



2021 ANNUAL 2022 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 2021.



THE CENTER FOR
HUMAN-CARNIVORE COEXISTENCE

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A male lion with a large, dark brown mane is shown in profile, looking towards the right. The lion is standing in a field of tall, dry, golden-brown grass. The background is a soft, out-of-focus savanna landscape under warm, golden light, suggesting late afternoon or early morning. The overall tone of the image is warm and naturalistic.

2021 ACTIVITIES

In 2021, 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 and ecological research; 3) student education and mentoring; 4) public outreach and engagement.

CHCC FACULTY TEAM

CHCC Leadership Team

Director: Kevin Crooks, Professor, Department of Fish, Wildlife, and Conservation Biology (FWCB); carnivore ecologist

Co-Director: Rebecca Niemiec, Assistant Professor, Human Dimensions of Natural Resources (HDNR); conservation psychologist

Co-Director: Stewart Breck, Research Wildlife Biologist, USDA National Wildlife Research Center; Affiliate Faculty, FWCB; carnivore ecologist

CHCC Faculty Team

Larissa Bailey: Professor, FWCB; wildlife conservation biologist

Joel Berger: Barbara Cox Anthony University Chair in Wildlife Conservation, FWCB; wildlife conservation biologist

Sara Bombaci: Assistant Professor, FWCB; wildlife conservation biologist

Dana Hoag: Professor, Department of Agricultural and Resource Economics; agricultural economist

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

Rick Knight: Emeritus Professor, HDNR; wildlife conservation biologist

Barry Noon: Emeritus Professor, FWCB; wildlife conservation biologist

Jonathan Salerno: Assistant Professor, HDNR; human behavioral ecologist

Courtney Schultz: Associate Professor, Department of Forest and Rangeland Stewardship; political scientist

Tara Teel: Professor, HDNR; conservation psychologist

Bastian Thomsen: Assistant Professor, HDNR; social scientist

George Wittemyer: Professor, FWCB; wildlife conservation biologist

2021 PROGRESS

• Formed New Leadership Structure

-In 2021, the CHCC formed a new leadership structure for the Center, including a Director and two Co-Directors

• Faculty Member Growth

-The CHCC added eight faculty members in 2021

-In total, 15 CSU faculty across departments and colleges are now members of the CHCC.

• Developed Formal Application Process

-Faculty, graduate students, and external collaborators can apply to join the CHCC

RESEARCH SOCIAL AND ECOLOGICAL

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. 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 PROJECTS

- Wolf restoration to Colorado
- Rancher sustainability in systems with predators, including wolves and grizzly bears in the Rocky Mountain West and jaguars in Colombia
- Changes in carnivore communities from human-induced forest fires in Brazil
- The role of community-based land stewardship in shaping carnivore conservation in the tropics of Guatemala
- Growing conflicts with black bears in urban systems
- Polar bears and their interactions with energy development
- African lions and conflict with cattle keepers in East Africa
- How human presence alters carnivore-prey interactions in South African food webs
- Disease transmission between wild felids, domestic cats, and humans
- Impacts of scavengers on chronic wasting disease spread
- Effect of scientific messaging on human behaviors related to carnivore conservation and management
- Defining a theoretical framework for coexistence with and tolerance of carnivores



23 SCIENTIFIC PUBLICATIONS

CHCC researchers published a total of 23 scientific publications on carnivores and coexistence in 2021

Boron, V., Bardales, R., Hyde, M., Jaimes-Rodriguez, L., Stasiukynas, D., Barragan, J., Passos Viana, D.F., & Payan, E. In Press. The role of unprotected and privately-protected areas for ocelot conservation: densities in Colombia and Brazil. *Journal of Mammalogy*.

Bolas, E.C., Sollmann, R., Crooks, K.R., Boydston, E.E., Shaskey, L., Boser, C.L., Dillon, A., & Van Vuren, D.H. 2021. Role of microhabitat and temporal activity in facilitating coexistence of endemic carnivores on the California Channel Islands. *Journal of Mammalogy*, gya125.

Ditmer, M.A., Niemiec, R., Wittemyer, G., & Crooks, K.R. In Press. Social-ecological factors influencing a public conservation behavior: the vote to restore gray wolves to Colorado, USA. *Ecological Applications*.

Ditmer, M.A., Stoner, D.C., Francis, C.D., Barber, J.R., Forester, J.D., Choate, D.M., Ironside, K.E., Longshore, K.M., Hersey, K.R., Larsen, R.T., McMillan, B.R., Olson, D.D., Andreasen, A.M., Beckmann, J.P., Holton, B., Messmer T.A., & Carter, N.H. 2021. Artificial nightlight alters the predator–prey dynamics of an apex carnivore. *Ecography*, 43:1–13.

Ditmer, M.A., Iannarilli, F., Tri, A.N., Garshelis, D.L., & Carter, N.H. 2021. Artificial night light helps account for observer bias in citizen science monitoring of an expanding large mammal population. *Journal of Animal Ecology*, 90(2), 330-342.

Fountain-Jones, N.M., Kraberger, S., Gagne, R.B., Trumbo, D.R., Salerno, P.E., Funk, W.F., Crooks, K., Biek, R., Alldredge, M., Logan, K., Baele, G., Dellicour, S., Ernest, H.B., Vandewoude, S., Carver, S., & Craft, M.E. 2021. Host relatedness and landscape connectivity shape pathogen spread in the puma, a large secretive carnivore. *Nature Communications Biology*, 4:12.

Hwang, M., Ditmer, M.A., Teo, S., Wong, S.T., & Garshelis, D.L. 2021. Sun bears use previously-logged forest more than primary forest in Sabah, Malaysia. *Ecosphere*, 12 (10), e03769.

Lewis, J. S., Spaulding, S., Swanson, H., Keeley, W., Gramza, A., VandeWoude, S., & Crooks, K.R. 2021. Human activity influences wildlife populations and activity patterns: implications for spatial and temporal refuges. *Ecosphere*, 12 (5), e03487.

Manfredo, M.J., Berl, R.E.W., Teel, T., & Bruskotter, J.T. 2021. Bringing social values to wildlife conservation decisions. *Frontiers in Ecology and the Environment*, 4(4), 323-330.

Niemiec, R., Berl, R., Gonzalez, M., Teel, T., Salerno, J., Collins, M., Camara, C., Breck, S., Schultz, C., Hoag, D., & Crooks, K. In Press. Evidence for rapid public attitude and belief change towards a conservation initiative. *Conservation Science and Practice*.

Niemiec, R., Gruby, R., Quartuch, M., Cavaliere, C., Teel, T., Crooks, K., Salerno, J., Solomon, J., Jones, K., Gavin, M., Lavoie, A., Stronza, A., Meth, L., Enrici, A., Lanter, K., Browne, C., Proctor, J., & Manfredo, M. 2021. Integrating social science into conservation planning. *Biological Conservation*, 262, 109298

Salerno, J., Andersson, K., Bailey, K., Hilton, T., Mwaviko, K., Donald, I., Bracebridge, C., Mangewa, L., Nicholas, A., Rutabanzibwa, H., & Hartter J. 2021. More robust local governance suggests positive effects of long-term community conservation. *Conservation Science & Practice*, 3(1), p.e297.

Salerno, J., Romulo, C., Brooks, J., Galvin, K., Glew, L., Mupeta, P. 2021. Adaptation and evolution of governance and institutions in community based conservation. *Conservation Science & Practice*, 3(1), e355.

Salerno, J., Gaughan, A.E., Stevens, F., Hilton, T., Bailey, K., Bowles, T., Cassidy, L., Biggs, D., Pricope, N., Mupeta, P., Cosmas, S., Wabahe Mosimane, A., Luwaya, M.H., Drake, M., Weaver, A., Kolarik, N., Woodward, K., & Hartter, J. 2021. Wildlife impacts and changing climate pose compounding threats to human food security. *Current Biology*, 31(22), 5077-5085.

Stoner, D.C., Ditmer, M.A., Mitchell, D.L., Young, J.K., & Wolfe, M.L. 2021. Conflict, coexistence, or both? Cougar habitat selection, prey composition, and mortality in a multiple-use landscape. *California Fish and Wildlife Journal*, 107(3):147-172.

Suraci, J., Gaynor, K., Allen, M., Alexander, P., Brashares, J., Cendejas-Zarelli, S., Crooks, K., Elbroch, M., Forrester, T., Green, A., Haight, J., Harris, N., Hebblewhite, M., Isbell, F., Johnston, B., Kays, R., Lendrum, P., Lewis, J., McInturff, A., McShea, W., Murphy, T., Palmer, M., Parsons A., Parsons, M., Pendergast, M., Pekins, C., Prugh, L., Sager, K., Schuttler, S., Sekercioglu, C., Shepherd, B., Whipple, L., Whittington, J., Wittemyer, G., & Wilmer, C. 2021. Disturbance type and species life history predict mammal responses to humans. *Global Change Biology*, <https://doi.org/10.1111/gcb.15650>

Teel, T.L., Adams, M., Don Carlos, A.W., Bonnell, M.A., & Breck, S.W. 2021. A mixed-methods social psychology application evaluating the role of citizen science in mitigating human-wildlife conflict. *Society & Animals*.

Thomsen, B. 2021. Wolf ecotourism: A posthumanist approach to wildlife ecotourism. In D. Fennell (Ed.), *Routledge's Handbook of Ecotourism*. (117-131). Routledge.

Thomsen, B., Thomsen, J., Copeland, K., Coose, S., Arnold, E., Bryan, H., Prokop, K., Cullen, K., Vaughn, C., Rodriguez, B., & Muha, R., 2021. Multispecies livelihoods: a posthumanist approach to wildlife ecotourism that promotes animal ethics. *Journal of Sustainable Tourism*, pp.1-19.

Van Anda, R., Bruyere, B., Salerno, J., Lengima, A., Alinta, V., & Yasin, A. 2021. Changing livelihood aspirations among formally educated pastoral youth in northern Kenya. *Children, Youth and Environments*, 31(2), 34-53.

Warrier, R., Noon, B., & Bailey, L.L. 2021. A framework for estimating human-wildlife conflict probabilities conditional on species occupancy. *Frontiers in Conservation Science*, 2, 37.

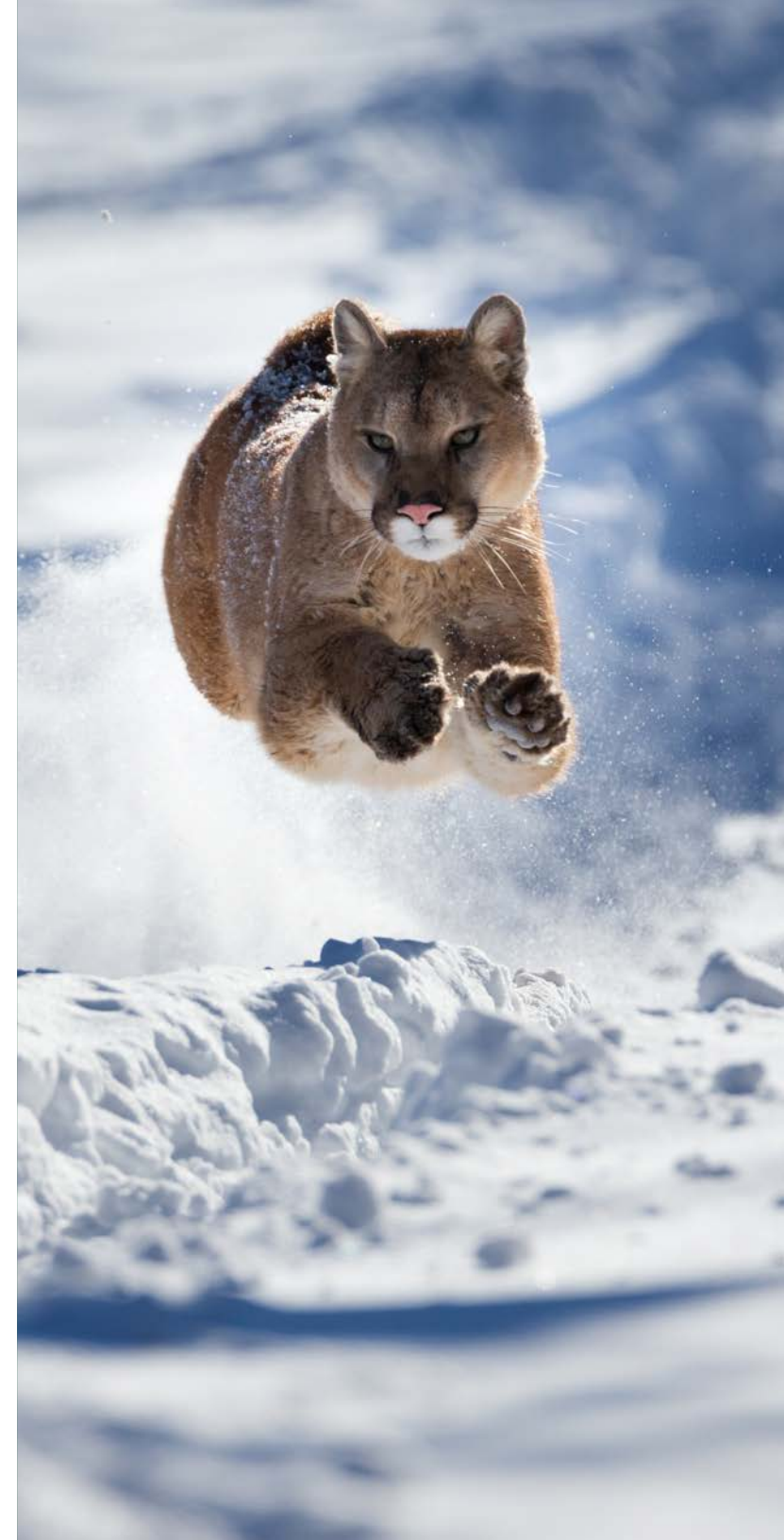
Windell, R.M., Bailey, L.L., Young, J.K., Livieri, T.M., Eads, D.A., & Breck, S.W. 2021. Improving evaluation of nonlethal tools for carnivore conservation: evaluating fladry to protect an endangered species from a generalist mesocarnivore. *Animal Conservation*, <https://doi.org/10.1111/acv.12726>.

Wright, D.S., Crooks, K.R., Hunter, D.O., Krumm, C.E., & Balgopal, M.M. 2021. Middle school science teachers' agency to implement place-based education curricula about local wildlife. *Environmental Education Research*, 27(10), 1519-1537.

SCIENTIFIC PRESENTATIONS

CHCC researchers presented multiple scientific presentations in 2021. Examples include:

- APRIL** | K Crooks and S. Breck participated in a one-day workshop hosted by the CSU Office for the Vice President of Research, the One Health Institute, and the USDA National Wildlife Research Center. The goal of the workshop was to identify and facilitate collaborative opportunities regarding wildlife diseases, their risks to human health and agricultural sustainability, and the management of those risks.
- JULY** | CHCC graduate students M. Gonzalez, M. Collins, B. Manzollilo, and R. Nickerson presented their research series Policy and Practice for Wolf Reintroduction in Colorado to leadership from the Colorado Department of Natural Resources and Colorado Parks and Wildlife.
- OCTOBER** | CHCC Postdoctoral Researcher M. Ditmer. Assessing socio-ecological habitat suitability for gray wolves in Colorado: integrating ballot box results into carnivore restoration planning. CSU Department of Fish, Wildlife, and Conservation Biology Seminar Series.
- OCTOBER** | R. Niemiec. Social aspects of Wolf Reintroduction. CSU Department of Fish, Wildlife, and Conservation Biology Seminar Series.
- OCTOBER** | CHCC Postdoctoral Researcher M. Ditmer presented wolf habitat suitability and conflict models to the Technical Working Group (TWG) and Stakeholder Advisory Group (SAG) meetings of Colorado Parks and Wildlife (CPW), whose goal is to advise on the development of a wolf restoration and management plan in Colorado.
- NOVEMBER** | M. Ditmer, G. Wittemyer, S. Breck, R. Niemiec, & K. Crooks. Assessing Socio-Ecological Habitat Suitability for Gray Wolves in Colorado: Integrating Ballot Box Results into Carnivore Restoration Planning. The Wildlife Society Annual Conference.
- NOVEMBER** | CHCC PhD student M. Hyde presentation with the Peruvian Ministry of Environment on jaguar ecology for International Jaguar Day.
- NOVEMBER** | CHCC PhD student M. Hyde presented and moderated a panel on fencing and carcass management as nonlethal tools to prevent livestock depredation at the Beyond Conflict Conference, an event convened by the USDA National Resource Conservation Service Conservation Innovation Grant (CIG) project to discuss conflict reduction with ranchers and other stakeholders in the Rocky Mountain West.
- DECEMBER** | CHCC MS student A. Conlon. Simulating social tolerance and retaliatory killing of lions in conflict areas of Tanzania. International Congress for Conservation Biology.



2021 FUNDING BY THE NUMBERS



\$2,598,374

TOTAL SECURED BY CHCC RESEARCHERS
ADMINISTERED VIA CSU



\$2,097,374

EXTERNAL GIFTS & GRANTS



\$501,000

INTERNAL CSU FUNDS



\$3,702,629

ACTIVE GRANTS FOR
CHCC AND PARTNERS

These funds will advance our human-carnivore coexistence research, education, and outreach efforts. Funding sources have included a mixture of governmental agencies, non-governmental organizations, and private foundations and donors detailed below:

EXTERNAL GIFTS: \$1,172,000 (all secured in 2021)

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

Turner Endangered Species Fund: Wolf recovery in Colorado: \$10,000. PIs R. Niemiec, K. Crooks (2021)

Donald Slavik Family Foundation: Stakeholder Engagement in Colorado Wolf Reintroduction Planning. \$147,000. PI's R. Niemiec, K. Crooks, S. Breck (2021-2022)

Bohemian Foundation: Centering the Voices of BIPOC Youth in Wildlife Conservation in the West: A Project-based Learning and Leadership Program. \$15,000. PI's R. Niemiec, K. Crooks, M. Balgopal, S. Bombaci, Rain Bear Stands Last, R. Frierson, N. Stafford (2021-2022)

EXTERNAL GRANTS: \$1,141,374 (\$925,374 secured in 2021)

NSF Decision Risk and Management Sciences Directorate: A Longitudinal Investigation of the Social Outcomes of Participatory Stakeholder Engagement Processes. \$195,413. PI's R. Niemiec, M. Quartuch (2021-2022).

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

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).

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)

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)

INTERNAL CSU GRANTS: \$501,000 (all secured in 2021)

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)

Warner College of Natural Resources Team Award: \$1000. Awarded to collaborative team of CHCC, Center for Collaborative Conservation (CCC), and CSU Extension for our work on human-carnivore coexistence, focused on wolf restoration to Colorado. (2021)

COLLABORATORS, ADMINISTERED OUTSIDE CSU: \$888,255 (2020)

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)

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 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 postdoctoral researchers, graduate students, and undergraduate students from the U.S. and abroad.

STUDENT GROWTH

The CHCC added one postdoctoral fellow and six graduate students in 2021. In total, three postdoctoral fellows and 14 graduate students were members of the CHCC in 2021.

POSTDOCTORAL FELLOWS

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

Richard Berl (2019-2021): HDNR, advised by T. Teel, R. Niemiec, and M. Manfredo. Facilitating organizational systems change in state wildlife agencies; Understanding and predicting social attitudes toward wildlife nationally and toward wolf reintroduction in Colorado; Application of computational and machine learning methods to natural resource science.

Mark Ditmer (2019-2021): FWCB, advised by K. Crooks and G. Wittemyer. Spatial modeling of wolf habitat suitability and conflict hotspots in Colorado.

GRADUATE STUDENTS

Martha Beirut: PhD Student, Graduate Degree Program in Ecology (GDPE), advised by J. Salerno. Human-elephant conflicts in western Uganda and environmental stewardship retention through the US.

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

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

Matt Collins: PhD Student, HDNR, advised by R. Niemiec. Cultural, interpersonal, and incentive-based factors that motivate ranchers to employ preventative and non-lethal predator control.

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.

Brielle Manzanillo: MS Student, Department of Forest and Rangeland

Stewardship, advised by C. Schultz. Political challenges and pathways for success in Colorado wolf reintroduction. Successfully defended thesis in Summer 2021.

Rae Nickerson: MS Student, Department of Ecosystem Science and Sustainability, advised by S. Breck and P. Evangelista. Identifying the psycho-social and socioecological factors influencing landowner reporting behavior of wolf-livestock predations, and exploring the connections between predation reporting and compensation policies.

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.

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

Cassandre Venumière-Lefebvre: PhD Student, FWCB, advised by K. Crooks and S. Breck. Human-bear coexistence and tolerance.

Erin Weingarten: PhD Student, GDPE, advised by G. Wittemyer. Incorporating behavioral observations and machine learning to mitigate human-elephant conflict in Kenya.

STUDENT AWARDS

R. Nickerson awarded the Y-Cross Ranch Animal Agriculture Scholarship for her work on wolves in Colorado. Rae also received honorable mention for the National Science Foundation Graduate Research Fellowship Program.

T. Layden accepted into the Center for Collaborative Conservation Fellowship Program.

M. Hyde received a \$1000 GDPE research grant for his project, Mapping attitudes and landscape connectivity to reduce retaliation against jaguars.

M. Lasky received a \$700 GDPE research grant for her project, Does fear of humans drive wildlife interactions in African food webs?

T. Layden received a \$2000 GDPE research grant for her project, The role of community-based land stewardship in shaping mammalian predator conservation in the tropics of Guatemala.

A. Conlon received a \$7500 fellowship from the Center for Collaborative Conservation for her project, Evaluating the efficacy of collaborative conservation education on shaping carnivore tolerance in Tanzania.

T. Layden received a \$7500 fellowship from the Center for Collaborative Conservation for her project, The role of community-led land stewardship in shaping carnivore conservation in the tropics of Guatemala.

STUDENT EDUCATION AND MENTORING



TEACHING

CHCC faculty and students also incorporated human-carnivore coexistence topics into their classroom teaching at CSU. Examples in 2021 include:

- **MARCH** | R. Niemiec guest lecture on Colorado wolf restoration to the HDNR Conservation Leadership through Learning Program
- **MARCH** | K. Crooks guest lecture on Colorado wolf restoration to BZ430 Animal Behavior and Conservation
- **SEPTEMBER** | K. Crooks guest lecture on Colorado wolf restoration to ESS 501 Principles of Sustainability
- **SEPTEMBER** | M. Lasky guest lecture on human-induced fear on South African wildlife to LIFE220 Fundamentals of Ecology
- **OCTOBER** | M. Gonzalez guest lecture on social science of Colorado wolf restoration to NRRT 376 Human Dimensions Research and Analysis
- **OCTOBER** | K. Crooks guest lecture on Colorado wolf restoration to FW260 Principles of Wildlife Management
- **OCTOBER** | K. Crooks moderated debate and presented lecture on Colorado wolf restoration in his course FW455 Principles of Conservation Biology
- **OCTOBER** | R. Niemiec guest lecture on the social science of Colorado wolf restoration to FW455 Principles of Conservation Biology
- **OCTOBER** | R. Niemiec guest lecture on Colorado wolf restoration to FW465 Human-Wildlife Conflicts
- **NOVEMBER** | S. Bombaci guest lecture on Tribal conservation and wolf reintroduction to FW310 Mapping Diverse Perspectives in Conservation



PUBLIC OUTREACH AND ENGAGEMENT

A primary goal for the CHCC is to educate the public, engage stakeholders, and inform science-based policy to facilitate human-carnivore coexistence and to reduce conflict, including direct conflict between carnivores and people and social conflict among stakeholders about carnivores

2021 HIGHLIGHT TIMELINE

PUBLIC EDUCATION & OUTREACH EFFORTS

FEBRUARY

- K. Crooks and M. Gonzalez participated in the CSU WCNr Tune Into Nature Podcast to discuss social and ecological considerations for Colorado wolf restoration.
- K. Crooks, R. Niemiec, and C. Camara began partnership with The Captain Planet Foundation Project Hero and Global GreenSTEM to contribute to the development of the Quest for Coexisting with Wolves, a K-12 education curriculum focused on approaches to coexist with wolves. Project Hero is a free online platform that offers standards-oriented and authentic project-based learning experience for empowering and engaging students to take action for wildlife.

FEBRUARY

- CHCC formed and led an informal working group of organizations focused on finding common ground and real-world solutions to promote conflict reduction and coexistence with carnivores in the Rocky Mountain West, focused on non-lethal tools that minimize impacts to ranchers and predators. This group includes CHCC, Center for Collaborative Conservation, CSU Extension, USDA National Wildlife Research Center, USDA Wildlife Services, Colorado Parks and Wildlife, Defenders of Wildlife, Working Circle, Western Landowners Alliance, National Resource Defense Council, National Wildlife Federation, Rocky Mountain Wolf Project, San Juan Citizens Alliance, Matt Barnes, and the International Wolf Center. Efforts focus on wolf restoration in Colorado.

MARCH

- D. Hoag initiated work on USDA Western Sustainable Agriculture Research and Education (SARE) grant. This collaborative project includes Warner College of Natural Resources (K. Crooks), College of Agricultural Sciences (D. Hoag), CSU Extension (C. J. Mucklow, R. Young), USDA Wildlife Services (S. Breck), an NGO (Western Landowners Alliance), and private landowners. The goal of this grant is to train CSU Extension agents regarding approaches to reduce conflict between carnivores and livestock in Colorado.
- A special “epilogue” to our Wolves in Colorado: Science & Stories series through the Denver Museum of Nature & Science, featuring Colorado Parks & Wildlife Director Dan Prenzl, discussed the path ahead for wolf restoration to Colorado. John Sanderson (CCC Director) co-hosted the webinar.

MARCH

- CHCC hosted a special webinar by 2nd grade students from the STEM Lab School in Northglenn, Colorado. The students presented their Problem-Based Learning solutions as to how people and wolves can coexist with less conflict in Colorado. The event was featured in High Country News.

APRIL

- K. Crooks and S. Breck served as expert panelists for student presentations at Northglenn High School, Colorado. High school students presented Problem-Based Learning solutions as to how people and wolves can coexist with less conflict in Colorado.
- K. Crooks delivered presentation to 2nd grade students from the STEM Lab School in Northglenn, Colorado regarding human-wildlife coexistence in urban areas.
- CHCC webinar by 2nd grade students from the STEM Lab School in Northglenn regarding wolf coexistence was featured on KUNC radio (18 minute mark). wolves can coexist with less conflict in Colorado. The event was featured in High Country News.

MAY

- C. Camara delivered presentation about Colorado wolf restoration to 180 5th graders for Poudre Virtual Elementary School Ecoweek in Fort Collins, Colorado.
- S. Breck, as well as partners J. Sanderson (CCC) and R. Young (CSU Extension), were invited to serve on the CPW Wolf Technical Working Group (TWG) to help develop the wolf restoration and management plan for Colorado.
- As part of our Western SARE project, our partners in CSU Extension and Western Landowners Alliance initiated “listening sessions” with select groups of engaged and influential livestock producers in Colorado to elicit concerns and ideas related to wolf reintroduction.

JUNE

- R. Niemiec, M. Gonzalez, and CPW social scientist M. Quartuch initiated their collaborative research project on their NSF RAPID Grant. CSU and CPW are partnering to study the public and stakeholder engagement process associated with wolf reintroduction in the state. Their research team is coordinating with the Stakeholder Advisory Group (SAG) convened by CPW, as well as the third-party facilitator (Keystone Policy Center) who is leading the SAG and TWG and facilitating statewide hearings and other engagement efforts. A joint press release between CSU and CPW was featured in CSU Source. Funding from the Donald Slavick Foundation will continue this work for a second year, through 2022.

JULY

- CHCC faculty and graduate students developed policy briefs on Colorado wolf reintroduction through the Center for Collaborative Conservation Fellows Program. These policy briefs were submitted and presented to leadership of the Colorado Department of Natural Resources and Colorado Parks and Wildlife.

OCTOBER

- CHCC hosted a panel discussion and dinner entitled Social Justice and Human-Carnivore Coexistence: Considering Indigenous Voices and Rights in Wolf Reintroduction and Management. Speakers included: 1) Rain Bear Stands Last, Global Indigenous Council; 2) Steve Whiteman, Wildlife Division, Southern Ute Tribe; 3) Peter David, Great Lakes Indian Fish and Wildlife Commission; and 4) Ernest House Jr, Keystone Policy Center, former Executive Director for the Colorado Commission of Indian Affairs. Funding provided by the CHCC, the WCNR Director of Diversity and Inclusion, and the CSU Vice President for Diversity for Inclusive Excellence. Approximately 190 people (mostly CSU students) attended the event

DECEMBER

- R. Niemiec served on a Social Science Advisory Panel for the California Ocean Science Trust to help develop a report to the USFWS on social science needs to inform sea otter reintroduction.

JUNE

- Our \$1 million dollar donation from an anonymous rancher was featured in a CSU press release, the Denver Post, and the weekly newsletter of author and podcaster Tim Ferriss (to an audience of millions worldwide).
- CHCC finalized our CHCC video

SEPTEMBER

- CHCC, and Co-Director Stewart Breck's work on urban bear conflict, were featured in a new book by Mary Roach: Fuzz: When Nature Breaks the Law (Chapter 2, Breaking and Entering and Eating: How do you Handle a Hungry Bear? pp. 29-53, W. W. Norton & Company).

NOVEMBER

- R. Niemiec was featured on the Conservation Unfiltered podcast to discuss how social science can inform conservation through the case study of wolf reintroduction in Colorado.

CHCC AND THE MEDIA

Media coverage of our educational 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 2021.

The search reported 103 stories from January 1 – December 31, 2021, with a reach of 25 million readers, viewers, and listeners and an advertising equivalency for CSU totaling \$45,898.

SELECT MEDIA COVERAGE

Reese, D. March 14, 2021. The Center for Human-Carnivore Coexistence: Minimizing conflict between people & nature. Engineers and Scientists Acting Locally.
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CHCC 2022 GOALS

Analyzing the social outcomes of stakeholder and public engagement in Colorado

Our team will continue to advance wolf restoration to Colorado by working with Colorado Parks and Wildlife to examine the social outcomes of the stakeholder and public engagement efforts that are being implemented for wolf reintroduction planning. This will include repeated surveys and interviews of participants in the Stakeholder Advisory Group, additional stakeholders, and the public. We are obtaining feedback on the process and tracking how social conflict, social learning, trust, and acceptability of management options change over time.

Statewide surveys of public support of non-lethal and lethal management approaches for carnivores in Colorado

We plan to conduct statewide mail and online surveys of the Colorado public regarding managing conflict between humans and mountain lions and bears. 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.

Produce maps of movement and habitat connectivity for wolves in Colorado

Our team is developing predictive maps of wolf movement to identify potential movement routes of wolves from release sites and potential areas of conflict. These maps will be published in scientific journals and shared with agencies directing wolf reintroduction, including Colorado Parks and Wildlife.

Development and dissemination of educational materials on human-carnivore coexistence

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 and/or black bears.

Coexistence between ranchers and predators in the Rocky Mountain West

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.

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.

Transmission of carnivore conflict and tolerance in East Africa

We will conduct field work and data collection to measure and model human migration and interactions with wildlife across rural landscapes in Tanzania. Project objectives include characterizing historic human-wildlife land use and interactions, analyzing mobile phone networks to understand how carnivore tolerance and conflict spread in human communities, and modeling future landscapes under scenarios of coexistence, climate change, and land use.



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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