



# 2022 ANNUAL REPORT

RESEARCH,  
EDUCATION,  
AND OUTREACH



THE CENTER FOR  
HUMAN-CARNIVORE COEXISTENCE



## 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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HUMAN-CARNIVORE COEXISTENCE

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A full-page background image of a lion in a savanna. The lion is shown in profile, facing right, with its head and shoulders visible. It has a thick, dark brown mane and a light brown face. The background is a soft-focus landscape of tall, golden-brown grass under a warm, hazy sky. The lighting suggests late afternoon or early morning, with a golden glow over the scene.

## 2022 ACTIVITIES

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.

**Rekha Warriar (2022-Present):** CHCC Postdoctoral Fellow. HDNR, advised by J. Salerno. Interactions among agropastoral households and their environment and the implications for large carnivore conservation in Tanzania.

### 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.

**Anthony J. Giordano:** CHCC Associate, Chief Conservation Science Officer, S.P.E.C.I.E.S. International carnivore conservation practice and research,

**Redae Tesfai:** Research Associate, Natural Resource Ecology Lab (advised by P. Evangelista). Combating illegal cheetah trafficking for the pet trade.

**Patricia Tricorache:** Research Assistant, Natural Resource Ecology Lab (advised by P. Evangelista). Combating illegal cheetah trafficking for the pet trade.

## 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.



# SOCIAL AND ECOLOGICAL RESEARCH

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.

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## 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

Bardales, R., Hyde, M., Gallo, J., & Boron, V. (2023). National parks and conservation concessions: A comparison between mammal populations in two types of tropical protected areas in Ucayali, Peru. *Journal of Tropical Ecology*, 39, E3.

Berger, J., Biel, M. & Hayes, F. P. (2022). Species conflict at Earth's edges—Contests, climate, and coveted resources. *Frontiers in Ecology and Evolution*, 10.

Berger, J. & Lambert, J.E. (2022). The humpty dumpty effect on planet earth. *Frontiers in Conservation Science*, 3, 783138.

Bolas, E.C., Sollmann, R., Crooks, K.R., Boydston, E.E., Shaskey, L., Boser, C.L., Dillon, A. & Van Vuren, D.H. (2022). Role of microhabitat and temporal activity in facilitating coexistence of endemic carnivores on the California Channel Islands. *Journal of Mammalogy*, 103(1), 18-28.

Crooks, K., Gonzalez, M. & Ghasemi, B. (2022). Scientist perspectives towards the status and management of gray wolves in the western U.S. *Conservation Science and Practice*, e12728.

Ditmer, M.A., Niemiec, R.M., Wittemyer, G. & Crooks, K.R. (2022). Socio ecological drivers of public conservation voting: Restoring gray wolves to Colorado, USA. *Ecological Applications*, p.e2532.

Ditmer, M.A., Wittemyer, G., Breck, S.W. & Crooks, K.R. (2022). Defining ecological and socially suitable habitat for the reintroduction of an apex predator. *Global Ecology and Conservation*, p.e02192.

Fennell, S. R., Copeland, K., Thomsen, B., S. Copeland, S. & Duggan, M. (In Press). Toward an era of multispecies livelihoods in coastal and marine community-based tourism. *Routledge Handbook of Nature-Based Tourism Development*. Ed. Ante Madic.

Fountain-Jones, N.M., Kraberger, S., Gagne, R.B., Gilbertson, M.L., Trumbo, D.R., Charleston, M., Salerno, P.E., Chris Funk, W., Crooks, K., Logan, K. & Alldredge, M. (2022). Hunting alters viral transmission and evolution in a large carnivore. *Nature Ecology & Evolution*, 1-9.

Gilbertson, M. J., Fountain-Jones, N.M, Malmberg, J. L., Gagne, R. B., Lee, J. S., Kraberger, S., Kechejian, S., Petch, R., Chiu, E., Onorato, D., Cunningham, M.W., Crooks, K. R., Funk, W. C., Carver, S., VandeWoude, S., VanderWaal, K. & Craft, M. E. (2022). Apathogenic proxies for transmission dynamics of a fatal virus. *Frontiers in Veterinary Science*, 9, 940007.

Hoag, D. (2022). Wildlife economics in the American West. Spring 2022 edition of the Western Economic Forum, Western Agricultural Economics Association, 20(1), 3-5.

Hoag, D., Breck, S., Crooks, K. & Niemiec, R.M. (2022). Economic consequences of the wolf comeback in the Western United States. Spring 2022 edition of the Western Economic Forum, Western Agricultural Economics Association, 20(1), 61-70.

Hyde, M., Breck, S.W., Few, A., Beaver, J., Schrecengost, J., Stone, J., Krebs, C., Talmo, R., Eneas, K., Nickerson, R., Kunkel, K. & Young, J.K. (2022). Multidisciplinary engagement for fencing research informs efficacy and rancher-to-rancher knowledge exchange. *Frontiers in Conservation Science*, 88.

Hyde, M., Boron, V., Rincon, S., Passos Viana, D. F., Larcher, L., Reginato, G. A. & Payán, E. (2022). Refining carbon credits to contribute to large carnivore conservation: The jaguar as a case study. *Conservation Letters*, e12880.

Kozakiewicz, C., Burrige, C. P., Lee, J. S., Kraberger, S., Fountain-Jones, N. M., Fisher, R. N., Lyren, L. M., Jennings, M. K., Riley, S. P. D., Serieys, L. E. K., Craft, M., Funk, W. C., Crooks, K., VandeWoude, S. & Carver, S. (In Press). Habitat connectivity and host relatedness influence virus spread across an urbanising landscape in a fragmentation-sensitive carnivore. *Virus Evolution*.

Lambert, J. E. & Berger, J. (2022). Restoring what we've lost: Lessons from evolutionary history for rewilding and coexisting in landscapes with predators. In *Routledge Handbook of Rewilding* (pp. 229-247). Routledge.

Landau, V. A., Noon, B. R., Theobald, D. M., Hobbs, N. T. & Nielsen, C. K. (2022). Integrating presence-only and occupancy data to model habitat use for the northernmost population of jaguars (*Panthera onca*). *Ecological Applications*, e2619.

Niemiec, R. M., Berl, R. E. W., Gonzalez, M. N., Teel, T., Salerno, J., Breck, S., Camara, C., Collins, M., Schultz, C., Hoag, D. & Crooks, K. (2022). Rapid changes in public perception toward a conservation initiative. *Conservation Science and Practice*, e12632.

Shockley, K. (2022). The Environmental constituents of flourishing: Rethinking external goods and the ecological systems that provide them. *Ethics, Policy & Environment*, 25(1), 1-20.

Soofi, M., Khorozyan, I. & Ghasemi, B. (2022). Coexistence between leopards and local people – challenges and solutions. *Cat News Special Issue* 15.

Soofi, M., Qashqaei, A. T., Trei, J. N., Shokri, S., Selyari, J., Ghasemi, B., ... & Waltert, M. 2022. A novel application of hierarchical modeling to decouple sampling artifacts from socio-ecological effects on poaching intensity. *Biological Conservation*, 267, 109488.

Thomsen, B., Cousins, T., Copeland, K., Thomsen, J., Coose, S., Mensah, A., Fennell, S. R., Deshwal, A., Guzman, J., Copeland, S., Nickerson, D., Duggan, M., Schneider, A., Taylor, M., Hernandez Saez, A. & Gosler, A. (2022). Posthumanist pluralities: Advocating for nonhuman species' rights, agency, and welfare in ecosystem governance. *Advances in Ecological Research: Pluralism in Ecosystem Governance*, 66, 117-146.

Thomsen, B., Copeland, K., Fennell, S. R., Thomsen, J., Harte, M., Deshwal, A., Maxwell, J., Taylor, M., Duggan, M., Schneider, A., Nickerson, D., Copeland, S., Breidenbach, B., Heid, T. & Muurlink, O. (In Press). The Promise of posthumanism in wildlife ecotourism. *Journal of Ecotourism*.

Venumière-Lefebvre, C., Breck, S. & Crooks, K. R. (2022). A systematic map of human-carnivore coexistence. *Biological Conservation*, 268, e109515.

Wright, D. S., Crooks, K. R. & Balgopal, M. M. (2022). Wildlife photographs: Seeing, caring, and learning through place-based education. In *Frontiers in Education*, 7, e910324.



## SCIENTIFIC PRESENTATIONS

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).

**April:** Ditmer, M., Wittemyer, G., Zeller, K., Breck, S., Fletcher, R., & Crooks, K. Assessing wolf reintroduction sites in Colorado: Predicting space use, movement, and conflict potential using a spatial absorbing Markov chains framework. International Association for Landscape Ecology - North American Annual Meeting, Riverside, CA.

**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.

**July:** Venumiere-Lefebvre, C. Follow-up evaluation on the effectiveness of a large-scale effort to use bear-resistant garbage cans for limiting conflict in Durango, Colorado. Human-Bear Conflict Specialist Leads Group, Virtual.

**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.

**October:** Crooks, K. Social-ecological scientific insights into Colorado wolf restoration. The International Wolf Symposium, Minneapolis, MN.

**October:** Gonzalez, M. A theoretical model of intergroup conflict: A Case study of wolf reintroduction in Colorado. The International Wolf Symposium, Minneapolis, MN.

**October:** Venumiere-Lefebvre, C., Breck, S., Johnson, H., Bailey L., Lischka S., & Crooks K. Follow-up evaluation on the effectiveness of a large-scale effort to use bear resistant garbage cans for limiting conflict in Durango, Colorado. 6th International Human-Bear Conflicts Workshop - Pathways to Progress: Connecting People, Conserving Bears, Lake Tahoe, NV.

**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. Can 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.



## 2022 FUNDING BY THE NUMBERS



**\$4,203,374**

TOTAL ONGOING CHCC FUNDING  
ADMINISTERED THROUGH CSU



**\$3,703,374**

EXTERNAL GIFTS & GRANTS



**\$500,000**

INTERNAL CSU FUNDS



**\$5,441,629**

TOTAL ONGOING FUNDING FOR  
CHCC AND PARTNERS

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. Pls K. Crooks, R. Niemiec (2021-2026).

Donald Slavik Family Foundation: Stakeholder engagement in Colorado wolf reintroduction planning. \$147,000. Pl's R. Niemiec, K. Crooks, S. Breck (2021-2022).

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. Pl's 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 National Wildlife Research Center Cooperative Agreement: Developing and evaluating strategies for managing human-carnivore conflict. \$56,000 Pls K. Crooks, S. Breck (2020-2022).

U.S. National Academies of Sciences and Agency for International Development Partnerships for Enhanced Engagement in Research (PEER): Livelihood change in the context of community conservation - Chobe, Botswana. \$160,000. PI: L. Cassidy. Co-Is: A.E. Gaughan, J. Salerno (2020-2023).

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

NSF Decision Risk and Management Sciences Directorate: A longitudinal investigation of the social outcomes of participatory stakeholder engagement processes. \$195,413. Pl's R. Niemiec, M. Quartuch (2021-2023).

NSF Human-Environment and Geographic Sciences: Adaptive human migration in changing environments: Leveraging geographic sciences to advance new models of migration decision-making. \$399,940. PI: J. Salerno. Co-Is: R. Boone, A. Gaughan, L. Hunter, J. Hartte (2021-2024).

USDA National Wildlife Research Center Cooperative Agreement: The role of scavengers on the spread of CWD. \$230,021. PI: G. Wittemyer (2021-2023).

USFS Rocky Mountain Research Station. Evaluating wildlife responses to recreation and other anthropogenic disturbances using novel data streams. \$350,000. PI: G. Wittemyer, M. Ditmer (2022-2025).

U.S. Fish and Wildlife Service. Combating illegal cheetah trafficking: An adaptive management strategy for building regional and national capacity in the Horn of Africa. \$1,000,000. PI: P. Evangelista (2022-2025).

### 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)

CHCC awarded Faculty Interdisciplinary Research Mini-Grants. Recipients: 1) J. Salerno, K. Jablonski, R. Warrier: Leveraging social networks and mobile technologies to promote human-carnivore coexistence (\$29,920); 2) C. Schultz, S. Breck, K. Crooks, C. Venumière-Lefebvre, M. Jones, S. Lischka: Integrating policy and behavior change to reduce human-black bear conflict in residential areas (\$29,947).

### 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 black bear is walking towards the camera on a forest floor covered in dry leaves and twigs. The bear has dark fur and a lighter-colored snout. The background is a blurred forest with green foliage and sunlight filtering through the trees.

# 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.

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## STUDENT MENTORING

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.

**Tom Hilton:** PhD Student, HDNR, advised by J. Salerno. Systems impacts of human-wildlife interactions - modeling multilevel economies from households to nation states.

**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.

**Monica Lasky:** MS Student, GDPE, advised by S. Bombaci. How human presence alters carnivore-prey interactions in South African food webs.

**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.

**Cassandra Venumière-Lefebvre:** PhD Student, FWCB, advised by K. Crooks and S. Breck. Integrating social and ecological science to identify effective strategies for human-bear coexistence.

**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.

**CHCC** awarded the inaugural CHCC Student Research and Outreach Mini-Grants (\$3000 each). Recipients included: 1) C. Camara: Captain Planet Foundation Wolf Coexistence Quest; 2) B. Ghasemi: Morality and wildlife conservation; 3) M. Hyde: Modeling retaliation in a landscape of impunity: Jaguars in the Colombian Llanos; 4) T. Layden: The role of community-led stewardship in shaping carnivore conservation in the tropics of Guatemala; 5) R. Nickerson: Evaluating the effectiveness of range riding at reducing livestock-carnivore conflicts; 6) C. Venumière-Lefebvre: Promoting human-carnivore coexistence through management and policy; 7) E. Weingarten: An investigation of Justice, Equity, Diversity, and Inclusion in the current U.S. undergraduate and graduate wildlife ecology curriculum.



## STUDENT EDUCATION AND MENTORING



## 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** | Gonzalez, M. Stakeholder perspectives of wolf reintroduction in Colorado. Guest Lecture, Principles of Conservation Biology (FW455)
- **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 Wildlife Management (FW260).
- **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.



A group of cowboys on horseback are silhouetted against a bright sunset sky filled with dramatic, textured clouds. In the background, a range of mountains is visible. In the foreground, several cowboys are mounted on horses, some holding lassos. To the right, a metal corral contains several dark-colored horses. The overall scene conveys a sense of traditional Western life and outdoor stewardship.

# 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.

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# 2022 HIGHLIGHT TIMELINE

## EDUCATION & OUTREACH EFFORTS

### FEBRUARY

CHCC organized a workshop, “Colorado Livestock Producers Forum on Wolf Management”, in Steamboat Springs, Colorado, focused on conflict reduction between wolves and ranchers in northern Colorado. CHCC partnered with CSU Extension, Colorado Parks and Wildlife, USDA Wildlife Services, USDA Western SARE (Sustainable Agriculture Research and Education), Routt County Cattlemen’s Association, and CSU Center for Collaborative Conservation. Over 160 people attended, primarily livestock producers.

### 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.

## 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>.

## 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).

## SEPTEMBER

CHCC helped organize a social conflict reduction event, "Community Dialogue at Stanko Ranch: Sustainable Ranching and Living with Predators," in Steamboat Springs, Colorado, in partnership with Stanko Ranch, CSU Extension, Rocky Mountain Wolf Project, Routt County Cattlemen's Association, and Routt County Farm Bureau. This weekend retreat fostered dialogue to help bridge the urban-rural divide and allowed wolf advocates to increase their understanding of sustainable ranching in landscapes with predators. 53 individuals attended the event, including ranchers and local community members from northern Colorado and participants from wolf advocacy groups, Colorado universities, and local, state, and federal government.

## 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.

## 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

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.



# 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 2022. The search reported 129 stories from January 1 – December 31, 2022, with a reach of 866 million readers, viewers, and listeners and an advertising equivalency totaling \$8 million.

## SELECT MEDIA COVERAGE

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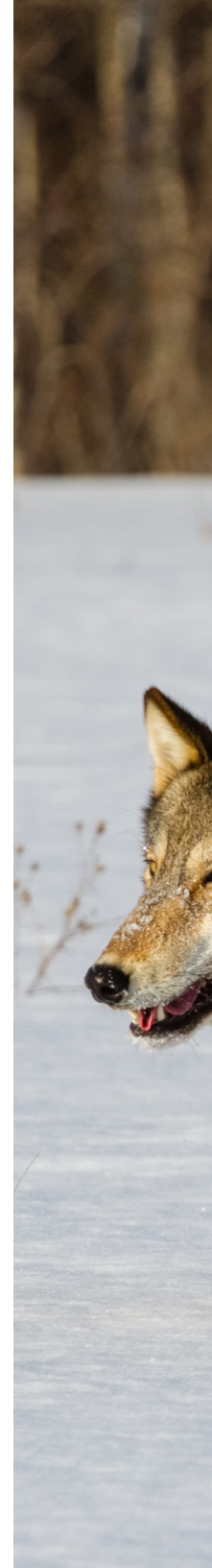
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## CHCC 2023 GOALS

### 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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