for the advancement of nonlethal methods for carnivore conservation. The prize award was $100,000.
SEPTEMBER

S. Breck ended over 1 year of service on the Colorado Parks and Wildlife Wolf Technical Working Group (TWG) to provide guidance on wolf restoration to Colorado, along with Robin Young at CSU Extension and John Sanderson at CSU’s Center for Collaborative Conservation.

C. Venumiere-Lefebvre joined the Colorado Bear Coalition to help facilitate a community meeting regarding conflict reduction with black bears in Aspen, Colorado.

SEPTEMBER - OCTOBER

CHCC, along with CSU Extension, organized a field trip for Colorado ranchers, CSU Extension agents, state and federal agency biologists, and CSU researchers to interact with Montana ranching communities, including the Blackfoot Challenge and the Madison Valley Ranchlands Group, which have deep experience living and ranching with wolves and other large carnivores. This field trip allowed Montana ranchers to share their knowledge and experience directly with Coloradans who are new to ranching with wolves.

OCTOBER

CHCC assisted Colorado Parks and Wildlife in organizing a “post-pounding party” to build fencing to deter wolves at the Gittleson Angus Ranch in Walden, Colorado. The Gittleson Ranch was the first in Colorado to experience livestock predation by recently colonized wolves.

NOVEMBER

In collaboration with CSU Extension, CHCC launched the Wolf Conflict Reduction Fund through the CSU Foundation. Donations to the fund support efforts of CSU and partners to implement on-the-ground, non-lethal tools to prevent livestock predation by wolves in Colorado. The Giving Page for the Fund can be here: https://advancing.colostate.edu/WOLFCONFLICTREDUCTION.

NOVEMBER

P. Tricorache represented CSU at the 19th Conference of the Parties of the Convention in International Trade of Endangered Species of Endangered Fauna and Flora (CITES). Her work helps counter illegal cheetah trade between the Horn of Africa and the Arabian Peninsula.

DECEMBER

Throughout 2022, R. Niemiec, M. Gonzalez, and B. Ghasemi continued to work with Colorado Parks and Wildlife to reduce social conflict regarding wolves and obtain feedback on the planning process for wolf reintroduction. They conducted interviews and surveys with members of the CPW Stakeholder Advisory Group (SAG); interviewed and surveyed additional stakeholders who are not directly part of the formal SAG process but are highly engaged in the wolf reintroduction issue; and collected ~1500 survey responses from the general public regarding their perceptions of the planning process for wolf reintroduction and the economic value of wolves in Colorado (in collaboration with D. Hoag).

DECEMBER

K. Crooks and R. Niemiec delivered presentations to a K-12 science teacher professional development workshop on the Wonder of Wolves through the CSU Natural Sciences Education & Outreach Center.
SELECT MEDIA COVERAGE


Olsen, N. October 9, 2022. Combatting the illegal cheetah trade, researchers first need to find the source. CSU Source. https://source.colostate.edu/combatting-the-illegal-cheetah-trade-researchers-first-need-to-find-the-source/

Dixon, A. November 9, 2022. Colorado State University to provide grants for communities coexisting with wolves. CSU Source. https://source.colostate.edu/colorado-state-university-to-provide-grants-for-communities-coexisting-with-wolves/


CHCC 2023 GOALS

RESEARCH

Enhance transdisciplinary research on human-carnivore coexistence by strengthening collaborations across disciplines and academic units within CSU, spanning the ecological, social, agricultural, veterinary, and engineering sciences.

Develop and test new technology and tools for reducing human-carnivore conflict.

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 or research and outreach internships.

Advance development of an international education and outreach program centered on human-carnivore coexistence, including an International Graduate Student Exchange Program.

**OUTREACH**

Advance partnership with CSU Extension to continue community-based outreach regarding conflict reduction with wolves and other carnivores in Colorado, including onboarding new Assistant Professor in Human-Wildlife Conflict and Coexistence, Veronica Yovovich.

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.
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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