

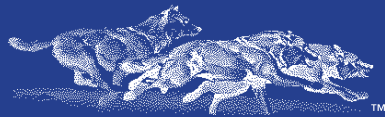


Photo: Mike O'Connell



2013 INTERNATIONAL WOLF SYMPOSIUM

Wolves and Humans at the Crossroads



International Wolf Center

OCTOBER 10-13, 2013
DULUTH, MINNESOTA USA

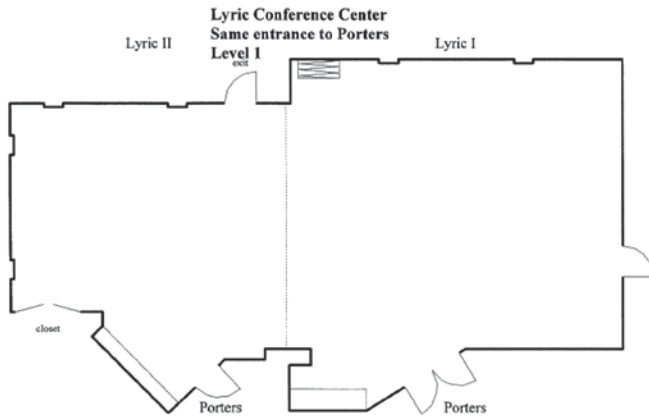


Facility Maps

Holiday Inn

Registration in Lobby on Level 3

Lyric I & II Head down the Escalator in the Holiday Center and through Porter's Restaurant.



Great Lakes Ballroom
Press GLB button in Elevator



DECC Harbor Side Convention Center

Skyway Level

3rd Level

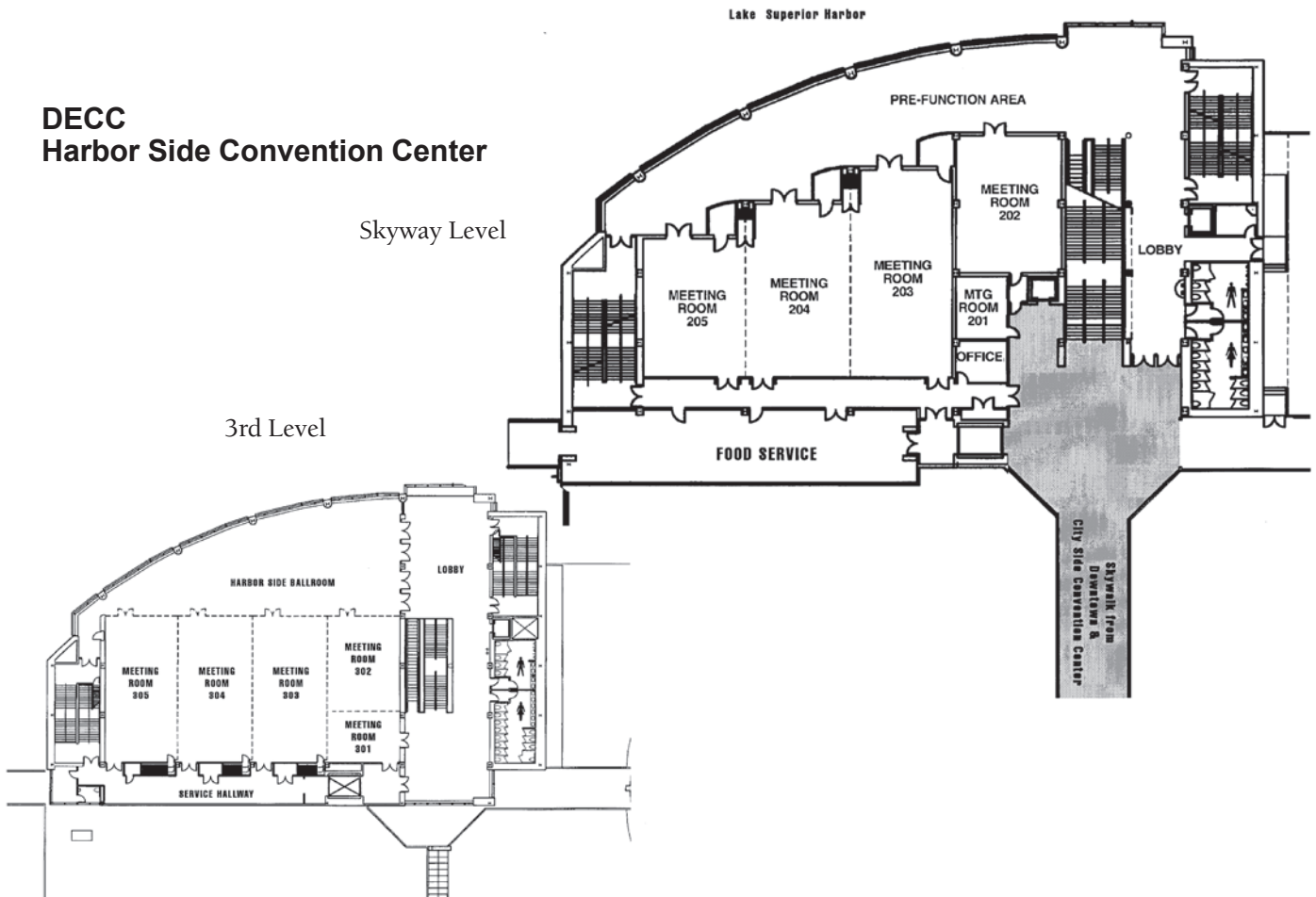


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International Wolf Center
Mission and Vision inside back cover



2013 INTERNATIONAL WOLF SYMPOSIUM

Wolves and Humans at the Crossroads

Sponsors and Donors

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Symposium Program Book

Publication Editors and Coordinators

Debbie Hinchcliffe and Neil Hutt

Graphic Designer

Tricia Austin





International Wolf Center

The Road Not Taken

by Robert Frost

*Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth. . .*

Welcome to Wolves and Humans at the Crossroads

Today we gather at a crossroads where, we imagine, a metaphorical wolf is waiting in Robert Frost’s undergrowth—watching to see what roads we will take.

A crossroad is a point where paths intersect, and we stop to ponder the best route to our destination. As any adventurer knows, a road may bring challenge, beauty, detours, failure or hard-won success. A crossroad, like this Symposium, is also a meeting place to talk and listen to each other’s hypotheses about how numbers of people and their policies and numbers of wolves and their behaviors might travel together on alternative roads to the future.

But which fork to take? The Symposium’s international speakers will share with us an enormous range of stimulating, entertaining and groundbreaking ideas on today’s wolf-related concerns. These issues are many: Recovery plans, successes and failures, delisting, hunting and trapping, genetic research, human tolerance and the very understanding of what wolf recovery means and does not mean. Controversies on these topics may well unite us or send us onto separate paths.

The proverbial wolf around the world, meanwhile, will lope about its business in Robert Frost’s “undergrowth,” and hope to stay out of our way.

Frost’s poem ends...

*I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I –
Took the one less traveled by,
And that has made all the difference.*

Given the roads we take now, will that famous future poetic sigh be one of satisfaction and relief, or one of regret? Today’s sigh, we imagine, is one of perseverance and resolve to get things right for survival of the wolf— a commitment we share even though our paths may diverge.

Our collective work will make all the difference.

Rob Schultz, Executive Director

Nancy jo Tubbs, Board Chair



IUCN World Conservation Union Wolf Specialist Group

The International Wolf Center is proud to sponsor the Wolf Specialist Group meeting held in conjunction with the 2013 International Wolf Symposium: Wolves and Humans at the Crossroads. Participants of this symposium are invited to observe and listen to the Wolf Specialist Group meeting, Sunday, October 13, 2013, 1:00 p.m. – 3:30 p.m. at the Holiday Inn, in the Lyric Conference Center on the 1st floor.

The IUCN World Conservation Union is the foremost international conservation organization, and the Species Survival Commission (SSC) is the IUCN's species conservation arm. The chairmen and members of the Wolf Specialist Group are appointed by the IUCN and SSC to promote ecologically sound management of the wolf worldwide and especially endangered wolf populations. International Wolf Center's founder, Dave Mech, has chaired this committee since 1978 and currently co-chairs it with Luigi Boitani.

Wolf Specialists attending the Symposium include:

Layne Adams, USA	Olof Liberg, Sweden
Juan Carlos Blanco, Spain	Dave Mech, USA (Co-chair)
Luigi Boitani, Italy (Co-chair)	Sabina Nowak, Poland
Ozgun Emre Can, United Kingdom	Nikita Ovsyanikov, Russian Federation
Ludwig Carbyn, Canada	Mike Phillips, USA
Dean Cluff, Canada	Jorge Servin, Mexico
Kaveh Hatami, Iran	Petter Wabakken, Norway
Djuro Huber, Croatia	
Yadvendradev Jhala, India	





Martin Harvey



2013 INTERNATIONAL WOLF SYMPOSIUM

Wolves and Humans at the Crossroads

Symposium-at-a-Glance
and Special Events and
Presentations



Symposium-at-a-Glance

Thursday, October 10, 2013

Morning

Field Trip to Ely, MN	<i>Departs from the Holiday Inn</i>
-----------------------	-------------------------------------

Afternoon/Evening

Wildlands Group Meeting	<i>International Wolf Center, Ely, MN</i>
Registration	<i>Holiday Inn, 3rd Floor Lobby</i>
Exhibit and Poster Setup	<i>DECC Pre-Function Area</i>
Welcome Reception	<i>Holiday Inn, Great Lakes Ballroom</i>

Friday, October 11, 2013

Morning

Registration	<i>Holiday Inn, 3rd Floor Lobby</i>
Posters and Exhibits	<i>DECC Pre-Function Area</i>
Silent Auction	<i>DECC Pre-Function Area</i>
Welcome and Opening Remarks	<i>DECC Harbor Side Ballroom</i>
Plenary – “A Debate About Wolf Recovery”	<i>DECC Harbor Side Ballroom</i>
Oral Presentation Categories	
Wolf Management	<i>DECC Room 202</i>
Wolf Ecology, Behavior, and Genetics	<i>DECC Room 203</i>
Wolves and Environmental Education	<i>DECC Room 204</i>
Wolf-Human Interactions	<i>DECC Room 205</i>

Afternoon/Evening

Posters and Exhibits	<i>DECC Pre-Function Area</i>
Keynote Address – “The ESA and Wolf Recovery: Past, Current and Future”	<i>DECC Harbor Side Ballroom</i>
Plenary – “Mexican Wolf Recovery”	<i>DECC Harbor Side Ballroom</i>
Oral Presentation Categories	
Mexican Wolf Recovery	<i>DECC Harbor Side Ballroom</i>
Wolf Management	<i>DECC Room 202</i>
Wolf Ecology, Behavior, and Genetics	<i>DECC Room 203</i>
Wolf Recovery	<i>DECC Room 204</i>
Wolf-Human Interactions	<i>DECC Room 205</i>
Special Presentation – “Dogs’ Relationship to Wolves: Genetics, Behavior and Conflict”	<i>DECC Harbor Side Ballroom</i>
Special Presentation – “The Life of Yellowstone Wolf 06”	<i>DECC Harbor Side Ballroom</i>



Saturday, October 12, 2013

Morning

Posters and Exhibits	<i>DECC Pre-Function Area</i>
Silent Auction	<i>DECC Pre-Function Area</i>
Oral Presentation Categories	
Moving from Recovery to State Management of Wolves	<i>DECC Harbor Side Ballroom</i>
Wolves Worldwide	<i>DECC Room 202</i>
Wolf Ecology, Behavior and Genetics	<i>DECC Room 203</i>
Wolf Recovery	<i>DECC Room 204</i>
Wolf-Human Interactions	<i>DECC Room 205</i>
Plenary – “A Debate About Wolf Hunting and Trapping” “Working Toward Consensus”	<i>DECC Harbor Side Ballroom</i>

Afternoon/Evening

Poster Session with Presenters and Exhibit Review	<i>DECC Pre-Function Area</i>
Oral Presentation Categories	
Wolves in Eurasia	<i>DECC Harbor Side Ballroom</i>
Wolf Management	<i>DECC Room 202</i>
Wolf Ecology, Behavior and Genetics	<i>DECC Room 203</i>
Wolves and Environmental Education	<i>DECC Room 204</i>
Wolf-Human Interactions	<i>DECC Room 205</i>
Banquet and Program Awards <i>Wild Wolves We Have Known</i> Book Signing	<i>Holiday Inn, Great Lakes Ballroom</i>

Sunday, October 13, 2013

Morning

Oral Presentation Categories	
Wolf Interactions with Other Carnivores	<i>DECC Harbor Side Ballroom</i>
Wolf Interactions with Prey	<i>DECC Room 202</i>
Wolf Ecology, Behavior and Genetics	<i>DECC Room 203</i>
Wolf Recovery	<i>DECC Room 204</i>
Wolf-Human Interactions	<i>DECC Room 205</i>
Keynote Address – “A 55-Year Career of Wolf Research”	<i>DECC Harbor Side Ballroom</i>
Symposium Closing Remarks	<i>DECC Harbor Side Ballroom</i>
IUCN Wolf Specialist Group Meeting	<i>Holiday Inn, Lyric Conference Center 1st floor</i>



Special Events and Presentations

Thursday, October 10, 2013

“Wolves and Wilderness” Bus Tour

7:00 a.m. – 5:30 p.m.

Join us for the “Wolves and Wilderness” tour. The bus departs from the Holiday Inn and will travel to Ely, through the Superior National Forest. Our destinations will be the North American Bear Center and the International Wolf Center, where we will have lunch. The Center’s wolf curator will lead a special learning session about the Exhibit Pack.

Wildlands Group Meeting

10:00 p.m. – 3:00 p.m. • IWC in Ely

At the wildlands meeting, like-missioned, habitat-focused organizations of the Lake Superior region of northeastern Minnesota and northwestern Wisconsin will explore ways to collaborate and to use their expertise to support each other’s work. They will develop ideas for having an impact on wildlands conservation that will ultimately support the long-term survival of wolf populations.

Registration

6:00 p.m. – 9:00 p.m. • Holiday Inn, 3rd Floor Lobby

Exhibit and Poster Setup

6:00 p.m. – 9:00 p.m. • DECC Pre-Function Area

Welcome Reception

7:00 p.m. – 9:00 p.m. • Holiday Inn, Great Lakes Ballroom

“Spirit of the Wild” - Presented by Spirit Way, Inc.

The wolf is an iconic symbol of the forest, and its howl is often referred to as the soul of the wild. In this dramatic presentation of wolf images from around the world, the beauty of these magnificent creatures inspires us to understand their ways and create an appreciation for the important role they play in a healthy, balanced ecosystem.



Registration	7:00 a.m. – 6:00 p.m. • Holiday Inn, 3rd Floor Lobby
Exhibit and Poster Displays	8:30 a.m. – 5:00 p.m. • DECC Pre-Function Area
Silent Auction	8:30 a.m. – 9:30 p.m. • DECC Pre-Function Area
Welcome and Opening Remarks	8:30 a.m. – 8:50 a.m. • DECC Harbor Side Ballroom
Rob Schultz , <i>International Wolf Center Executive Director, Symposium Co-chair,</i>	
Judy Hunter , <i>International Wolf Center Board of Directors, Symposium Co-chair</i>	
Nancy jo Tubbs , <i>International Wolf Center Board Chair</i>	

“A Debate about Wolf Recovery” 8:50 a.m. – 10:15 a.m. • DECC Harbor Side Ballroom
Plenary

This lively debate on wolf recovery will be riveting, humorous, intelligent and controversial. What is the ultimate aim of the Endangered Species Act? What roles should federal, state and tribal agencies play in restoring wolves? What is the right balance when considering preservation, conservation and control? What are the best and worst agency policies for wolf restoration and conservation? When are the protections provided by the Endangered Species Act no longer needed? Throughout, this panel of experts will attempt to answer the controversial question “What is wolf recovery and how should it be achieved?” At the end, you will get to vote for the version of recovery you most support and can see a summary of responses in a future report by the International Wolf Center.

Debate participants are Mike Phillips, Ed Bangs and Larry Voyles with Nancy jo Tubbs as moderator.

Mike Phillips has a long history of working with threatened and endangered species in the research, management and policy realms. He led the effort to restore red wolves to the southeast and gray wolves to the Greater Yellowstone Ecosystem. He has served on every Mexican Wolf Recovery team convened since 1995. He has directed the Turner Endangered Species Fund since its inception in June 1997. Mike has been a Montana state legislator since 2006 and is currently a state senator.

Ed Bangs was the U.S. Fish and Wildlife Service’s Gray Wolf Recovery Coordinator for the northwestern U.S. from 1988 until his retirement in June 2011. From 1975 until 1988 he worked on a wide variety of wildlife programs including wolf, lynx, brown and black bear, wolverine, marten, coyote, moose, bald eagle and trumpeter swan management and research. During this period he was also involved in the reintroduction of caribou, and in land-use planning and management on the Kenai National Wildlife Refuge in Alaska. Ed was involved with the recovery and management of wolves in Montana, Idaho and Wyoming beginning in 1988 and led the interagency program to reintroduce wolves to Yellowstone National Park and central Idaho in the mid-1990s.

Larry Voyles is the Director of the Arizona Game and Fish Department and serves as the Chairman of the Executive Committee of the Association of Fish and Wildlife Agencies. Larry has worked for the Arizona Game and Fish Department for 38 years, starting out as a District Wildlife Manager. He rose through the ranks, serving as the Department’s Training Coordinator, Regional Supervisor and ultimately as Executive Director, a position he has held since 2008. Larry’s department has approximately 650 employees, a \$100 million budget and owns or manages 274,000 acres of land, including a variety of wildlife areas.



**Keynote Address – “The ESA and Wolf Recovery:
Past, Current and Future”**

12:45 p.m. – 1:30 p.m. • DECC Harbor Side Ballroom

Jamie Rappaport Clark

Ms. Clark will review the recent history of wolf conservation in this country by comparing and contrasting the differing outcomes for gray wolf conservation in the Western Great Lakes, in the Northern Rockies and Pacific Northwest, and in the Southwest with the Mexican gray wolf. She will talk about the challenges surrounding the current controversial proposal by the U.S. Fish and Wildlife Service to delist the gray wolf throughout most of the United States and will describe what additional steps are needed to change the polarized debate over wolf conservation.

Jamie Rappaport Clark, who took over the reins as President and CEO of Defenders of Wildlife in October, 2011, has been devoted to the preservation and protection of America’s wildlife throughout her career. Jamie came to Defenders in 2004 after a 20-year career in conservation with the federal government, mostly with the U.S. Fish and Wildlife Service (the Service). In recognition of her accomplishments and national leadership in this field, President Bill Clinton appointed her as director of the Service in 1997, a post she held until 2001. During her tenure as director, Jamie oversaw the establishment of 27 new national wildlife refuges and presided over the recovery of key endangered species such as the bald eagle and the gray wolf. Jamie’s tenure as director of the Service was also marked by the adoption of a number of innovative policies to encourage landowners to voluntarily conserve wildlife.

Under Jamie’s leadership, Defenders has provided vast wildlife expertise to help the Obama administration shape the first-ever solar energy development program with strong protections for wildlife and habitat on public lands. She guided Defenders’ efforts with members of Congress to create the National Climate Change and Wildlife Science Center and successfully advocated for wildlife protections that are now central to forest management policies. She has expanded Defenders’ efforts to provide tools and education to ranchers and others to help people coexist with wildlife, including wolves, bears, panthers and prairie dogs. Jamie’s philosophy is to collaborate with others who share Defenders’ commitment to wildlife conservation and challenge those who violate or seek to weaken our nation’s environmental laws.

Jamie is recognized as a leading national expert on the Endangered Species Act and imperiled wildlife. She has testified before Congress on numerous occasions in support of strong fish and wildlife conservation laws. Her leadership and expertise have helped defeat numerous efforts to undermine the Endangered Species Act.

“Mexican Wolf Recovery”

1:30 p.m. – 3:30 p.m. • DECC Harbor Side Ballroom

Plenary

The critically endangered Mexican wolf has been the focus of a recovery program since the 1970s. Much progress has been achieved since then, including the establishment of a successful captive breeding program. Concerning efforts to develop a recovery plan to replace the existing 1982 plan and restore wild populations, much activity has taken place over the last 15 years. Papers delivered in this plenary session will present the current status of recovery plan development and restoration efforts on behalf of the Mexican wolf in the U.S. and Mexico.

Presenters include:

Sherry Barrett - Mexican Wolf Recovery Coordinator for the U.S. Fish and Wildlife Service and member of the Mexican Wolf Recovery Team presents: “Mexican wolf reintroduction update”

Carlos Lopez-Gonzalez – Research professor at the Universidad Autonoma de Querétaro, Querétaro, Mexico and member of the Mexican Wolf Recovery Team presents: “Mexican wolf reintroduction in Chihuahua, Mexico: lessons learned”

Rich Fredrickson - Conservation Biologist and member of the Mexican Wolf Recovery Team presents: “Recovering Mexican wolves: demography, genetics, and representation”

Doug Smith - Yellowstone Wolf Project Leader and member of the Mexican Wolf Recovery Team presents: “Prey of the Mexican wolf: enough, the right kind and how many will they eat?”

John Vucetich - Associate Professor of Wildlife Ecology at Michigan Technological University and member of the Mexican Wolf Recovery Team presents: “The effect of human-caused mortality on wolf populations and the importance of accounting for such losses in recovery criteria”

Mike Phillips - Executive Director of the Turner Endangered Species Fund and member of the Mexican Wolf Recovery Team presents: “Mexican wolf recovery region”



**“Dogs’ Relationship to Wolves:
Genetics, Behavior and Conflict”**

7:00 p.m. – 8:00 p.m. • DECC Harbor Side Ballroom

OPEN TO THE PUBLIC

Raymond Coppinger

Much of the dog literature starts off with the catechism, “Most scientists now agree that man’s best friend descended from the wolf.” And the gestalt of that ancestral wolf is the northern gray wolf (*Canis lupus lupus*). An overlapping group of scientists doesn’t see the process exactly as a descent but rather a sub-speciation, and thus renamed the domestic dog *Canis lupus*. So where are the data that overwhelmingly convince these scientists? Were these data generated by the geneticists, the archeologists, or the anthropologists?

Raymond Coppinger majored in literature and philosophy with an emphasis on the philosophy of science as an undergraduate at Boston University. After graduation he worked for the Smithsonian Astrophysical Institution, computing orbits for the new satellites that the Russians and Americans were putting into space. In 1962 he worked on a National Science Foundation grant computing the seasonal timing and population size of migrating birds using Dew line defense radar. He then worked for the U.S. Fish and Wildlife Service on the embryology of reproductive control of *Larus* gulls. His Ph.D. thesis in biology (University of Massachusetts residency at Amherst College) is on the evolution of color patterns in neotropical Ithomiid butterflies and its effect on avian predators. He joined the founding faculty at Hampshire College in 1969, and the Graduate Faculty of the University of Massachusetts, where he was a professor of biology whose studies focused on the behavioral evolution of domestic animals, especially the dogs. He had grants from the Department of the Interior, the Department of Agriculture, and various foundations and livestock associations from 1976 to 1992, implementing non-lethal methods of predator control using dogs he collected in Europe and the Near East. He retired from undergraduate teaching in 2006 but continued at the graduate school until 2011. He now consults and lectures around the world on a variety of dog-related issues and continues to write books, chapters and papers with his wife Lorna and colleagues.

“The Life of Yellowstone Wolf 06”

8:15 p.m. – 9:15 p.m. • DECC Harbor Side Ballroom

OPEN TO THE PUBLIC

Bob Landis and Doug Smith

Emmy Award-Winning Wildlife Cinematographer Bob Landis explores the life of beloved wolf 832, AKA Female 06, the queen of the Yellowstone Lamar Canyon pack. In this exclusive presentation, he features footage of 06 that he captured before her death in December 2012. Bob will cover the aftermath of her death, a traumatic event for many regular observers of the Yellowstone wolves. In addition, the sudden loss of 06, the Lamar Canyon alpha, had destructive impacts on the members of her pack but Bob will show the resiliency of wolves in general to these losses. Doug Smith will be joining Bob to point out details in the film and to answer questions the audience may have.

Bob Landis was born and raised in Appleton, Wisconsin. He moved to Billings, Montana in 1968 to teach high school mathematics and film wildlife in Yellowstone. Bob became a full-time professional filmmaker in 1993 when he produced his first film with National Geographic Television (NGT), Coyotes of Yellowstone. Since then he has produced six other films on Yellowstone, mostly with NGT. With National Geographic Television, he is currently editing a film about Yellowstone’s famous alpha wolf, Female 06, whom he followed for six years and who was killed outside the park in December of 2012.

Doug Smith is currently the Yellowstone Wolf Project Leader. He has been in Yellowstone 19 years and has studied wolves for 34 years. He has been responsible for the capture of about 500 wolves. Doug has worked in Yellowstone, Isle Royale and Wolf Park and has collaborated with researchers from Alaska, Canada and Europe. He is a member of Reintroduction IUCN, Reintroduction Specialist Group, The Mexican Wolf Recovery Team and The Northern Rocky Mountain Recovery Team.



Exhibit and Poster Displays

8:30 a.m. – 4:00 p.m. • DECC Pre-Function Area

“Moving from Recovery to State Management of Wolves”

8:15 a.m. – 10:15 a.m. • DECC Harbor Side Ballroom

Session

Wolf management policies differ from state to state. It is important at this crossroad, to compare these differences and learn what has worked well, what hasn't, and where to go from here in managing wolves. The path for states has been extremely difficult. The controversy over the hunting of wolves has fueled heated debate and led to criticism that management is not based on science.

Speakers include:

Bob Ream - *Past chair of the Montana Fish, Wildlife and Parks Commission*

Jon Rachael - *Idaho Department of Fish and Game*

Nathan Lance - *Montana Fish, Wildlife and Parks*

Ken Mills - *Wyoming Game and Fish Department*

Dan Stark - *Minnesota Department of Natural Resources*

Dave MacFarland - *Wisconsin Department of Natural Resources*

Brian Roell - *Michigan Department of Natural Resources*

“A Debate About Wolf Hunting and Trapping” and “Working Toward Consensus”

Plenary

10:30 a.m. – 12:30 p.m. • DECC Harbor Side Ballroom

“A Debate About Wolf Hunting and Trapping”

Dr. Alistair Bath (Moderator) and Debate Panelists:

Howard Goldman

Jim Hammill

Gary Leistico

Paul Paquet

Federal protection under the Endangered Species Act has been removed in 6 states with recovered populations of wolves. Wolves are, therefore, managed under individual state laws and regulations. Hunting is one tool that states can use to manage resident wildlife. But hunting wolves is a contentious issue. Should states allow regulated hunting of wolves under state game laws? Should wolves be exempt from regulated hunting? Who are the decision makers? What is the role of public opinion, and how should that opinion be accurately measured? Dr. Alistair Bath will moderate a lively discussion by the debate panelists as they explain their positions and listen to the rebuttals. Then the audience will participate with questions directed to the panelists. This is an opportunity for audience members to broaden their own perspectives and understanding of this complex and important wildlife issue.

“Working Toward Consensus: Finding Common Ground Among Panel Members and the Audience on Understanding the Key Issues Regarding Hunting Wolves”

Dr. Alistair Bath, Debate Panelists and Audience

Traditionally at international wolf conferences, panels have been assembled and opportunities provided for all panel members to express their concerns and viewpoints to the audience. The end result has the benefit of the audience listening to various perspectives and perhaps becoming more tolerant of diverse opinions. The disadvantage, though, of such a panel approach is that the audience leaves without understanding whether the panel agrees on any issues and whether there is ever hope for consensus. In addition, the audience plays a passive role listening to the debate. Dr. Alistair Bath is going to fully engage the audience and the panel members using his Applied Human Dimensions-Facilitated Workshop Approach to find common ground and explore where consensus may be found on issues regarding wolf hunting.

The International Wolf Center hopes that all participants will learn some useful strategies to apply in conflict resolution situations.



Session Participants:

Dr. Alistair Bath is an associate professor at Memorial University, Newfoundland, Canada, with more than 25 years of experience in human-wildlife conflicts and human dimensions in natural resource management issues. He has worked on wolf reintroduction in Yellowstone National Park as well as wolf control issues in the Yukon Territory. Alistair is a member of the IUCN/SSC Large Carnivore Initiative for Europe (<http://www.lcie.org/>) and has led various research projects throughout Europe on large carnivores. He has taught human dimension courses and facilitation training sessions for several government agencies and for conservation biology programs in Italy, Germany, Croatia, Slovenia, Austria, Poland, and Portugal. Alistair has been a keynote speaker at international wolf and bear conferences. He enjoys working with people and finding solutions to the conservation challenges that we face today.

Howard Goldman is the Minnesota State Director of the Humane Society of the United States (HSUS). He was a member of the Minnesota Department of Natural Resources (DNR) Wolf Roundtable and the Wisconsin DNR's Wolf Stakeholders Group. He represented the HSUS at the U.S. Fish and Wildlife Service delisting hearings in Grand Rapids, Minnesota and Ashland, Wisconsin. He has been a wolf advocate for over 20 years.

Jim Hammill is a native and current resident of Michigan's Upper Peninsula recently retired from his position as a wildlife biologist for the Michigan Department of Natural Resources after 30 years of service. He is president of Iron Range Consulting and Services, a land and wildlife management company that he runs with his wife, Julie Hammill. Jim is a former member of the International Wolf Center Board, has served on both state and federal wolf recovery teams and led the Michigan Wolf Recovery Program for years.

Gary Leistico is a shareholder in the Rinke Noonan law firm located in St. Cloud, Minnesota. Rinke Noonan is a law firm of 26 attorneys representing clients in a wide array of practice areas. He concentrates his practice in Environmental Law, Criminal Law and Civil Litigation. A native of Elk River, Minnesota, Gary graduated from St. Cloud State University. He received his law degree from the William Mitchell College of Law. Gary joined Rinke Noonan in 1994. Gary is admitted to practice law in Minnesota, South Dakota, and North Dakota, and a number of other federal and tribal courts. He is presently general counsel to the National Trappers Association and the Minnesota Trappers Association, and represents numerous Trappers Associations and trappers throughout the Country. He has litigated cases in both state and federal courts relating to trapping. Gary has been an avid trapper in Minnesota for the past 40 years.

Paul Paquet is an Adjunct Professor in Geography at the University of Victoria, British Columbia, Canada, where he supervises graduate student research. He is an internationally recognized authority on mammalian carnivores, especially wolves, with research experience in several regions of the world. He previously worked as a biologist for the Canadian Wildlife Service. He is Senior Scientist with the Raincoast Conservation Foundation. He is also an international consultant and lecturer. He has been conducting field research on wolves and other large mammalian carnivores since 1972, with an enduring interest in applied ecology and environmental philosophy. Paul has published numerous scholarly and popular articles on the ecology, behaviour, and conservation of large carnivores, as well as three books on wolves. He is a member of several government, industry, and NGO advisory committees concerned with the conservation of biodiversity. His current research focuses on conservation of large carnivores and the effects of human activities on their survival.

Poster Session with Presenters and Exhibit Review

12:30 p.m. • DECC Pre-Function Area

Banquet and Program

6:00 p.m. – 9:30 p.m. • Holiday Inn Great Lakes Ballroom

After Dinner Program

Erich Klinghammer Award - Wolf Park will present this award, which is given in Dr. Klinghammer's memory, for outstanding contributions in the fields of wolf behavior, ecology, and conservation.

“Who Speaks for Wolf Award.” - The International Wolf Center will present this annual award to an individual* who has made exceptional contributions to wolf education by teaching people how the wolf lives and by placing the wolf in the broader context of humankind's relationship to nature. (*Not a staff or board member)

Book Launching - The International Wolf Center officially launches its very own new book, *Wild Wolves We Have Known: Stories of Wolf Biologists' Favorite Wolves*, edited by Richard P. Thiel, Allison C. Thiel and Marianne Strozewski. This book is a collection of 23 stories written by wolf biologists throughout North America and Europe who have devoted much time to the study of wild wolves and who, in the course of such work, have witnessed remarkable events in the lives of these wolves. These authors share with readers events that rarely, if ever, reach print, especially in the scientific literature. Following the dinner, a number authors will read excerpts from their stories. Many of the authors will be available afterwards to personalize participants' copies and to discuss this unique book. All royalties benefit programs at the Center.

Book signings

8:30 p.m. – 9:30 p.m. • Holiday Inn Great Lakes Ballroom

by authors of *Wild Wolves We Have Known*



Keynote Address - "A 55-year Career of Wolf Research"

Dave Mech

11:00 a.m. – 12:00 noon • DECC Harbor Side Ballroom

In this fascinating presentation, Dr. L. David Mech, one of the world's most renowned wolf experts, will share from his wealth of knowledge on everything from basic wolf ecology and behavior to his personal interactions with moose, deer, elk, caribou and muskoxen. He will also present highlights from five decades of research on wolves in Isle Royale National Park; Minnesota; Denali National Park; Ellesmere Island and Yellowstone National Park.

L. David Mech ("Dave") is a Senior Research Scientist with the U.S. Geological Survey and an Adjunct Professor at the University of Minnesota. Dave holds a B.S. degree from Cornell University, a Ph.D. degree and an honorary doctorate degree from Purdue University. He has published 400+ articles and 10 books. Dave has studied wolves full time since 1958 with studies in Minnesota, Isle Royale, Alaska, and Yellowstone, and he lived part of each summer from 1986 through 2010 with a pack of wolves tolerant to humans on Ellesmere Island, Canada 600 miles from the North Pole. He has chaired the IUCN Wolf Specialist Group of the World Conservation Union since 1978 and is founder and vice chair of the International Wolf Center. (www.wolf.org).

Closing Remarks

12:00 noon – 12:10 p.m. • DECC Harbor Side Ballroom

Rob Schultz, International Wolf Center Executive Director, Symposium Co-chair,

Judy Hunter, International Wolf Center Board of Directors, Symposium Co-chair

Nancy jo Tubbs, International Wolf Center Board Chair

IUCN Wolf Specialist Group

Lunch and Meeting

1:00 p.m. – 3:30 p.m. • Holiday Inn, Lyric Conference Center 1st floor

Participants of the symposium are invited to observe and listen to the Wolf Specialist Group meeting.





International Wolf Center



2013 INTERNATIONAL WOLF SYMPOSIUM

Wolves and Humans at the Crossroads

Oral Presentations



Oral Presentations by Category

Mexican Wolf Recovery

The Mexican wolf species survival plan

Jackie Fallon – Curator of Animals,
Lake Superior Zoo, Duluth, MN, USA

Factors related to pup production and recruitment of Mexican wolves in Arizona and New Mexico

John K. Oakleaf – U.S. Fish and Wildlife Service,
Albuquerque, NM, USA

Mexican gray wolf recovery: missing the mark, so far

David R. Parsons – Carnivore Conservation Biologist,
The Rewilding Institute, Albuquerque, NM, USA

Mexican Wolf Recovery Plenary

Mexican wolf reintroduction updates

Sherry Barrett – Mexican Wolf Recovery Team;
Mexican Wolf Recovery Coordinator, U.S. Fish and Wildlife Service, Albuquerque, NM, USA

Recovering Mexican wolves: demography, genetics, and representation

Rich Fredrickson – Mexican Wolf Recovery Team,
Missoula, MT, USA

Mexican wolf reintroduction in Chihuahua, Mexico: lessons learned

Carlos A. Lopez-Gonzalez – Mexican Wolf Recovery Team;
Research Professor, Universidad Autónoma de Querétaro, Querétaro, MEXICO

Mexican wolf recovery region

Mike Phillips – Mexican Wolf Recovery Team;
Director, Turner Endangered Species Fund,
Bozeman, MT, USA

Prey of the Mexican wolf: enough, the right kind and how many will they eat?

Doug Smith – Mexican Wolf Recovery Team;
Yellowstone Wolf Project Leader, Yellowstone National Park, WY, USA

The effect of human-caused mortality on wolf populations and the importance of accounting for such losses in recovery criteria

John A. Vucetich – Mexican Wolf Recovery Team;
School of Forest Resources and Environmental Sciences, Michigan Technological University,
Houghton, MI, USA

Moving from Recovery to State Management of Wolves Session

Wolf management in Montana: post-delisting

Nathan Lance – Wolf Management Specialist,
Montana Department of Fish, Wildlife and Parks,
Butte, MT, USA

State management of wolves in Wisconsin

David MacFarland – Large Carnivore Specialist,
Wisconsin Department of Natural Resources,
Rhinelander, WI, USA

State management of wolves in Wyoming following delisting

Ken Mills – Large Carnivore Biologist, Wyoming Game and Fish Department, Pinedale, WY, USA

Wolf management in Idaho since delisting in 2009 (. . . and re-listing, and re-listing . . .)

Jon Rachael – State Wildlife Manager, Idaho Department of Fish and Game, Boise, ID, USA

Moving from recovery to state management of wolves – Introduction

Bob Ream – Chair (retired), Montana Department of Fish, Wildlife and Parks Commission,
Helena, MT, USA

State management of wolves in Michigan

Brian J. Roell – Wildlife Biologist,
Michigan Department of Natural Resources,
Marquette, MI, USA

Wolf management and monitoring in Minnesota

Dan Stark – Minnesota Department of Natural Resources, Grand Rapids, MN, USA

Wolf Ecology, Behavior, and Genetics

How hot is too hot? Live-trapped gray wolf rectal temperatures related to survival

Shannon Barber-Meyer – USGS Wolf and Deer Project, Northern Prairie Research Center, Ely, MN, USA

Gene flow in a Polish population of wolves in relation to their genetic structuring and habitat connectivity

Tomasz Borowik – Mammal Research Institute, Polish Academy of Sciences, Białowieża, POLAND



Contributions to science from captive wolves

Peggy Callahan – Founder, Wildlife Science Center, Columbus, MN, USA

North-south axis in the genetic structure of European wolves

Sylvia Czaromska – Mammal Research Institute, Polish Academy of Sciences, Bialowieza, POLAND

Habitat use of a large carnivore, the red wolf, in a human-altered landscape

Justin Dellinger – School of Environmental and Forest Sciences, University of Washington, Seattle, WA, USA

Influence of wolf predation risk on elk movement in northern Yellowstone National Park

Michel T. Kohl – Department of Wildland Resources, Utah State University, Logan, UT, USA

Social physiology of wolves and dogs during a simulated hunt

Kim Kortekaas – University of Vienna, Wien, AUSTRIA; Wolf Science Center, Ernstbrunn, AUSTRIA

Spatio-temporal distribution of activity and space use among wolves, ungulates and humans in Croatia

Josip Kusak – Veterinary Faculty, University of Zagreb, Zagreb, CROATIA

Understanding the limits to wolf predatory power

Dan MacNulty – Associate Professor of Wildlife Ecology, Department of Wildland Resources, Utah State University, Logan, UT, USA

Proportion of breeders by age class in wild female gray wolves

L. David Mech – Northern Prairie Wildlife Research Center, USGS, St. Paul, MN, USA

Seasonal predation patterns of gray wolves on the northern range of Yellowstone National Park

Matthew Metz – Research Associate, Yellowstone Wolf Project, Yellowstone National Park, WY, USA

Parasites of wolves and their ecological correlates in Yellowstone (USA), Abruzzo (IT) and Mercantour (FR) National Parks

Barbara Molnar – Post-Doctoral Candidate, University of Neuchâtel, Neuchâtel, SWITZERLAND

Wolves brush with extinction at Isle Royale – again

Rolf O. Peterson – Research Professor, School of Forest Resources and Environmental Science, Michigan Technological University, Houghton, MI, USA

Factors affecting wolf presence in the Iberian Peninsula

Francisco Petrucci-Fonseca – Centro de Biologia Ambiental (CBA), Faculdade de Ciências Environment Universidade de Lisboa, Lisbon, PORTUGAL

Group composition effects in inter-pack aggressive interactions of Yellowstone gray wolves

Kira A. Quimby – Yellowstone Wolf Project, Gardiner, MT, USA

Age structure and pack composition of an unexploited wolf population in Yellowstone: Does pack complexity affect sociality and fitness?

Doug Smith – Yellowstone Wolf Project Leader, Yellowstone National Park, WY, USA

Reproductive consequences of life history traits, morphology, pack composition, and environmental conditions for female wolves

Daniel R. Stahler – Project Biologist, Yellowstone Wolf Project, Yellowstone National Park, WY, USA

Mate-finding and spacial variation in mortality cause a demographic Allee effect in Great Lakes wolves

Jennifer Steinglein – Ph.D. Candidate, University of Wisconsin-Madison, Madison, WI, USA

Comparing genetic ancestry and morphology of wolves in western Great Lakes states

Tyler Wheeldon – Ph.D. Candidate, Trent University, Peterborough, Ontario, CANADA

Wolf Interactions with Prey**The historical relationship of wolf control, bovine diseases and bison fluctuations in Wood Buffalo National Park**

Ludwig N. Carbyn – Adjunct Professor, University of Alberta, Edmonton, Alberta, CANADA

Wolf depredation assessment in Iran

Kaveh Hatami – Islamic Azad University, Tehran Science and Research, Faculty of Energy and Environment, Tehran, IRAN

Evaluating the impact recovering gray wolves (*Canis lupus*) may have on coyote (*Canis latrans*) and whitetail deer (*Odocoileus virginianus*) populations in northeast Wisconsin

Erik R. Olson and Ronald N. Schultz – Department of Natural Resources, Northland College, Ashland, WI, USA



Facultative scavenging of cattle by wolves

Tyler R. Petroelje – Ph.D. Candidate, Mississippi State University; Crystal Falls, MI, USA

Gray wolf (*Canis lupus*) movement patterns in Manitoba: implications for wolf management plans

Fiona Scurrah – Manitoba Hydro, Winnipeg, Manitoba, CANADA

Wolf Management

Status of wolves in Canada:**2013 provincial/territorial survey**

Dean Cluff – Environment and Natural Resources, Government of the Northwest Territories, Yellowknife, Northwest Territories, CANADA

Integrating big game and livestock management: new paradigm and practice for managing wolves in the mountain west

Timothy Kaminski – Mountain Livestock Cooperative, Longview, Alberta, CANADA

Wolves in Oregon

Robert Klavins – Oregon Wild, Portland, OR, USA

Wolf-livestock conflict assessment and action plan forward for the 21st century.

Kyran Kunkle – Conservation Science Collaborative and Wildlife Biology Program, Gallatin Gateway, MT, USA

Challenging a deadly paradigm: a look at the influence of value perceptions and the North American Model on wolf management in western Canada

Victoria M. Lukasik – Ph.D. Candidate, Department of Geography, University of Calgary, Calgary, Alberta, CANADA

The practice of wolf control to protect livestock and halt decline of wild prey in Canada

Marco Musiani, – Faculties of Environmental Design and Veterinary Medicine, University of Calgary, Calgary, Alberta, CANADA

Iberian wolf howls: insights into their biological function and potential usefulness for monitoring wild populations

Vicente Palacios – Instituto Cavanilles de Biodiversidad y Biología Evolutiva, Universidad de Valencia, Valencia, SPAIN

Predicting abundance of gray wolves in Montana using hunter observations and field monitoring

Kevin Podruzny – Wildlife Biometrician, Montana Department of Fish, Wildlife and Parks, Helena, MT, USA

Reservation wolves and border wolves: embracing cooperative wolf management and buffer zones

Jason D. Sanders and Erik R. Olson – University of Wisconsin School of Law, Madison, WI, USA and Assistant Professor of Natural Resources, Northland College, Ashland, WI, USA

Social perception of the Mexican gray wolf (*Canis lupus baileyi*) in areas chosen for reintroduction in the Sierra Madre Occidental, Mexico

Jorge Servin and Dora Carreon – Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico City, MEXICO and Universidad Autónoma Metropolitana Unidad Iztapalapa, Mexico City, MEXICO

The Idaho Wood River Project: resolving wolf and livestock conflicts with nonlethal methods using a community stakeholder model

Suzanne Asha Stone – The Idaho Wood River Project and Defenders of Wildlife, Boise, ID, USA

Wolf hunting in Michigan and the North American Model

John A. Vucetich – School of Forest Resources and Environmental Sciences, Michigan Technological University, Houghton, MI, USA

Wolf Recovery

Lessons from wolf restoration in the northwestern U.S.

Ed Bangs – Wolf Recovery Coordinator (retired), U.S. Fish and Wildlife Service, Helena, MT, USA

Causes of mortality in endangered red wolves (*Canis rufus*): lessons in recovery and management

Becky Bartel – Assistant Coordinator, Red Wolf Recovery Program, U.S. Fish and Wildlife Service, Manteo, NC, USA

What does the USFWS proposal to remove wolves from the ESA mean for wolves in the Pacific Northwest?

Hilary Cooley – Pacific Region Wolf Coordinator, U.S. Fish and Wildlife Service, Boise, ID, USA



Efficacy of initial releases and translocations of Mexican wolves

Maggie Dwire – Mexican Wolf Recovery Program, U.S. Fish and Wildlife Service, Albuquerque, NM, USA

Recent trend of public attitude on wolf restoration in Japan

Narumi Nambu – Japan Wolf Association, Tama City, Tokyo, JAPAN

Reintroducing wolves: a chance for dingoes too?

Thomas M. Newsome – Fulbright postdoctoral scholar, Oregon State University, Corvallis, OR, USA

Eastern wolf (*Canis lycaon*) dispersal from Algonquin Provincial Park, Ontario: implications for population expansion in surrounding areas

Brent R. Patterson – Ontario Ministry of Natural Resources and Trent University, Peterborough, Ontario, CANADA

Applied adaptive management in the recovery of red wolves (*Canis rufus*): successful use of sterilized coyote (*Canis latrans*) placeholders

David R. Rabon – Red Wolf Recovery Program Coordinator, U.S. Fish and Wildlife Service, Manteo, NC, USA

Wolf recovery in California

Lauren Richie – Associate Director, California Wolf Center, San Francisco, CA, USA

Cross-fostering in gray wolves (*Canis lupus*)

Inger Scharis – Wildlife biologist and writer, Skarblacka, SWEDEN

West coast wolves: Can things be different here?

Amaroq Weiss – West Coast Wolf Organizer, Center for Biological Diversity, Petaluma, CA, USA

Gray wolves in Wisconsin: from extirpation to game species

Adrian P. Wydeven – Forest Wildlife Specialist, Wisconsin Department of Natural Resources, Ashland, WI, USA

Wolf-Human Interactions

Analysis of wolf-human conflicts in Turkey: encounters, depredation and preventive measures

Huseyin Ambarli – Wildlife Researcher, Middle East Technical University, Ankara, TURKEY

Thompson, Manitoba: creating tolerance and respect for wolves through education and eco-tourism

Volker Beckmann – Project Coordinator, Spirit Way, Inc., Thompson, Manitoba, CANADA

Using critical discourse analysis to identify implicit and explicit stakeholder perceptions of wolves

Jessica Bell – Ph.D. Candidate, Department of Sociology, Michigan State University, East Lansing, MI, USA

Rough riders to wolf riders: politics trumps science in the battle to delist the Northern Rocky Mountain wolf

Rebecca A. Convery – University of Florida, Levin College of Law, Dunnellon, FL, USA

Boreal wolf-prey interactions: evaluating and mitigating the effects of human activities

Philip D. DeWitt – Research Ecologist, Matrix Solutions, Inc., Edmonton, Alberta, CANADA

Wyoming wolves in the news: how media coverage helps or hinders conflict resolution

Lydia A. Dixon – Ph.D. Candidate, University of Colorado, Boulder, CO, USA

The role of private-public partnerships in reducing wolf-human conflict

Erin Hunt – Program Manager, Mexican Wolf Fund, Julian, CA, USA

When wolves move near human settlements?

Ilpo Kojola – Large Carnivore Research, Finnish Game and Fisheries Research Institute, Oulu, FINLAND

Wolves killing dogs: influenced by ungulate prey density?

Ilpo Kojola – Large Carnivore Research, Finnish Game and Fisheries Research Institute, Oulu, FINLAND

Understanding the ecology of human-wolf conflict in winter pastures of semi-arid ecosystems of Georgia

Bejan Lortkipanidze – Conservation and Research Coordinator, Center for Biodiversity Conservation and Research, Tbilisi, GEORGIA

Wolves, livestock, and livelihoods: seeking solutions to conflict in the arid steppes of Mongolia

James D. Murdoch – Assistant Professor, Wildlife and Fisheries Biology Program, Rubenstein School of Environment and Natural Resources, Burlington, VT, USA



Use of various types of crossing structures on highways by wolves in Poland

Robert W. Myslajek – Vice President,
Association for Nature “Wolf”, Lipowa, POLAND

Implications of the sociopolitical conflict over wolves

Erik R. Olson – Department of Natural Resources,
Northland College, Ashland, WI, USA

Importance of recruitment to accurately predict the impacts of human-caused mortality on wolf populations

Robert A. Ream – Montana Fish, Wildlife and Parks
Commission, Chair (retired), Helena, MT, USA

Wolf predation on overwintering livestock in the semi-arid Vashlovani National Park, Georgia

Irakli Shavgulidze – NACRES, Center for Biodiversity
Conservation and Research, Tbilisi
REPUBLIC OF GEORGIA

Ojibwe relations with brother Ma’iingan (wolf): an overview of the traditional relationship and contemporary stewardship

Kekek Jason Stark and Peter David –
Great Lakes Indian Fish and Wildlife Commission,
Odanah, WI, USA

Longitudinal change in human attitudes and behavior toward wolves

Adrian Treves – Associate Professor of
Environmental Studies, University of
Wisconsin-Madison, Madison, WI, USA

Enemy of the shepherd, wolf in dog’s clothing?: wolf as deity, devil, menace, mistreated

Renee Worringer – Professor of Islamic/
Middle East History, University of Guelph,
Guelph, Ontario, CANADA

Behavioral response of wolves to roads: scale-dependent ambivalence

Barbara Zimmermann – Lecturer and Scientist,
Faculty of Applied Ecology and Agricultural Sciences,
Hedmark University College, Kopang, NORWAY

Wolves and Environmental Education**Mexican wolf (*Canis lupus baileyi* – Nelson & Goldman, 1949) reintroduction program: a view from the education standpoint**

Miguel Armella – Department of Biology,
Autonomous Metropolitana University,
Iztapalapa, Mexico City, MEXICO

Strategies in history and education taken meet the challenges of wolf protection and management?

Karlyn Atkinson Berg – Wolf/Predator Consultant,
Director for the Wildlife Program and Design,
Bovey, MN, USA

A captive Minnesota gray wolf population provides a unique and high impact undergraduate research opportunity for two-year community college students

Jennifer Braido and Paula Croonquist –
Biology Faculty, Anoka-Ramsey Community College,
Coon Rapids, MN, USA

Ma’iingan and the Anishinaabeg

Reyna Crow – Northwoods Wolf Alliance and
organizer for Idle No More, Duluth, MN, USA

The wolf and the general public

Ron DeArmond – CEO of Pella Wildlife Company
and member of the IUCN Commission on Education
and Communication, Des Moines, IA, USA

Controversial issues in the classroom

Jess Edberg – Information Services Director,
International Wolf Center, Ely, MN, USA

Message received: effective techniques for delivering clear and memorable presentations

Dorothy F. McLeer – Program Coordinator/
Interpretive Naturalist, Dearborn Environmental
Interpretive Center, University of Michigan,
Dearborn, MI, USA

Project WOLFF and Project Wild Wise, co-existing with carnivores: a contrast in middle school carnivore awareness classroom projects on the west and east side of Washington state

Lorna Smith and Darrell Smith – Western Wildlife
Outreach, Port Townsend, Washington, USA

The challenge of connecting local people to red wolf restoration

Kim Wheeler – Executive Director,
Red Wolf Coalition, Columbia, NC, USA

Wolf Interactions With Other Carnivores**Inter-specific territoriality in a *Canis* hybrid zone: spatial segregation between wolves, coyotes, and hybrids**

John F. Benson – Environmental Life and Sciences
Graduate Program, Trent University, Peterborough,
Ontario, CANADA



Survey of attitudes toward, conflicts with, and management of wolves and bears in rural villages in Armenia

Serda Ozbenian – Executive Director, Armenian Environmental Network, Takoma Park, MD, USA

Contrasts in the languages of wolves and black bears

Lynn Rogers and Susan A. Mansfield – Wildlife Research Institute, Ely, MN, USA

Relations between wolves and black bears

Lynn Rogers and Susan A. Mansfield – Wildlife Research Institute, Ely, MN, USA

Genetic and morphological differentiation of wolves and coyotes in northeastern Ontario

Tyler Wheeldon – Trent University, Peterborough, Ontario, CANADA

Wolves in Eurasia

Where wild prey do not exist anymore: a summary of wolf research in agricultural habitats in Spain

Juan Carlos Blanco – Wolf Project CBC, Madrid, SPAIN

Challenges and opportunities for wolf conservation in Europe

Luigi Boitani – Co-chair, IUCN Wolf Specialist Group; Chair, Large Carnivore Initiative for Europe; University of Rome, Rome, ITALY

Challenges in management of wolves in Croatia 17 years after protection

Djuro Huber and Josip Kusak – Department of Biology, Veterinary Faculty, University of Zagreb, Zagreb, CROATIA

Status of wolves in India

Yadvendra V. Jhala – Wildlife Institute of India, Dehra dun, INDIA

Selective harvest to improve the genetic status of a wolf population

Olof Liberg - Grimsö Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences, Riddarhyttan, SWEDEN

Wolf recovery, zoning and management challenges on the Scandinavian Peninsula

Petter Wabakken – Faculty of Applied Ecology and Agricultural Sciences, Hedmark University, Koppang, NORWAY

Wolves Worldwide

Wolves of Turkey and Central Asia: a snapshot of human-wolf interactions and a call for action to boost research on wolves

Özgün Emre Can – WildCRU, Department of Zoology, University of Oxford, Oxford, UK

Wolf recovery and conflicts in Scandinavia: a legal perspective

Yaffa Epstein – Department of Law, Uppsala University, Uppsala, SWEDEN

If you wander, they will eat you: conflicting knowledge, environmental justice, and wolf attacks in central Asia

Adam Perou Hermans – Environmental Studies, University of Colorado, Boulder, CO, USA

Population status and distribution of Indian wolf (*Canis lupus pallipes*) in Uttar Pradesh, India

Satish Kumar – Department of Wildlife Sciences, Aligarh Muslim University, Aligarh, Uttar Pradesh, INDIA

Ecology and genetics of wolves recovering western Poland

Sabina Nowak – Association for Nature “Wolf”, Lipowa, POLAND



Oral Presentations (alphabetical by presenter)

Analysis of wolf-human conflicts in Turkey: encounters, depredation and preventive measures

Ambarli, Hüseyin

*Department of Biology, No: 105, Middle East Technical University, 06800 Ankara, Turkey
(huseyinambarli@gmail.com)*

Bio: Dr. Hüseyin Ambarli is a wildlife researcher who has been doing research mainly on wild carnivores and threatened ungulate species since 2003. Additionally, he has been conducting surveys to understand people's perceptions and attitudes toward carnivore species. Recently, Dr. Ambarli has been studying the reintroduction of the threatened Anatolian fallow deer.

Abstract: The wolf is one of the widespread and conflict-causing carnivore species in Turkey, but studies on its ecology are very limited. To reveal the consequences of wolf-human conflict in Turkey, I compiled data about 139 incidents from the archive of national media from May 2004 to April 2013. 69% of the all incidents occurred in Eastern and Central Anatolia, representing the main distribution of wolves in Turkey. 44% of all incidents (n=61) occurred as depredation on sheep and goats, mostly (70%) in autumn, whereas depredation on cattle was rare at 8%. On the other hand, 407 small livestock were wounded and 2,206 were killed either in stables or sheepfolds by wolves. Shepherds usually accompanied sheep with mixed breeds of livestock guarding-dogs (LGD) and rifles as protective measures. 22% of the incidents (n=31) resulted in attacks to humans that caused 8 deaths and 46 injured people. Some of the injuries were severe. In the last decade the attacks occurred mainly in spring and autumn. At least 15 of them were rabid wolf cases. Locals killed wolves usually during the close encounters, and 17% of incidents (n=23) were unprovoked attacks to wolves by either LGDs or humans to kill or frighten them. To reduce damage, depredation on livestock can be prevented by electric fences around corrals and increasing the number of LGDs, particularly Kangal/Akbas breeds. Recently, small livestock were insured against wildlife damage, but detailed field and human-dimension studies are needed to understand wolf ecology and human attitudes in Turkey.

Mexican wolf (*Canis lupus baileyi* – Nelson & Goldman 1949) reintroduction program: a view from the education standpoint

Armella, Miguel A., Maria Asunción Soto, Maria de Lourdes Yáñez, L. Carmen Vázquez, Xochitl Ramos

*Department of Biology, Autonomous Metropolitana University, Iztapalapa, Mexico City, Mexico
(maa@xanum.uam.mx)*

Bio: Miguel A. Armella is a Mexican scientist who got his Ph.D. at the University of Arkansas, USA, in 1990 in Animal Behavior. Since he got back to his native Mexico, he has been working with Behavior and Physiology. He has directed over 20 students on their masters and doctoral theses on this subject.

Abstract: For several decades the Mexican Wolf Recovery Team has made different attempts to reintroduce specimens to the wild. It faced several problems, but finally in October 2011 a group of five wolves was reintroduced in the northern state of Sonora with poor results. Another attempt was made at the end of 2012. Up to now at least one wolf is still alive. In this paper we review the general process, not only from the historical perspective but also from the educational viewpoint. We consider that poor environmental education both with the general public and with interested people is one of the main causes of these fracases. Based on these results as well as on our own surveys, we started to produce new educational materials for young and adult, and to develop a new strategy to educate the people near the release sites and the public in general. This includes production of several educational videos. This strategy is based on age as well as situation (rural vs urban). Results from experiments suggest that visual as well as participative actions are the best way for a young audience to retain the knowledge. We also present some videos to help zoos educate people about wolves and to help understand the real situation of Mexican wolves in Mexico.



Lessons from wolf restoration in the northwestern U.S.

Bangs, Ed, Mike Jimenez (USFWS); Doug Smith (NPS); John Steuber (USDA WS); Justin Gude (MT FWP); Jon Rachael (ID FG); Ken Mills (WY GF); Russ Morgan (OR DNR); Harriet Allen (WA DNR); Curt Mack (Nez Perce Tribe)

Wolf Recovery Coordinator (Retired), U.S. Fish and Wildlife Service, 1124 9th Ave. Helena, MT 59601 (edward100@bresnan.net)

Bio: Ed Bangs was the U.S. Fish and Wildlife Service’s Gray Wolf Recovery Coordinator for the northwestern U.S. from 1988 until his retirement in June 2011. He received a B.S. degree in game management from Utah State University in 1974 and his M.S. in wildlife management from University of Nevada, Reno in 1979. From 1975 until 1988 he worked on a wide variety of wildlife programs and was an instructor for gun, hunter, and bear safety. He was a master instructor for the national bowhunter education program. Ed was involved with the recovery and management of wolves in Montana, Idaho, and Wyoming beginning in 1988 and led the interagency program to reintroduce wolves to Yellowstone National Park and central Idaho in the mid-1990s. He had opportunities to examine wolf/human relationships in many other parts of the world, including Mongolia, Sweden, England, Japan, Italy, and Spain.

Abstract: Gray wolf (*Canis lupus*) populations were deliberately eliminated from nearly all of their historical range in the contiguous United States by 1930. Naturally dispersing wolves from Canada first denned in Montana in 1986. An intense period of scientific research, public outreach, and politics followed and resulted in wolves from western Canada being reintroduced to central Idaho and Yellowstone National Park, Wyoming in 1995 and 1996. The population grew rapidly, and at least 1,700 wolves now live in the Northern Rocky Mountains (NRM): Montana, Idaho, Wyoming, and parts of eastern Oregon and Washington. The population has been biologically recovered since December 2003 when at least 663 wolves were present, but removal of federal protections was delayed for several years. Packs now occupy mountainous forested habitat in over 130,000 square miles of the NRM. Wolf restoration resulted in both benefits (public viewing, harvest opportunities and restoration of ecological processes) and costs (agency funding, livestock and pet depredation, and competition with big game hunters). Federal, state, and tribal cooperators tried a wide variety of deterrents, relocated wolves 117 times, and killed over 1,886 to reduce livestock conflicts. Wolf predation, in combination with other factors, reduced some elk, deer, and moose populations, thereby reducing the allowable harvest by human big-game hunters. Starting in 2009, states began to implement public harvest programs to provide hunter/trapper opportunity, reduce conflict, and meet other objectives. By 2012, up to one third of the minimum wolf population was legally killed by humans and as intended, it may have finally decreased. The NRM wolf population is now being managed similarly to other resident wildlife by the affected states and Native American Tribes. While the NRM wolf population is biologically healthy, controversy continues as legal, policy, political and human value issues continue to be debated symbolically through wolves. We discuss the history, science, and politics behind restoring wolves to the NRM and possible implications to future wolf restoration efforts.



How hot is too hot? Live-trapped gray wolf rectal temperatures related to survival

Barber-Meyer, Shannon and L. David Mech

Northern Prairie Wildlife Research Center, USGS Wolf and Deer Project, 1393 Highway 169, Ely, MN 55731 (sbarber-meyer@usgs.gov)

Bio: Dr. Shannon Barber-Meyer is the U.S. Geological Survey wildlife biologist implementing the Superior National Forest Wolf and Deer Project under the direction of Dr. L. David Mech. Prior to joining the USGS Northern Prairie Wildlife Research Center, she taught graduate students in Grand Teton National Park, researched tiger conservation in Asia, emperor penguin populations in Antarctica and elk calf mortality in Yellowstone National Park. She helped reintroduce Mexican gray wolves into the Southwest.

Abstract: Average ambient summer temperatures have recently increased in northeastern Minnesota and are generally expected to continue to do so. Because physically and chemically immobilized animals have reduced options and ability to thermoregulate, we were concerned about the potential non-immediate lethal implications to overheated live-trapped gray wolves (*Canis lupus*) in our research operations. Therefore, we analyzed rectal temperatures related to survival 1 year post-capture from over 200 wolves captured in foot-hold traps for radio collaring purposes during May-August 1998-2011. We used logistic regression to determine that the maximum observed wolf rectal temperature (°F) during capture (mean=103.6, SD=2.1, min=95.9, max=108+) was not a significant predictor of survival to 1 year post-capture although higher temperatures may negatively influence survival. We also present cases of wolves surviving rectal temperatures that we previously considered likely lethal. As climate change continues, mitigating overheating in immobilized wolves will become more important. To that end we discuss ways to reduce live-trapped wolf rectal temperatures.

Mexican wolf reintroduction update

Barrett, Sherry, John K. Oakleaf, Maggie Dwire, Elizabeth A. Jozwiak, Tracy Melbiness

U.S. Fish and Wildlife Service, 2105 Osuna NE, Albuquerque, NM, 87113 (Sherry_Barrett@fws.gov)

Bio: Sherry Barrett spent 9 years working as a Biologist for the Bureau of Reclamation in Phoenix, Arizona, before joining the U. S. Fish and Wildlife Service in 1990. Sherry subsequently worked for the Fish and Wildlife Service in Reno, Nevada; Carlsbad, California; and Tucson, Arizona. Her work has focused on endangered species conservation issues including multi-species, landscape-level habitat conservation plans focused on the desert tortoise in Clark County, Nevada; the California gnatcatcher in San Diego County, California; and the cactus ferruginous pygmy-owl in Pima County, Arizona. In December 2010, Sherry moved to Albuquerque, New Mexico, where she is now the Mexican Wolf Recovery Coordinator. Sherry received her Bachelor of Science Degree in Biology at Northern Arizona University and her Master of Science degree in Zoology at Arizona State University.

Abstract: We will report the progress of field efforts from 1998-2012 to reestablish Mexican wolves (*Canis lupus baileyi*) into the Blue Range Wolf Reintroduction Area (BRWRA). The reintroduction area encompasses approximately 6850 mi² (17,740 km²) of the Apache-Sitgreaves National Forests in east-central Arizona and the Gila National Forest in west-central New Mexico. In 2000, the White Mountain Apache Tribe agreed to allow free-ranging wolves to inhabit the Fort Apache Indian Reservation, which added 2,440 mi² (6,320 km²) of area to the western edge of the BRWRA. The primary goal of this reintroduction effort is to restore a viable, self-sustaining population of at least 100 wild Mexican wolves distributed across the BRWRA. In January 1998, the first Mexican wolves were released from captivity into Arizona. By the end of 1998, we counted only 4 wolves remaining in the wild. From these humble beginnings, the population has grown to a minimum population of 75 wolves in 14 groups inhabiting areas of Arizona and New Mexico. Further, over 95% of the BRWRA population is wild-born. However, several changes in the reintroduction program may increase the ultimate success of Mexican wolves in the area.



Causes of mortality in endangered red wolves (*Canis rufus*): lessons in recovery and management

Bartel, Becky, David. R. Rabon, Jr., Art Beyer

Red Wolf Recovery Program, U.S. Fish and Wildlife Service, PO Box 1969, Manteo, NC 27954
(rebecca_bartel@fws.gov)

Bio: Dr. Becky Bartel is the Assistant Coordinator of the U.S. Fish and Wildlife Service's Red Wolf Recovery Program. Dr. Bartel's research interests include assessing species interactions and community dynamics and patterns in a conservation-driven framework. Her previous work evaluated long-term population trends of carnivores and small mammal communities, predator-prey relationships dynamics, and population viability analyses of multiple endangered species.

Abstract: Effective recovery of endangered species is reliant on the identification of threats that cause population declines. Recent high levels of mortality in the reintroduced population of endangered red wolves (*Canis rufus*) in northeastern North Carolina have far-reaching effects on recovery efforts. These losses can disrupt population dynamics, reduce the number of breeding animals/pairs, and can increase opportunities for hybridization between red wolves and coyotes (*Canis latrans*). Examining 25 years of data, we identified causes of observed mortality for 367 wild red wolves, and included suspected illegal activities, involving gunshot, poisoning, and other suspected illegal take; vehicle collisions; health-related causes; intraspecific competition; private trapping; and, unknown causes. Sixty percent of all observed mortalities during this period were human-caused and potentially avoidable. We also assessed trends of mortality over time. From 1987-2012, an average of 14 mortalities was observed/year; with more recent years (2000-2012) seeing a 38% increase in annual mortalities. Given the current wild population estimates of approximately 100-120 red wolves, these mortality rates are alarming. Additionally, we observed trends related to causes of mortality changing over time, with increasing levels of human-caused mortality in recent years, specifically by gunshot. While 14 cases of gunshot mortality were observed from 1988-1999, there were 70 detected gunshot mortalities from 2000-2012. These trends illustrate an immediate need to find solutions to avoid and manage the unnecessary and unnatural losses of red wolves.

Thompson, Manitoba: creating tolerance and respect for wolves through education and eco-tourism

Beckmann, Volker and Marion Morberg

Spirit Way, Inc. (vbeckmann@mymts.net); (www.thompsonspiritway.ca)

Bio: Volker Beckmann is a freelance graphic designer and marketing consultant who has been running his own business called Design North for over 40 years. He was born in Germany and lived in South Africa but spent most of his life in Thompson, Manitoba. Thompson is a small city of 15,000 people in the wilderness of northern Canada. Volker has received numerous design awards professionally and personally for community volunteer service. Volker and his wife Marsha have been married for 42 years. They are passionate downhill ski instructors who have skied all over the world. Volker is the volunteer Project Coordinator for Spirit Way, Inc., a non-profit community organization that has raised over \$1.7 for community attractions including nearly \$1 million for numerous wolf initiatives including the largest lighted mural in the world. The various wolf projects will be explained in more detail during the Symposium. For more information, please visit the web site at www.thompsonspiritway.ca.

Abstract: Creating human tolerance for wolves is no easy task. Overcoming fear, misinformation and stories handed down through generations is a monumental task in trying to change public attitudes toward any predator. How can we create understanding for the important role wolves play in a balanced environment? What can we do to help the public appreciate and benefit from the value that wolves bring to our region and forests? When a small group of volunteers set out to answer these questions in one of Manitoba's most northern communities, little did they realize the impact they would make in changing public attitudes toward wolves and ushering in new opportunities for education and eco-tourism. In less than 10 years, they organized their efforts as Spirit Way, Inc., a non-profit organization that has raised almost \$1 million to transform the city of Thompson into one of the most wolf-friendly communities on earth.

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The results of their work have inspired people around the world, often intrigued by their 10-story mural of a wolf watching over the city; nearly 50 wolf statues spanning a distance of 1,000 miles; “Wolves Without Borders” partnerships with schools in the United States and Canada; and significant efforts to support wolf education, research and discovery through the University of Manitoba and Spirit Way’s “Wolves and Carnivores Conference” that attracted leading wolf biologists and wildlife managers to Thompson. Discover the journey that Spirit Way volunteers have taken – and where they are heading in the years ahead – to realize the ecological and economic asset that wild wolves bring to northern Manitoba’s boreal forests and communities.

Using critical discourse analysis to identify implicit and explicit stakeholder perceptions of wolves

Bell, Jessica,

*Department of Sociology, 6E Berkey Hall, Michigan State University, East Lansing, MI 48824
(belljes2@msu.edu)*

Bio: Jessica Bell is a Ph.D. student in Sociology, Animal Studies, and Environmental Science and Policy at Michigan State University. She received her Bachelor of Science in Human Development and her Master of Arts in Psychology from Northwestern University, and developed her interest in interdisciplinary work at the University of Chicago Social Neuroscience Laboratory, where she conducted research at the biological, psychological, and sociological levels of analysis. Her current research interests include the sociopolitical dynamics of wolf reintroduction, conservation criminology and zoological crime, and the ways in which visual and discursive representations of wildlife affect conservation. She is currently working on a book chapter that examines hunter and cattlemen discourse on American wolves; this chapter is part of an edited international volume on wolf-human interactions that will be published by the University of Goettingen Press (Goettingen, Germany) in late 2013.

Abstract: Recent work on the human dimensions of wildlife has documented the ways in which discourse shapes and maintains social representations of wildlife (e.g., Miller 2005). Although there has been much research on public attitudes towards wolves, there has been little in-depth work on how discourse (particularly online discourse) reveals and contributes to perceptions of wolves. Critical Discourse Analysis or CDA (Fairclough 1989) is a theoretical and methodological tool for examining how language reflects ideological assumptions. I discuss how CDA illuminates how representations of wolves a) reflect religious and political ideologies, b) derive from implicit assumptions about the relationship between humankind and nature, and c) perpetuate opposition to wolf reintroduction. Based on my analysis of discourse on wolves in hunter and cattlemen online trade journals and discussion boards, I document how the dominant discourse in these forums clusters around three themes: hierarchy, intrusion, and the anthropomorphism of nature. Wolves threaten an anthropocentric, hierarchical vision of nature and symbolize derided human groups that are seen as intruding upon traditional values and ways of life. Human benchmarks of ethics are anthropomorphically superimposed on the behavior of wolves, leading to the image of wolves as “inhumane” predators. I argue that this discourse reveals that wolves implicitly threaten traditional views of the social structure of the United States and of the human-animal boundary. I discuss how the integration of CDA into stakeholder research can yield both a better understanding of the resilience of the wolf controversy and the design of more effective wolf conservation initiatives.



Inter-specific territoriality in a *Canis* hybrid zone: spatial segregation between wolves, coyotes, and hybrids

Benson, John F.

Environmental and Life Sciences Graduate Program, Trent University, Peterborough, Ontario, K9J 7B8, Canada, (benson.johnf@gmail.com)

Bio: John Benson studied wolf-coyote hybridization dynamics in and adjacent to Algonquin Provincial Park in Ontario, Canada for his Ph.D. research at Trent University. John is currently a wildlife biologist with Alaska Fish and Game studying predator-prey interactions between wolves, bears, and moose.

Abstract: Gray wolves (*Canis lupus*) and coyotes (*Canis latrans*) generally exhibit intraspecific territoriality manifesting in spatial segregation between adjacent packs. However, previous studies have found a high degree of interspecific spatial overlap between sympatric wolves and coyotes. Eastern wolves (*C. lycaon*) are the most common wolf in and around Algonquin Provincial Park (APP), Ontario, Canada and hybridize with sympatric gray wolves and coyotes. We hypothesized that all *Canis* types (wolves, coyotes, and hybrids) exhibit a high degree of spatial segregation due to greater genetic, morphologic, and ecological similarities between wolves and coyotes in this hybrid system compared with western North American ecosystems. We used GPS telemetry and probabilistic measures of spatial overlap to investigate spatial segregation between adjacent *Canis* packs. Our hypothesis was supported as: 1) the probability of locating wolves, coyotes, and hybrids within home ranges ($\alpha = 0.05$) or core areas ($\alpha < 0.01$) of adjacent packs was low, and 2) the amount of shared space use was negligible. Spatial segregation did not vary substantially in relation to genotypes of adjacent packs or local environmental conditions (i.e. harvest regulations or road densities). We provide the first telemetry-based demonstration of spatial segregation between wolves and coyotes, highlighting the novel relationships between *Canis* types in the Ontario hybrid zone relative to areas where wolves and coyotes are reproductively isolated. Territoriality among *Canis* may increase the likelihood of eastern wolves joining coyote and hybrid packs, facilitate hybridization, and could play a role in limiting expansion of the genetically distinct APP eastern wolf population.

Strategies in history and education taken meet the challenges of wolf protection and management?

Berg, Karlyn Atkinson

Wolf/Predator Conservation Consultant, 44781 Bittner's Point Road, Bovey, MN (karlyn.atkinson.berg@wildblue.net)

Bio: Karlyn Atkinson Berg has lectured about the wolf throughout the United States for over 42 years, and she studied and worked with live wolves for 27 years. Karlyn has helped design education programs, education materials and wolf exhibits in the effort of wolf conservation. She has been a designer and consultant on many film and wolf projects including the acclaimed "Wolves & Humans" exhibit for the Science Museum of Minnesota that is now housed at the International Wolf Center. Karlyn has served as a wolf/predator consultant to many national environmental and wildlife groups. As a wolf advocate, she has served on several state wolf stakeholder groups, monitors wolf issues and continues to do wolf programs. Karlyn is the Director for the Wildlife Education Program and Design and has lived in northern Minnesota wolf country for the last 40 years.

Abstract: This presentation will review the history of human and wolf relationships, and the efforts to recover and coexist with the wolf. I will examine the resurgence of negative attitudes, and why these attitudes have persisted. Why do antiquated perspectives still shape management convictions and fuel the efforts to return to extensive lethal wolf control? Can understanding the historic source of these negative ideas help change these negative sentiments and influence ecologically sound wolf legislation and management? The subsequent discussion will try to evaluate what we may have learned from the past strategies used, how these strategies may need to be adjusted to effectively maintain wolf recovery and examine the new challenges. Questions raised will include: what have been the successes and failures of the pro-wolf efforts and what are the results and future of education efforts and litigation? Questions considered will scrutinize the basis of management plans and does hunting as a "tool" reduce conflicts? Have wolf plans been driven by pressures from special interest groups, designed by legislators, or founded in science and ecology or in accordance with the public trust doctrine? The presentation will consider the challenges for humans to coexist and protect a predator species.



Where wild prey do not exist anymore: a summary of wolf research in agricultural habitats in Spain

Blanco, Juan Carlos and Yolanda Cortés

Wolf Project, CBC, C/ Manuela Malasana 24, 28004 Madrid, Spain (jc.blanco2503@gmail.com)

Bio: Juan Carlos Blanco coordinated the first wolf survey in Spain in 1988, and since then, he has been studying wolves and working on their conservation. He has studied the ecology of wolves in agricultural areas, and from 1999 to 2011 he prepared and coordinated the National Strategy on Wolves in Spain with the Ministry of the Environment. He is a Biologist with a Ph.D. in Animal Ecology.

Abstract: Wolves are usually associated with undisturbed areas and the presence of wild ungulates, their main type of prey across much of their range. But in many areas of southern Europe and likely of southern and central Asia, wolves live in habitats where large ungulates have been depleted. We present a summary of a study conducted in agricultural areas of Spain for more than 10 years. The diet of wolves is composed mainly of carrion of livestock which died of natural causes and are abandoned in the field by shepherds. Wolves live in packs which maintain territories of a few hundred square kilometers. We present data on wolf movements, social structure, dispersal, pack formation and mortality. In general, our results are very similar to those obtained in less modified habitats, except for the dispersal distance, which was much shorter than in other studies. In Spain, wolf population dynamics depends on human tolerance, which in general is related to damage to livestock. They in turn are influenced by husbandry methods. These results can help people understand the ecology and behaviour of other wolf populations living in habitats where natural prey are absent or very scarce, and the lack of natural food is compensated by the availability of livestock carcasses.

Challenges and opportunities for wolf conservation in Europe

Boitani, Luigi

Department of Biology and Biotechnologies, University of Rome, Viale Universita 32, 00185 Roma (luigi.boitani@uniroma1.it)

Bio: Professor Luigi Boitani is co-chair of the IUCN Wolf Specialist Group and chair of the Large Carnivore Initiative for Europe, a 40-member group of experts from all European countries. He is Professor of Animal Ecology and Conservation Biology at the University of Rome. He has been working on wolves for more than 40 years.

Abstract: Wolves, as other large carnivore species (bear, lynx and wolverine), in Europe are increasing in number and distribution areas, and are often in close contact with human activities. Few small and isolated populations still occur in a few countries. The positive trends have been favored by the general abandonment of marginal agriculture and widespread increase of wild prey such as deer and wild boar. I will present the most recent data on wolf numbers and ranges for all European countries as well as a summary of the recent improvements toward management at population level instead of at country level. The overall goal set by the Large Carnivore Initiative for Europe (an IUCN/SSC Specialist Group) is “to maintain and restore, in coexistence with people, viable populations of large carnivores as an integral part of the ecosystems and landscapes across Europe.” This implies extensive coexistence with human activities. Throughout most of Europe, the coexistence of wolves and humans (inside and outside protected areas) is already fairly common and it is encouraged by setting clear management goals and through the implementation of effective means to prevent and mitigate the conflicts. However, coexistence with human activities also implies acceptance that wolves may not be allowed to express the full range of their ecological roles as human intervention may be necessary to control the natural ecological patterns toward socially and economically acceptable compromises.



Gene flow in a Polish population of wolves in relation to their genetic structuring and habitat connectivity

Borowik, Tomasz, S. D. Czarnomska, B. Jędrzejewska, M. Niedziałkowska, A. V. Stronen, M. Huck M, S. Nowak, R. W. Mysłajek, H. Okarma, M. Konopiński, W. Śmietana, W. Jędrzejewski

Mammal Research Institute, Polish Academy of Sciences, Waszkiewicza 1, 17-230 Białowieża, Poland (tborowik@zbs.bialowieza.pl)

Bio: Tomasz Borowik's main interest lies in population ecology and conservation biology of ungulates and large carnivores. He has been involved in the national census of wolves and lynx in Poland. At the same time, he is conducting a Ph.D. project on factors affecting the reproduction of red deer (*Cervus elaphus*) in three woodlands of northeastern Poland.

Abstract: Dispersal and gene flow in populations of highly mobile mammals, such as wolves, are often determined by the landscape structure and ecological connectivity. Previous studies on the genetic structure of Polish wolves revealed three major subpopulations: Carpathian Mountains in southern Poland, Roztocze in the southeast, and the Lowland in northeastern and western regions of the country. Spatial genetic differentiation based on microsatellite alleles and haplotype frequencies explicitly indicated the Carpathian subpopulation to be the most genetically isolated. Our study aimed at assessing the rates and directions of gene flow within and between these subpopulations. Results on current migration rate (BayesAss) showed relatively high self-recruitment within each of the identified subpopulations and low migration rates between them. Within the Carpathian and Roztocze subpopulations, we observed similar rates of gene flow in all directions. In the Lowland subpopulation, almost one-way dispersal was found; wolves predominantly dispersed from stable and dense populations in the woodlands of northeastern Poland to recently colonized (and still unsaturated) woodlands in western Poland and eastern Germany. Our findings are concordant with the previous studies, which indicated high habitat permeability within populations but weak connectivity between regions occupied by different subpopulations of wolves.

A captive Minnesota gray wolf population provides a unique and high-impact undergraduate research opportunity for two-year community college students

Braido, Jennifer and **Paula Croonquist**

Biology Faculty, Anoka-Ramsey Community College, 11200 Mississippi Boulevard NW, Coon Rapids, MN 55433 (Jennifer.Braido@anokaramsey.edu); Biology Faculty, Anoka-Ramsey Community College, 11200 Mississippi Boulevard NW, Coon Rapids, MN 55433 (Paula.Croonquist@anokaramsey.edu)

Bio: Jennifer Braido has been teaching at Anoka-Ramsey Community College (ARCC) for nine years. Braido's graduate work focused on the Teaching of Biological and General Sciences at the University of Illinois at Urbana-Champaign primarily centered on involving two-year college students in relevant and engaging practices inside and outside the classroom. During her tenure at ARCC, Braido has led the service-learning initiative by incorporating students in a variety of research-oriented projects with non-profit organizations including Three Rivers Park District, Linwood Township, and the Wildlife Science Center. Most recently, she was instrumental in the re-design of the ARCC Field Biology course to incorporate the Minnesota Master Naturalist Curriculum with the purpose of enabling students to learn about Minnesota's natural resources, empowering them to educate others, and providing them opportunities to do service-based conservation projects. Braido has combined her life-long commitment to service, passion for wolves, and connection with the Wildlife Science Center to develop an experience that provides students the ability to perform service while engaging in undergraduate research.

Bio: Paula Croonquist has been teaching at Anoka-Ramsey Community College for eight years. A molecular geneticist by training (Ph.D. in Molecular, Cellular, Developmental Biology and Genetics from the University of Minnesota, 2004) Croonquist's doctoral work focused on understanding the genetic basis of Multiple Myeloma, a hematological cancer. During her tenure at ARCC, Croonquist has led the undergraduate research initiative by developing an Independent Research Summer Program in partnership with the Genetics, Cell and Development Department and College of Biological Sciences at the University of Minnesota. Most recently, her major interest and effort has been introducing novel research projects within course curricula to engage community college students in high-impact undergraduate research.

Abstract: Our project seeks to develop an undergraduate research opportunity for Anoka-Ramsey Community College students to acquire relevant field and laboratory research skills in an innovative

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hands-on learning experience supported by the National Science Foundation-funded Community College Undergraduate Research Initiative (CCURI). During this experience, Field Biology students will work with a population of captive gray wolves at our partnering non-profit organization, the Wildlife Science Center, to acquire field research skills while capturing and handling these live gray wolves and performing physical examinations, administering vaccines, and collecting buccal cells, hair, scat, and blood samples. Collected specimens will be used by genetics and microbiology students to generate concrete data within the context of a novel research project, investigating the effects of mange in the lives of Minnesota gray wolves, that will hone their laboratory molecular genetics/genomics research techniques. Through their participation in a humane scientific study on a captive gray wolf population, ARCC students will learn multiple skills necessary for performing valuable, authentic research at the undergraduate level, thereby aiding the conservation effort of one of Minnesota's most prominent and captivating organisms. This early and unique learning experience will lay the foundation for their future academic and professional careers while simultaneously providing service in the form of data acquisition and analysis to our partnering non-profit organization. Students will directly benefit the scientific community by contributing to the body of knowledge generated for the conservation and management of Minnesota gray wolves, thus helping to ensure that this keystone species can continue to thrive in this state.

Contributions to science from captive wolves

Callahan, Peggy

*Executive Director, Wildlife Science Center, 5463 West Broadway, Columbus, MN 55025
(peggy@wildlifesciencecenter.org)*

Bio: Peggy Callahan, a native of Rochester, Minnesota, first became interested in canines through her family dogs who were her constant companions. Inspired by a reply to a letter she had sent to a wolf biologist asking for a job at age eight, Peggy earned a degree in Biology from Carleton College and began working for the "Wolf Project" in August 1985. For five years she managed the colony for research, focusing on refining chemical immobilization techniques for use in the field. In addition to her wolf time, Peggy also assisted with studies involving black bear, red fox, white-tailed deer and wolves in the field, including assisting with the Isle Royale wolf captures in 1989 and 1991. When federal funding for the Wolf Project ceased in 1991, the Wildlife Science Center was created by Peggy and other colleagues to keep the facility open. After three years of intensive building and program planning, the Wildlife Science Center opened its doors to the public as a non-profit education and research facility.

Abstract: Wolves are one of the most intensively studied mammals in Minnesota and beyond. Biologists have followed wolf packs, studied social behavior, predation, and a multitude of other topics. However, there have been questions that are not possible to answer in a free-ranging setting because of the difficulty controlling certain variables, thereby confounding the ability to draw scientific conclusions. Captive research offers the opportunity to control variables like age, gender, nutrition, and health. It offers opportunity to perform repetitions, within and among, allowing for larger sample sizes and better understanding of certain issues. For example, scientists have used captive wolves to study what are the most effective, efficient forms of anesthesia to use in a field setting. Reproductive strategies and annual patterns were well-established, thereby allowing efforts at captive breeding of endangered species to be more successful. Of course, captivity has offered a safe setting for the building of populations of poorly represented species and subspecies. Multiple pieces of equipment have been tested, and countless biologists trained by using captive wolves as learning tools. This resource continues to be valuable, as the efforts by biologists move from recovery to management of wolves in the wild.



Wolves of Turkey and Central Asia: a snapshot of human-wolf interactions and a call for action to boost research on wolves

Can, Özgün Emre

WildCRU, Department of Zoology, University of Oxford, Oxford OX1 2JD, UK (emre.can@zoo.ox.ac.uk)

Bio: Dr. Emre Can is a postdoctoral researcher at Wildlife Conservation Research Unit, Department of Zoology at the University of Oxford. He completed the first field-based studies on wolves in Turkey, and his efforts were instrumental in changing the legal status of wolves from pest species to game species in 2003. His current research focuses on human-wolf interaction in Central Asia and on Asiatic black bears, leopards and clouded leopards in the Nepalese Himalayas. Emre is a member of the council of the International Association for Bear Research and Management and a member of IUCN Wolf, Bear, Canid and Hyaena Specialist Groups.

Abstract: The wolf (*Canis lupus*) is probably the most persecuted species in North America and Europe. Although the species was not popular even among biologists until the mid-twentieth century, a quick search of current scientific literature databases produces more than five thousand published papers that are related to wolves. Our knowledge of wolves, however, is mostly based on studies completed in North America and Europe. There are few studies from Central Asia, and so information on human-wolf interactions in this region is very limited. The existing literature indicates that people's attitudes toward wolves in Central Asia are negative. However, indirect evidence concerning attitudes toward wolves from references to art, literature, social conventions, religion and values suggests that Central Asia may actually be the region where attitudes toward wolves have historically been more favorable than in any other area in the wolf's range. Human-wolf conflicts can occur where wolves live in proximity to humans or, from the wolves' perspective, where humans live in proximity to them. The contemporary negative perceptions of the wolf in Central Asia seem to be related with today's socio-economic situations rather than the persistence of negative beliefs, as is the case in Western culture. Conservation of wolves requires understanding wolves, as well as human populations, and Central Asia seems to be the region where future research efforts are needed most. This talk will provide a snapshot of human-wolf interactions in Turkey and Central Asia in the hope of being a call to action to boost wolf research in this region.

The historical relationship of wolf control, bovine diseases and bison fluctuations in Wood Buffalo National Park

Carbyn, Ludwig N.

University of Alberta, Edmonton, Alberta, Canada (lcarbyn@ualberta.ca)

Bio: Lu Carbyn is an Adjunct Professor in the Department of Renewable Resources at the University of Alberta in Edmonton where he teaches and works with graduate students. He has a Master's degree in zoology from the University of Alberta and a Ph.D. in zoology from the University of Toronto. Lu Carbyn is an emeritus Research Scientist with the Department of Environment Canada, and for 32 years he was a Research Scientist with the Canadian Wildlife Service.

Abstract: Wood Buffalo National Park contains the largest free-roaming bison population in the world. Bison numbers have widely fluctuated from a low of several hundred around the turn of the 19th century to a peak of an estimated 12,000 in the mid-20th century. Wolves have historically always been present; however, intensive predator control was carried out in the 1950s and early 1960s. Introduction of Plains Bison in the 1920s had major consequences in the dynamics of the wolf-bison relationships, as bovine diseases impacted herd health and population viability. In modern times, wolf predation has the greatest influence in calf recruitment and yearling survival. Within the last decade, the wolf/bison/bovine disease relationships have resulted in a stabilization of bison numbers at a population level of roughly 5,000 bison.



Status of wolves in Canada: 2013 provincial/territorial survey

Cluff, Dean and Brent Patterson

Regional Biologist, North Slave Region, PO Box 2668, 3803 Bretzlaff Drive, Environment and Natural Resources, Government of the Northwest Territories Yellowknife, NT, Canada X1A 2P9 (dean_cluff@gov.nt.ca)

Bio: Dean Cluff, M.Sc., is the regional biologist for the North Slave Region, Department of Environment and Natural Resources. Dean graduated with a Bachelor of Science degree from the University of Guelph (Ontario) and a Master of Science degree in Zoology from the University of Alberta. Dean began his work with the Government of the Northwest Territories in 1993 as a polar bear biologist based in Yellowknife, NT Canada. In 1995, Dean became the first regional biologist for the North Slave Region. Dean's initial project involved a study of wolves and eskers and that led to a continuing interest in these predators. These studies led Dean to co-supervise several graduate students on wolf ecology in the central Arctic. Dean has been a Canadian representative on the IUCN's Wolf Specialist Group since 2001. He has accompanied Dr. David Mech on four occasions to Ellesmere Island (Nunavut) for wolf observations there. Dean has also been involved in research and management of caribou, moose, bison, muskoxen, grizzly bears, and black bears. Dean is currently developing a technique to index trends in wolf abundance on the tundra. He works closely with caribou biologists on calving ground surveys and herd monitoring. Dean's professional satisfaction comes from the variety of projects he is involved in and the amazing people he works with on a daily basis. From that collaboration, he has visited many parts of the Canadian north and gained valuable field work experience.

Abstract: Two decades ago, Canada claimed >50,000 wolves distributed across 7 of its 10 provinces and all three territories. A brief follow-up assessment in 2005 produced similar results. Since then, wolf management has varied from increasing restrictions on hunting in some jurisdictions to wolf removal programs in others. Consequently, a national status assessment on wolves in Canada is timely. To do so, we canvassed biological staff from government wildlife agencies from the same Canadian provinces and territories where wolves continue to exist. We circulated a 13-question survey that requested current estimated numbers of wolves in each jurisdiction, trend, and details on how wolves have been managed over the last three years. Questions about conflicts with wolves, with people and livestock, plus any research projects underway were also asked. Finally, a brief assessment on the public sentiment toward wolves was requested. We summarized agency responses and discussed regional differences. Wolves in the boreal and tundra ecoregions are relatively abundant, and their conservation status remains not at risk in all jurisdictions. The status of wolves in the High Arctic region remains uncertain because of insufficient data to assess. Wolves are strictly protected in approximately 3% of their Canadian range while regulations governing hunting and trapping of wolves continue to vary widely. Livestock depredation by wolves is still a problem in the western provinces, but the number of wolves removed in response has declined. The potential impact of wolf predation on moose populations remains a concern across much of Canadian wolf range. Wolf predation on woodland caribou, seemingly exacerbated by industrial development, is also a major issue for managers and conservationists. Agency response to extreme declines in woodland caribou numbers in Alberta and British Columbia have resulted in wolf removal programs in those areas. These programs show no signs of abatement because long-term solutions remain both elusive and controversial. Wolves continue to elicit strong and polarized values through Canada, largely influenced by rural and urban backgrounds. However, shifting societal attitudes and efforts of some non-government organizations continue to influence public acceptance of wolves and recognition of their role in maintaining functional ecosystems.



Rough riders to wolf riders: politics trumps science in the battle to delist the Northern Rocky Mountain wolf

Convery, Rebecca A.

22430 NW 20th Street, Dunnellon, FL 34431 (bconvery@msn.com)

Bio: Rebecca Convery holds a B.A. in International Relations from Mary Washington University, an M.A. in Foreign Policy Studies from the University of Virginia, and a J.D. from the University of Montana, where she focused her studies on Environmental and Land Use law. Upon graduation from law school, Ms. Convery clerked for the Honorable Justice John Warner of the Montana Supreme Court. Ms. Convery practiced local government and criminal law in Montana for 8 years prior to attending the University of Florida, Levin College of Law, where she is pursuing a Master's of Law in Environmental and Land Use Law. Ms. Convery will be submitting her paper for publication in a law review journal in August 2013.

Abstract: The “recovery” of the Northern Rocky Mountain (NRM) gray wolf in the western United States is celebrated as one of the greatest success stories under the Endangered Species Act (ESA). However, the reintroduction of wolves to the Greater Yellowstone Area (GYA) in Montana, Wyoming and Idaho has also been one of the most hotly debated and politically charged issues in species recovery since the enactment of the ESA in 1973. This paper covers the history of wolf eradication in the GYA and traces the events that led up to the reintroduction of gray wolves in 1995. It examines the 1987 NRM Wolf Recovery Plan and argues that the recovery goals were not based on the best available science on wolves. Rather, the recovery goals were arbitrarily set to placate the western livestock industry and big game hunting interests. This paper also examines the legal battle to delist the NRM wolf and considers the impact that the use of aggressive hunting and trapping programs under state management plans will have on the long-term viability of the NRM wolf population.

What does the USFWS proposal to remove wolves from the ESA mean for wolves in the Pacific Northwest?

Cooley, Hilary

U. S. Fish and Wildlife Service, 1387 South Vinnell Way, Boise, ID 83709 (Hilary_cooley@fws.gov)

Bio: Hilary Cooley lives in Boise, Idaho where she works for the U.S. Fish and Wildlife Service as the Wolf Coordinator for the Pacific Region. She was previously with Idaho Department of Fish and Game. Dr. Cooley received her Ph.D. from Washington State University in 2008, focusing on impacts of hunting on cougar population dynamics. She received an M.S. degree in 2004 from Washington State University where she focused on cougar prey selection. She holds a B.S. degree from the University of Vermont.

Abstract: Gray wolves (*C. lupus*) are currently listed in the contiguous United States and Mexico under the Endangered Species Act (ESA). The U.S. Fish and Wildlife Service recently published a proposal to remove the gray wolf from the ESA but to maintain endangered status for the Mexican wolf by listing it as a subspecies (*C. l. baileyi*). In the proposal, we evaluate whether wolves currently recolonizing the Pacific Northwest qualify as a Distinct Population Segment (DPS) that warrants listing under the ESA. We found that the Northwest does not qualify as a DPS due to a lack of discreteness from the recovered wolf population in the Northern Rocky Mountains (NRM). Three wolf packs have been confirmed in the Northwest (outside of the NRM DPS); some of those territories are very close to the wolf population in the NRM DPS; and genetic analysis of wolves in the Northwest does not lead us to conclude that wolves on either side of the NRM DPS line have marked genetic differences. Given known long-distance dispersal events across the NRM boundary, and lack of major habitat barriers, it is very likely that wolves on either side of the NRM boundary will not form discrete populations as defined in our DPS policy. Furthermore, we are confident that wolves will continue to recolonize the Pacific Northwest regardless of federal protection. Wolves are classified as endangered under both the Oregon and Washington Endangered Species Acts, and California recently declared wolves as a candidate for state listing.



Ma'iingan and the Anishinaabeg

Crow, Reyna

209 N 11 Avenue W, Duluth, MN (batcat13@mac.com)

Bio: Reyna Crow is a freelance writer, co-founder of the Northwoods Wolf Alliance, and organizer for Idle No More.

Abstract: As cultural values have historically been strongly influential in management and other policy toward the environment generally and wolves in particular, I believe environmental education can and should be informed by non-dominant cultural views, including Indigenous environmental ethics. I will provide a brief introduction to environmental ethics from an Anishinaabeg perspective, with detailed discussion of the cultural and ecological significance of the wolf from an Anishinaabeg world view. I will distribute, discuss, and respond to questions about the “Declaration Designating the White Earth Reservation as a Ma'iingan (Wolf) Sanctuary,” passed by the Tribal Council of the White Earth Band of Chippewa Indians. Other resources that environmental educators and others will find useful in understanding and discussing the complex and important relationship between the Anishinaabeg and ma'iingan will be shared with participants. Ample time will be allowed for questions and discussion, with an emphasis on ways to encourage further dialog between cultural groups.

North-south axis in the genetic structure of European wolves

Czarnomska, Sylwia D., A.V. Stronen, C. Pertoldi, D. Demontis, E. Randi, M. Niedzialkowska, M. Pilot, V.E. Sidorovich, W. Jedrzejewski, I. Dykyy, J. Kusak, E. Tsingarska, I. Kojola, A.A. Karamanlidis, A. Oricans, B. Jedrzejewska

*Mammal Research Institute, Polish Academy of Sciences, ul. Waszkiewicza 1, 17-230 Białowieża, Poland
(s_czarnomska@ibs.bialowieza.pl)*

Bio: Sylwia Czarnomska is a Ph.D. candidate at the Mammal Research Institute, Polish Academy of Sciences, with a focus on landscape and conservation genetics of European species of mammals.

Abstract: Earlier study on central and eastern European wolves (*Canis lupus*) shows population genetic structure based on mtDNA and microsatellite markers in the absence of geographic barriers and across relatively short distances for this highly mobile species. Natal-habitat-biased dispersal and adaptation to local environments were proposed as mechanisms linking population ecology with genetic structure. To evaluate the population structure observed with presumable neutral markers and test for adaptation to local environments, we examined 177 wolves from 11 countries (Belarus, Bulgaria, Croatia, Finland, Greece, Italy, Latvia, Poland, Russia, Slovakia, Ukraine) representing highly ecologically diversified local populations using the Canine HD BeadChip (Illumina®) and a final set of 67K single nucleotide polymorphism (SNP) loci. The results supported previous findings of an isolated Italian population with lower genetic diversity than that observed across other areas of the continent. Moreover, we detected population clusters in north-central Europe, the Carpathian Mountains, the Ukrainian steppe, and the Balkan-Dinaric region. We observed high diversity within Belarus, with wolves from western and northern Belarus representing the two most differentiated groups within north-central Europe. We observed a primary north-south axis, which is highly concordant with the direction of the strongest changes in many environmental factors in Europe. We are presently in the process of evaluating the presence of loci under selection and their association with ecological factors (e.g., climate, altitude, biome, ecozone, human population density, road density, snow cover).



The wolf and the general public

DeArmond, Ron

Pella Wildlife Company, 3800 Merle Hay Road, #1315, Des Moines, IA 50310 (Ron@PellaWildlifeCompany.org)

Bio: Ron DeArmond is CEO of Pella Wildlife Company, a non-profit wildlife conservation organization; member of the IUCN Commission on Education and Communication; The Wildlife Society; and the Iowa Academy of Science.

Abstract: This presentation will focus on three areas. The human element of wildlife management is becoming more important as it becomes clear that an understanding of the public and constituents often means the difference between the success or failure of wildlife management programs (Responsive Management 2011). While the public has been increasingly drawn into the wildlife decision arena, typically their level of wildlife knowledge is limited. Education of the public remains one of the greatest challenges for the future (Sixty-Third North American Wildlife and Natural Resources Conference). IUCN Wolf Specialist Group Manifesto on Wolf Conservation 10: In some areas there has been a marked change in public attitudes towards the wolf. This change in attitudes has influenced governments to revise and even to eliminate archaic laws. It is recognized that education to establish a realistic picture of the wolf and its role in nature is most essential to wolf survival. Education programs, however, must be factual and accurate. As a member of the IUCN Commission on Education and Communication, we are looking for ways to present educational programs that promote biodiversity that will enhance healthy ecosystems to ensure sustainability of all historically native species. The wolf-human issue is one of the most polarizing wildlife management challenges for a species that is essential to biodiversity and healthy ecosystems where the wolf historically lived. This presentation will explain how data collected in the field are presented to the general public in a way where the manifesto on wolf conservation can be achieved.

Habitat use of a large carnivore, the red wolf, in a human-altered landscape

Dellinger, Justin

School of Environmental and Forest Sciences, University of Washington, Box 352100 Seattle, WA 98195 (jad1nel2@gmail.com)

Bio: Justin Dellinger is a native of western North Carolina. He received his B.S. from UNC Wilmington and his M.S. from Auburn University, studying foraging and spatial ecology of red wolves. He served as a wildlife biologist for one year in Arizona studying mountain lions. He is currently a Ph.D. student at the University of Washington in Seattle studying the impacts of naturally re-colonizing gray wolves on mule and white-tailed deer in north-central Washington. Justin is most proud of the fact that his two year old son Jude can name almost any animal you show him as well as replicate the sounds they produce or some other associated bit of knowledge.

Abstract: Large carnivores, with their expansive home range and resource requirements, are a good model for understanding how animal populations alter habitat selection and use as human densities and development increase. We examined the habitat selection of red wolves (*Canis rufus*) in North Carolina, USA, where the population of red wolves resides in a mosaic of naturally occurring and human-associated land cover. We used locations from 20 GPS-collared red wolves, monitored over 3 years, to develop resource selection functions at the landscape level. Red wolves selected for human-associated land cover over other land-cover types. Red wolves also selected areas near secondary roads. However, red wolves avoided areas with high human density, and avoidance of natural land-cover types decreased as human density increased; this interaction was strong enough that red wolves selected for natural land-cover types over human-associated land-cover types at relatively high human density. Similarly, avoidance of natural land-cover types decreased when wolves were near secondary roads. These results suggest that red wolves will use human-associated landscapes, but modify their habitat selection patterns with increased human presence. Such findings suggest that large carnivores such as the red wolf may not strictly require habitats devoid of humans. In a world with rapid human alteration of habitat, understanding how increasing human density and development impact habitat selection is vital to managing for population persistence of large carnivores and maintaining top-down ecological processes.



Boreal wolf-prey interactions: evaluating and mitigating the effects of human activities

DeWitt, Philip D. and Jonah L. Keim

*Matrix Solutions, Inc, 142-6325 Gateway Boulevard, Edmonton, AB T6H-5H6 Canada
(pdewitt@matrix-solutions.com)*

Bio: Philip DeWitt is a research ecologist with Matrix Solutions, Inc., an environmental consulting company that contributes to sustainable development by using science. He first encountered wolves working as a field assistant on the Isle Royale Wolf-Moose Project and now studies predator-prey-habitat interactions in the Canadian Rocky Mountains and boreal forest.

Abstract: Human activities impose both positive and negative effects on wildlife movement, habitat use, perceived predation risk and nutritional condition. We inferred the effects of oil exploration activities on wolf-prey relationships in boreal Canada where timber and oil extraction is imposing rapid environmental change with potential consequences for wildlife communities. We investigated how white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), and threatened woodland caribou (*Rangifer tarandus*) alter selection in response to oil exploration, and the subsequent effect on wolves (*Canis lupus*). Using winter track count data, we estimated resource selection models that considered vegetation, terrain, snow, and oil exploration activities. Resource selection models indicate that wolves and prey altered selection in response to active oil exploration (i.e., seismic lines characterized by packed snow) more so than historical exploration. Our data show that prey avoided, whereas wolves selected, active seismic lines. These findings suggest that wolves are motivated by a combination of potential prey encounters and energetic savings, whereas prey are motivated by forage and security. Our results demonstrate that packed snow influences the cost-benefit choices available to boreal predators and prey. The fact that historical oil exploration did not influence wolf-prey interactions in our study suggests that managing people may be more effective than managing the vegetation disturbed by seismic lines. For example, managing the distribution of packed snow relative to prey habitat could provide refuge for prey in winter.

Wyoming wolves in the news: how media coverage helps or hinders conflict resolution

Dixon, Lydia A. and Adam Perou Hermans

Environmental Studies, 397 UCB University of Colorado, Boulder, CO 80309-0397 (Lydia.dixon@colorado.edu)

Bio: Lydia A. Dixon is a Ph.D. student studying policy in the environmental studies program at the University of Colorado at Boulder. Lydia's work focuses on understanding how to reduce conflicts between large carnivores and rural communities in the American West, and what factors contribute to successful conservation outcomes. She is also a Research Associate with the Northern Rockies Conservation Cooperative in Jackson, Wyoming.

Abstract: This study analyzes the content of media coverage of wolves in Wyoming from the first attempt at delisting, in March of 2008, until management of wolves was transferred to the state from the U.S. Fish and Wildlife Service on September 30, 2012. The research asks how local and national media presented wolf news during this time period and identifies the frames used (fear, conflict, celebration, ecology, etc.) through the theoretical lens of the Narrative Policy Framework (Shanahan, Jones & McBeth, 2011). The purpose of this research is to understand how different scales of media coverage varied in the framing and posit how it might affect – positively or negatively – attempts at finding policy solutions to the controversy over wolf management in Wyoming. Preliminary results indicate that national media coverage was correlated with periods of political activity, such as relisting decisions or lawsuits, while local coverage tended to have a broader temporal spread and depth of focus. Media also trended toward reporting conflicts instead of solutions and pitting stakeholders' perspectives against one another. Understanding how conflicts between wolves and people are presented in the media, as well as who presents information (or has access to the media), is important in order to find solutions to redress the long-standing bitter antagonism between stakeholders over management and conservation of wolves in Wyoming. Media coverage may exacerbate the perception of conflict by disproportionately promoting stories of conflict over more neutral or even positive stories on wolves.



Efficacy of initial releases and translocations of Mexican wolves

Dwire, Maggie, John K. Oakleaf, Sherry Barrett, Colby M. Gardner, and Elizabeth A. Jozwiak

U.S. Fish and Wildlife Service, 2105 Osuna NE, Albuquerque, NM 87113 (Maggie_Dwire@fws.gov)

Bio: Maggie Dwire has spent the last 13 years working for the U.S. Fish and Wildlife Service on the Mexican Wolf Recovery Program. Maggie began as a field intern, progressing through technician and biologist positions before her current role as the Assistant Mexican Wolf Recovery Coordinator. While completing her bachelor's degree at the University of California, San Diego, Maggie worked at the California Wolf Center during their transition into becoming one of the premier captive breeding facilities for Mexican wolves. In addition to her responsibilities regarding recovery and reintroduction, Maggie serves as the U.S. Fish and Wildlife Service's liaison to the Mexican Wolf Captive Breeding Program.

Abstract: Reintroduction of wolves requires the release of wolves from captivity or the translocation of wild wolves into areas where programs are trying to establish wolf populations. We assessed the success of release methodologies for both initial releases from captivity and translocations of free-ranging Mexican wolves in the Blue Range Wolf Recovery Area. Three methodologies of releases/translocations were employed on this project: (1) hard releases, (2) soft releases, and (3) modified soft releases in which the wolf or wolves were held in an electrified mesh enclosure until they either released themselves or were released by reintroduction staff. A successful release/translocation was considered any wolf that ultimately bred and produced pups in the wild. The proportion of successfully released wolves was compared between releases and translocations and between various methodologies using a chi-squared analysis. We released 132 wolves 196 separate times, including translocations (n = 103, some of the translocated wolves were captured in the wild), and initial releases from captivity (n = 93). Overall, wolves were successful 27% of all known fate releases. We identified three factors that related to successful release: (1) breeding animals were more successful than sub-adults or pups, (2) releases in the summer and fall were more successful than those that occurred in the spring or winter, and (3) proportion of time spent in the wild was positively correlated with success. We suggest that these factors could help guide future reintroduction efforts in Mexico and the United States to maximize successful releases. Additionally, future reintroductions would likely benefit from a large experience center in a wild, protected area similar to those used for red wolves.

Controversial issues in the classroom: wolves

Edberg, Jess

Information Services Director, International Wolf Center, 1396 Highway 169, Ely, MN 55731 (jedberg@wolf.org)

Bio: Jess Edberg currently serves as the information services director at the International Wolf Center. Her background in animal science, field-work and outdoor travel contribute to her motivation to be an environmental educator. In addition to coordinating and leading programming at the Center, Jess works with the public to mitigate wolf-human conflict and provide science-based resources to empower people to coexist with wolves. In her spare time, Jess enjoys a variety of outdoor sports and relieves stress by playing ice hockey.

Abstract: Addressing controversial topics in an educational or public setting can be a daunting task. Such topics usually elicit emotional responses from individuals and are often passionately debated. In some cases, discussing a controversial issue and sharing personal feelings or perspectives with others can be intimidating for participants. How can educators promote healthy debate and critical thinking about hot-button issues while nurturing an environment of respect and effective communication? Using wolves as a discussion topic, we will look at techniques and activities that help provide educators with a starting point to engage participants in productive debate while respecting individual boundaries and comfort levels.



Wolf recovery and conflicts in Scandinavia: a legal perspective

Epstein, Yaffa

Uppsala University, Department of Law, Box 512, Uppsala, Sweden (yaffa.epstein@jur.uu.se)

Bio: Yaffa Epstein is an attorney currently pursuing a doctorate in Environmental Law at Uppsala University in Sweden. She has a law degree from the University of Minnesota. Her forthcoming article "Population Based Species Management across Legal Boundaries: The Bern Convention, Habitats Directive, and the Gray Wolf in Scandinavia" will be published in the Georgetown International Environmental Law Review this November.

Abstract: The protection of biodiversity, like many other environmental goals, transcends political boundaries. This is particularly true regarding large carnivores, which typically require a relatively low population density and a range that may extend thousands of kilometers across many legal borders. As biologists such as Boitani have emphasized, to be effective in preserving the long term genetic diversity and thus survival of a species, conservation management must be coordinated throughout a population's range. It is particularly interesting to look at the management of the gray wolf across the political borders of northern Europe. Sweden and Norway share a wolf population. The related Karelian population crosses Finland and part of western Russia. Each of these countries regulates wolf management under different international agreements. Sweden is bound by the Bern Convention and Habitats Directive. Finland is a party to both the Bern Convention and the Habitats Directive, but made reservations with respect to the wolf. It has no obligation to protect the wolf under the Bern Convention and only partial obligation under the Habitats Directive. Norway is bound by the Bern Convention only, as it is not a member of the EU. Russia is not a party to either agreement. This presentation looks at how these differing levels of international obligation have affected national legislation and international cooperation for wolf recovery. The conclusions drawn about trans-border cooperation will be of relevance in the United States, where the management responsibility for most wolf populations has recently devolved to the states after decades of coordinated Federal regulation.

The Mexican wolf species survival plan

Fallon, Jackie

Mexican Wolf SSP Education Advisor, Lake Superior Zoo, Duluth, MN (jfallon@lsz.org)

Bio: Jackie Fallon is the Curator of Animals at the Lake Superior Zoo and is the Education Advisor to the Mexican Wolf Species Survival Plan program. Jackie has been involved in wolf conservation for over 20 years.

Abstract: The Mexican Wolf Species Survival Plan (MWSSP) is a program of the Association of Zoos and Aquariums (AZA). The mission of the MWSSP is to support the reestablishment of the Mexican wolf in the wild through captive breeding, public education, and research. Basic tools of the MWSSP are a studbook pedigree for the captive population with genetic and demographic goals, and a management plan for the captive population. The genetic goal decided in 1994 for the captive population is to preserve 75% of the gene diversity in captivity for 50 years. The 2011 AZA Canid Taxon Advisory Group Regional Collection Plan recommends that space be available in AZA institutions for 300 Mexican wolves. Currently the captive population is near carrying capacity (260) in 53 institutions in the U.S. and Mexico. The current calculated gene diversity retained from the founding population is 83.4%. The captive population is the sole source of Mexican wolves for the reestablishment project in the Blue Range Wolf Recovery Area of east-central Arizona and west-central New Mexico and the reintroduction project in the Sierra Madre Occidental of Mexico.



Recovering Mexican wolves: demography, genetics, and representation

Fredrickson, Rich

1310 Lower Lincoln Hills Drive, Missoula, MT 59802 (fredrickson.richard@gmail.com)

Bio: Rich Fredrickson has a long history of working with threatened and endangered species in the research, management, and policy realms. He has worked with American marten, northern spotted owls, marbled murrelets, Peninsular bighorn sheep, and Mexican wolves, among others. He is interested in demography, population genetics, evolution, and climate change.

Abstract: The primary biological threats to Mexican wolf recovery are excessive human-caused losses, inbreeding depression, and small population dynamics. To examine the relative performance of potential recovery scenarios, we conducted 100-year simulations that directly incorporated these threats using the program Vortex 10. In the simulations we considered a range of adult survival rates, and sizes of subpopulations. The simulations also included inbreeding depression on litter size and the gray wolf social system. All wolves in the simulated populations were derived from the existing Mexican wolf pedigree. With three large subpopulations of 250 wolves, extinction rates were high when there was no connectivity between subpopulations. The reintroduced Blue Range population (BRP), however, performed much worse than the other two populations, despite starting with twice as many wolves, due to the high degree of relatedness among its founding wolves. When each subpopulation received one migrant per generation (mpg), extinction rates were greatly reduced, and the mean census size of the BRP at year 100 approached that of the other populations. For the BRP to perform similarly to the other populations, however, the BRP needed to receive at least two mpg. Small subpopulations (100 wolves) had high extinction rates even with substantial connectivity to the BRP and did not contribute to overall population viability. All subpopulations showed signatures of genetic bottlenecks throughout the 100-year period. We concluded that large subpopulations will be necessary to reestablish a viable population of Mexican wolves, but small subpopulations may be useful to increase the geographic representation of the recovered population.

Wolf depredation assessment in Iran

Hatami, Kaveh and Leila Amigh

Islamic Azad University, Tehran Science and Research, Faculty of Energy and Environment (kaveh_h@yahoo.com)

Bio: Kaveh Hatami has worked for many years to change negative attitudes toward wolves and other imperiled predators in Iran. For example he is a co-founder of the Iranian Cheetah Society, an organization focused on conserving the cheetah in its natural habitats. Hatami has designed a wide variety of conservation education programs for both urban and rural target groups. These programs (for audiences including herdsmen, villagers, young children, and university students) are aimed at reducing conflict between people and predators. Through mass media and face-to-face presentations, Hatami has raised public awareness about wildlife values and encouraged public engagement in conservation. He also offers free consulting for people interested in wolves and related issues. For many years, the outlook for wolves in Iran was not good. But Hatami is optimistic about the positive impact of his work. In an International Wolf magazine article in 2005, he expressed hope for the long-term survival of wolves in his country when researchers found evidence of wolves in northeastern Iran and also in a region southwest of Golestan National Park. Presently, Hatami is a representative for the Agriculture Research and Education Extension Organization where he works on sustainable agriculture management and focuses on wolves and agricultural issues. He is a member of the IUCN Wolf Specialist Group.

Abstract: The gray wolf (*Canis lupus*) is the largest member of the Canidae in Iran with distribution across the country. The history of wolf-human conflict is long, but there was no recorded confirmation or analysis, so this paper is the first of its kind for Iran. The last 2-3 year coverage of wolf attacks in the media, and the emotional reaction, led us to do a real assessment of wolf depredations on human properties and possibly human lives to detect effective and/or intensifying factors to identify proper ways to promote the general attitude in the affected areas toward non-lethal-control approaches. Based on this idea, we surveyed 177 wolf-attack reports between 2005 and 2011 and could confirm 102 cases. We came to the conclusion that although the depredations followed the global norm, the success of each attack was high either for human-beings or livestock. Some 90% of the events were successful. 2,798 sheep were lost or injured, and 93 people (male, female and children) were bitten. Of all attacks 87% could be prevented by available means. Rabid wolves were responsible for just 5% of attacks, and religious belief is still the main motivation for co-existing.



If you wander, they will eat you: conflicting knowledge, environmental justice, and wolf attacks in central Asia

Hermans, Adam Perou and Lydia A. Dixon

Environmental Studies, 397 UCB, University of Colorado, Boulder, CO 80309-0397
(adam.hermans@colorado.edu)

Bio: Adam Perou Hermans is a Ph.D. student studying Environmental Philosophy at the University of Colorado at Boulder. Adam's work focuses on conservation and control and on how different conceptions of nature determine both what is conserved and how conservation is conducted. His dissertation concerns issues of justice arising from conflicts between international wildlife conservation and local communities.

Abstract: Wolves attack people in Central Asia. This claim confounds many wolf biologists, most trained, based and working in the West. Not a single fatal wolf attack was authenticated in North America until the November 8th, 2005 death of Kenton Carnegie in Saskatchewan (Geist 2007). Central Asians' histories of human-wolf interactions fundamentally differ from those in North America, and from familiar accounts of human-wolf conflict. Most Central Asian narratives were suppressed, ignored, unheard, forgotten, or simply unavailable to the West until recently. Understanding these histories is especially important as attacks continue, and have even increased. In this presentation, I will first note these different accounts of wolves, and then show how different environmental histories and narratives, and perhaps dramatically different populations of wolves, created these accounts. Following this, I critique how narratives of human-wolf interactions are continually and differently constructed by referencing current account of human-wolf conflict in Central Asia, particularly in the High Pamir of Tajikistan and Afghanistan. I'll then show these wolf attacks present an issue of environmental justice, and how recognizing this justice element motivates, if not necessitates, that these accounts are addressed. Awareness, acceptance, and appreciation of Central Asian narratives and histories of wolf conflict may be as important for expanding understanding of wolves and wolf-human conflict as they are for understanding the human-human conflict often challenging conservation.

Challenges in management of wolves in Croatia 17 years after protection

Huber, Djuro and **Josip Kusak**

Biology Department and Veterinary Faculty of the University of Zagreb, Heinzelova 55, 10000 Zagreb, Croatia (huber@vef.hr); Biology Department and Veterinary Faculty of the University of Zagreb, Heinzelova 55, 10000 Zagreb, Croatia (djuro.huber@gmail.com); Department of Biology, Veterinary Faculty, University of Zagreb, Heinzelova 55, 10000, Zagreb, Croatia, (kusak@vef.hr)

Bio: Dr. Djuro Huber is a Professor of Biology, serving on the Faculty of Sciences at the University of Zagreb where he teaches general biology with a focus on ecology and taxonomy. Dr. Huber is also a Doctor of Veterinary Medicine, and he serves on the Faculty of Veterinary Medicine at the University of Zagreb. A specialist in large carnivore research and management, Dr. Huber is a member of both the IUCN Wolf Specialist Group and the Bear Specialist Group. He is also a member of the Large Carnivore Initiative for Europe (LCIE).

Bio: Josip Kusak is a professor of Biology of the University in Zagreb, Croatia. He has studied wolf spatial ecology in Croatia for 15 years and is involved in conservation and management of wolves in Croatia and elsewhere. He got his initial training for wolf research at the Wolf and Deer Research Project in K-Lab near Ely, Minnesota, during 1996.

Abstract: In 1995, when the wolf became a protected species in Croatia, the estimated number was about 50. In 2012 the estimate was 220. Does the 4.4-fold increase mean success and a secure future? Wolves in Croatia belong to the large Dinaric-Balkan population with 3000-3500 animals; the second largest in Europe. Their status ranges from full protection to no protection, but their safety is in the large number and in reproduction that balances losses. In Croatia, as well as in other range countries, low human acceptance is the major threat which creates the main management challenge. The wolf



management plan for Croatia (WMP) prescribes a number of measures to increase acceptance. Prior to protection there were no damage compensations. Now the state pays for damages, an average of \$1800 per wolf per year, but locals are not satisfied with the timing and with amounts of compensation. Coupling compensation with the use of preventive measures is understood as additional pressure for livestock breeders, even after numerous donations of guarding dogs and electric fences. Hunters are not eligible for compensation for the game taken by wolves, and they hardly accept any sharing of prey species with wolves. In 2005, revision of the WMP introduced the legal harvest of a limited quota (15% for all anthropogenic losses) to reduce the losses of livestock and game, as well as to replace illegal killings. The results are the ever-increasing requests for a larger quota with no sign of less poaching and with refusal to participate in monitoring activities. The new revision of the management plan planned for 2014 will have a hard mission in an effort to balance between law enforcement and allowing some wolves to be killed.

The role of private-public partnerships in reducing wolf-human conflict

Hunt, Erin

*Program Manager, Mexican Wolf Fund, P.O. Box 1389, Julian, CA 92036
(erin@mexicanwolfconservationfund.org)*

Bio: Erin Hunt is Program Manager for the Mexican Wolf Fund and works in collaboration with the Mexican Wolf Recovery Project Interagency Field Team to find and fund solutions to challenges to Mexican wolf recovery. She has participated in research on conditioned taste aversion, behavioral responses to y-poles, enrichment for captive wolves, and pack dynamics. In addition to involvement with conservation in the field via the Mexican Wolf Fund, she assists the Mexican Wolf Species Survival Plan captive breeding efforts via management of a captive breeding facility for Mexican gray wolves.

Abstract: 2013 marks the 15th anniversary of the reintroduction of Mexican gray wolves into the Blue Range Wolf Recovery Area in Arizona and New Mexico. In fifteen years, we have learned critical lessons about human tolerance for wolves. Conflicts between wolves and human activities continue to threaten the survival of this rare and genetically distinct subspecies of gray wolf. Without the acceptance of those impacted by the presence of wild wolves, some argue that conservation efforts cannot succeed. In the unique biological and political landscape of the southwestern U.S., what role do private-public partnerships play in human acceptance of wolf recovery? The Mexican Wolf Fund is a private fund dedicated to reducing conflicts between wolves and human activities by funding a range of proactive, non-lethal techniques. These innovative approaches developed by researchers, field biologists and cooperators not only have the potential to prevent conflicts before they occur, but they can also foster communication and cooperation between diverse stakeholders such as wildlife managers, conservation organizations, livestock producers, and community members affected by wolf recovery. Funding proactive, non-lethal tools has enabled the development of creative solutions on the ground, some of which are credited by the U.S. Fish and Wildlife Service with keeping genetically valuable wolves in the wild when they might otherwise have been lethally controlled or permanently removed. Every success increases tolerance for wolves and other predators. Thus the role of private funding is crucial to both initial relationship building and long-term tolerance that ultimately determine how successful conservation efforts will be.



Status of wolves in India

Jhala, Yadvendra V., B. Habib, S. Shrotriya and S. Lyngdoh

Wildlife Institute of India, P.O. Box #18, Chandrabani, Dehra dun, India (jhalay@wii.gov.in)

Bio: Dr. Yadvendra V. Jhala is a Senior Professor and Head of the Animal Ecology and Conservation Biology Department at the Wildlife Institute of India. He also holds the honorary position of the Research Associate of the Smithsonian Institution. Dr. Jhala has 25 years of research experience in carnivore ecology based on radio-telemetry, implementing large-scale (country-wide) monitoring programs, and capture and immobilization of wild carnivores including Asiatic lions, tigers, wolves, striped hyenas, golden jackal, and Indian fox. In 2009, he received the “Carl Zeiss Roll of Honour for Excellence in Wildlife Conservation” from the Smithsonian Conservation Biology Institute.

Abstract: Extant Indian wolves belong to three distinct genetic lineages, two of which, the peninsular and the Himalayan wolf are ancient and endemic. The Himalayan wolf inhabits high altitude (1800 to 4500m) valley habitats (<40% slope) ranging across Himachal Pradesh, Nepal, Tibet, and Sikkim. It subsists primarily on blue sheep, Kiang foals, rodents, and livestock. Himalayan wolf habitats mapped using presence data in MAXENT show them to be patchy. Wolf densities within these are low, and persecution high; therefore, their status is precarious. The peninsular wolf occurs in 13 Indian states and in Pakistan. Country-wide wildlife surveys conducted in 2010 in an occupancy framework estimate its range to be about 220,000 km². Based on an average territory size of 150 (15SE) km² for breeding packs, there are likely 1200-1800 packs in India. Peninsular wolves prefer scrub-grassland habitats over thick forests which are often occupied by dhole. Peninsular wolves subsist primarily on blackbuck, gazelle, nilgai calves, hare and livestock. Economic loss by wolves subsisting on livestock amounts to about US \$1000 per 100 km² since dead livestock carcasses are available for scavenging. Wolves are legally protected, but enforcement is difficult. Canine distemper and rabies often wipe out entire packs from the landscape. Wolf conservation is dependent on coexistence within landscapes having sufficient prey, with undisturbed denning refuges of 8-20 km² interspersed in a matrix of traditional land uses.

Integrating big game and livestock management: new paradigm and practice for managing wolves in the mountain west

Kaminski, Timothy

Mountain Livestock Cooperative, Longview, Alberta, Canada (MtnLivestkCoop@icloud.com)

Bio: Timothy Kaminski is the principal biologist and founder of Mountain Livestock Cooperative, a non-profit organization dedicated to conserving working ranches and large carnivores in the mountain West. Using his background of working with wolves for nearly 30 years as a recovery team participant from 1978-1987; as the principal congressional lobbyist in Washington D.C. for restoring wolves to Yellowstone and as wolf biologist and project leader in the Rocky Mountain U.S. and Canada for more than a decade, his efforts have focused on work with ranchers, and understanding and reducing wolf and large carnivore-livestock conflicts in the Rocky Mountains and Southwest since 1997. For the past 3 years he has been employed by an agriculture community and 40 ranchers as managing director of Ranchland Project Leader in southern Alberta. By merging carnivore biology and behavior with livestock experience and expertise; and careful use of space and time; and wolf and grizzly bear home range and movements, this community-based and proactive effort is succeeding at assisting and coordinating ranchers' use of grazing management and husbandry practices to reduce wolf and grizzly bear conflicts with cattle throughout the year.

Abstract: Dogma and tradition in wildlife and natural resource management are undermining 21st century needs for a socially acceptable approach to conserving large carnivores. Ignoring aspects of social behavior, family-group composition, and spatial resource use common in large carnivores and critical to reducing conflict, a culture of killing cemented in western state's management of wolves is increasingly backed by politics, careerism, and liberal harvests that extend even to periods of denning. Existing alliances struck solely between states and big game hunting constituencies are undermining confidence, opportunity and public trust in a morally based conservation ethos central to a continuing



legacy of wildlife management for all Americans. I introduce a conservation and problem-oriented paradigm to meet the needs of people and wildlife. I propose managing demographic residency and spatial stability in wolf and grizzly bear home ranges to conserve big game and reduce livestock conflicts. Drawing on spatial and resource-based fidelity well-demonstrated in wolves and grizzly bears, I merge carnivore biology and behavior with livestock husbandry and grazing management. I describe information and understanding necessary for ranchers to reduce livestock vulnerability, and profile a step-wise process for reducing conflicts. I integrate this paradigm with selection-oriented harvest designed to foster social cohesion and space-based stability in home range residency by wolves and grizzly bears. I summarize the advantages of this region-based approach over steady turnover via broad geographic and non-selective culling typical of classic problem wildlife management. A socially acceptable approach amongst public land users and wildlife stakeholders could erase shortcomings in state and agency budgets and resources. I conclude with an overview of funding attainable through a private-public Trust for Carnivore Conservation.

Wolves in Oregon

Klavins, Robert

Oregon Wild, 5825 North Greeley Avenue, Portland, OR 97217 (rk@oregonwild.org)

Bio: Rob Klavins is the Wildlife Advocate for Oregon Wild, a statewide conservation group with a long history protecting wildlife and the big wild places of the Pacific Northwest. Klavins gained an appreciation for the outdoors by growing up fishing and exploring the Midwest. Summers were highlighted by trips to northern Minnesota and an accidental visit to the International Wolf Center. As wolves recovered in the Upper Midwest, he graduated from Lawrence University with a degree in Biology before heading to Oregon and working as an educator and community organizer. Rob has become the state's leading voice for wolf recovery and has recently appeared on NBC Nightly News, in *Time* magazine, and *The New York Times*. His work at Oregon Wild was recently recognized with a prestigious Skidmore Prize (<http://tinyurl.com/cyqcbre>).

Abstract: In 2012 Oregon tried a unique one-year experiment and may have shown a different path forward for wolf management. In the intermountain West, the terms “wolf wars” and “wolf recovery” have become conflated. The conflict and controversy that so often generate headlines haven't benefited anyone – certainly not wolves. However, as wolves begin to retake their place in the Pacific Northwest, they do so on a vastly different political, social, and ecological landscape. In 2005, after an exhaustive public process, Oregon crafted a wolf plan that became a model for all three of the west coast states. The plan allowed the state to kill wolves but prioritized conservation. After passing its first test in 2009, the plan's inherent ambiguity enabled a repeat of the same unnecessary conflicts to play out in one of America's “greenest” states. It took a legal challenge, but in 2012, Oregon became the only state with a meaningful wolf population that didn't purposely kill them. The results were a win for everyone. Not surprisingly, the wolf population increased – nearly doubling. Meanwhile conflict with the livestock industry decreased dramatically as reluctant but responsible ranchers began increasing efforts at implementing non-lethal conflict deterrence. Meanwhile, in neighboring states, wolf killing only served to feed continued controversy. The “Oregon experiment” cast doubt on many accepted but untested claims about wolf management and social issues. Though only a single data point, there are certainly lessons to be learned from the 2012 experience.



Influence of wolf predation risk on elk movement in northern Yellowstone National Park

Kohl, Michel T. Daniel R. MacNulty, Douglas W. Smith, Daniel R. Stahler

Department of Wildland Resources, Utah State University, Logan, UT (michel.kohl@aggiemail.usu.edu)

Bio: Michel Kohl is a Ph.D. student and Quinney Fellow in the Department of Wildland Resources at Utah State University. He obtained his M.S. in Wildlife Biology from the University of Montana in 2012 while studying bison ecology on the northern Great Plains. He also received his B.S. in Wildlife Biology from the University of Montana in 2008. He is originally from the Ft. Peck Indian Reservation of northeastern Montana.

Abstract: The loss and restoration of large apex predators can have substantial effects on community structure and dynamics. For example, predator-caused changes in prey movement and habitat use may instigate a behaviorally-mediated trophic cascade (BTMC). In a popularly cited example, wolf (*Canis lupus*) reintroduction to Yellowstone National Park (YNP) has been hypothesized as a driving factor in the recovery of riparian vegetation via behavioral modification of elk (*Cervus elaphus*); however, the evidence for a BTMC is inconclusive due in part to a lack of knowledge regarding the extent that elk actually avoid areas of high wolf predation risk. We used an empirically based (i.e., turning-angle, step-length) conditional logistic regression movement analysis of GPS collared female elk ($n = 28$) during winter (2000-2004) on the Northern Range of YNP to evaluate elk response to an integrated measure of wolf predation risk (e.g., elk distribution, wolf distribution, wolf-killed elk locations, environmental factors). We found weak, non-linear selection for areas of higher predation risk by elk. Because this surprising result may represent possible attraction by elk to underlying variables within the predation risk model such as elk distribution, we analyzed the model to examine other potential predation risk metrics which more adequately explain variation in elk movement. An increased understanding of wolf spatial impacts on prey species is critical for conservation and management of predator and prey, particularly as large predator restoration is increasingly viewed as a tool for ecological recovery.

When wolves move near human settlements?

Kojola, Ilpo, Samuli Heikkinen, Salla Kaartinen, Erik Saarnio

Finnish Game and Fisheries Research Institute, Oulu Game and Fisheries Research, FI-90014 University of Oulu, Finland (ilpo.kojola@rktl.fi)

Bio: Dr. Ilpo Kojola has worked in large carnivore research at Finnish Game and Fisheries Research Institute since 1996. His team had collared 154 wolves with transmitters during 1998 through 2012. Wolves had been decreasing in Finland, but now public attitudes are becoming increasingly negative. One reason could be the recent return of wolves to human-dominated landscapes in southwestern Finland.

Abstract: Wolves that move near settlements are often considered to be a problem because they may kill domestic dogs and because people are afraid of them. Herein we analyzed locations of 31 GPS-collared territorial wolves that were captured in Finland during 2002 through 2012. Wolves avoided human residences, but in some territories nighttime visits less than 100 m from the nearest house were not rare. The most important reason for increasing positions so close to houses was the high density of human residences; therefore, positions near houses were most common in southwestern Finland where human population density is higher than in eastern Finland. The difference between night and day was sharp. We also found some evidence that young (1-2 year old) wolves did not avoid human settlements as carefully as did older wolves. The wolves that most regularly visited settlements often became costly in terms of damage they caused by killing dogs or livestock.



Wolves killing dogs: influenced by ungulate prey density?

Kojola, Ilpo, Petter Wabakken, Jens Karlsson, Olof Liberg, Håkan Sand, Mari Tikkenen

*Finnish Game and Fisheries Research Institute, Oulu Game and Fisheries Research, FI-90014
University of Oulu (ilpo.kojola@rktl.fi)*

Bio: Dr. Ilpo Kojola has worked in large carnivore monitoring and research since 1996. His team has radio-collared 154 wolves in Finland during 1998 through 2013.

Abstract: Wolves attacking domestic dogs is a major conflict between wolves and hunters in Finland and Scandinavia. Wolves might regard dogs as competitors for prey and treat dogs like they do medium-sized carnivores such as coyotes (*Canis latrans*). Heterospecific aggression in various species of organisms is related to the abundance of resources. Moose (*Alces alces*) is the primary prey of wolves in northern Europe, and densities within Finnish wolf territories range between 0.2 – 0.4 animals/km² but between 1.0 – 1.5 moose/km² in Scandinavia. A linear model, where study area (population), the log-transformed number of wolf litters per year and the two-tailed interaction term between study area and log-transformed number of litters were treated as independent variables, accounted for 64.6% of the variation in the annual number of dogs killed by wolves. All three effects were significant. Our results provided evidence that the density of primary prey can influence the rate at which wolves attack domestic dogs. Other potential reasons for the observed differences are also discussed.

Social physiology of wolves and dogs during a simulated hunt

Kortekaas, Kim,

*University of Vienna, Ph.D. Candidate, College of Cognition & Communication, University of Vienna,
Althanstraße 14, 1090 Wien, Austria, (kim.kortekaas@univie.ac.at); Wolf Science Center,
Dörfles 48, 2115 Ernstbrunn, Austria*

Bio: Kim Kortekaas, finished her master's degree in Biology in 2009 at the University of Wageningen (the Netherlands) working on a variety of species in Africa. At the moment she is a Ph.D. student at the University of Vienna (within the FWF Ph.D. College of Cognition and Communication) and the Wolf Science Center in Austria. She has worked the last 1.5 years on the development of a non-invasive method to measure heart rate in wolves and dogs. At the moment, she is training them to voluntarily use a treadmill in order to simulate the chase phase of the social hunt.

Abstract: Wolves (*Canis lupus*) cooperate with each other when rearing their young, defending territories, and hunting large game. However, we know very little about the influence of social factors on these joint actions, especially in regard to the hunt. By using a large treadmill (2.5 x 10 m) to simulate the chase during hunts, we aim at a better understanding of the animals' behaviour and physiology when pack members engage in running together rather than running alone. We assume that the social relationship of the animals, in regard to their dominance and affiliative interactions, will influence these decisions. To test the influence of social context, in this study, we use heart rate, heart rate variability, and cortisol levels to measure the physiological response of the animals and record their behaviour when running alone or when running with different social partners. Furthermore, by using exactly the same methods on similarly raised domestic dogs kept in packs, we aim to trace back the functional and adaptive changes that occurred in the social life of dogs during domestication. In essence, this will be the first comparative study in wolves and dogs to investigate how social relationships influence whether or not canines engage in joint running and where physiological measurements are used to better understand these decisions.



Population status and distribution of Indian wolf (*Canis lupus pallipes*) in Uttar Pradesh, India

Kumar, Satish

Department of Wildlife Sciences, Aligarh Muslim University, Aligarh-202 002, UP, India (satish_amu@yahoo.com)

Bio: Satish Kumar will be giving a presentation on the status and distribution of wolves in Uttar Pradesh, a state in northern India having very high incidences of wolf-human conflicts during the last two decades. The areas where wolves are still found in this state are densely populated and represent a unique co-existence of wolves with humans despite high conflict. Satish works with the Aligarh Muslim University and is based in the same state where he has conducted field surveys on wolves from time to time.

Abstract: The population status and distribution of the Indian wolf (*Canis lupus pallipes*) was assessed in Uttar Pradesh, India, where they have remained in conflict with man since 1996 and earlier during the nineteenth century. The state of Uttar Pradesh lies in the Gangetic Plain biogeographic zone, which has the highest human density. The population of wolves is unknown in Uttar Pradesh where wolf-human conflicts have grown alarmingly. The wolf was widely distributed in Uttar Pradesh in the past and commonly seen in several districts until the 1920s to 1930s. Bounties were offered to eliminate wolves, and the practice was common during that period. Special attention was given in the areas wherever wolves endangered human life. Wolf surveys were conducted in different districts of the state and especially in the areas where wolf-human conflicts are high. At present, the natural prey base of wolves is extremely low in these areas, and they survive primarily on livestock and also by scavenging. Wolves killed and injured several children 1-10 years of age during 1996 to 2001, and 25-30 wolves were killed in Pratapgarh, Rae Bareli, Unnao and Fatehgarh districts. Wolf habitat is still abundant in the state around the Yamuna and Ganges Rivers and their major tributaries, but there is extremely scanty or no natural prey left, so wolves occur in low numbers, surviving primarily on livestock. There are about 100 wolves still surviving in a few districts in Uttar Pradesh, and it is challenging to conserve and manage this lesser-known wolf population due to the rise in wolf-human conflicts.

Wolf-livestock conflict assessment and action plan forward for the 21st century

Kunkel, Kyran

Conservation Science Collaborative and Wildlife Biology Program, University of Montana, 1875 Gateway South Road, Gallatin Gateway, MT 59730 (kyran@montana.net)

Bio: Kyran Kunkel has conducted wolf research and conservation for 25 years. He received his Ph.D. examining effects of wolf re-colonization in and around Glacier National Park, Montana.

Abstract: Despite wolves reoccupying the western U.S. now for >30 years, and conflicts with livestock being the most important problem for long-term wolf conservation and important economically for ranchers, strikingly little success has been achieved in managing this conflict. In fact, few alternative approaches to killing wolves have been rigorously designed and measured and implemented. Killing wolves has not reduced the problem on a significant temporal or time scale either. In fact this may exacerbate it, is expensive, generally unsupported by the public, and can be limiting to wolf conservation. We compared the efficacy of no lethal action, partial pack removal, and full pack removal. From 1989 to



2010 we documented 967 depredations by 156 packs in the northern Rockies. The mean time between recurrent depredations was 115 days following no action, 170 days following partial pack removal, and 753 days following full pack removal. Given that the average time to the next depredation was almost 4 months with no action; that partial removal did not gain large relief over no action; and that complete pack removal is difficult and ecologically, monetarily, and socially costly; alongside appropriate lethal control, we recommend robust implementation and testing of proactive wolf livestock conflict management. There are no published, tested and adaptive best-management practices that can be readily applied by ranchers. New, proactive approaches need to be rigorously tested and implemented. Given all this, we see a great need for a strategic road ahead for proactive wolf-livestock conflict resolution.

Spatio-temporal distribution of activity and space use among wolves, ungulates and humans in Croatia

Kusak, Josip and Peter Haswell

Department of Biology, Veterinary Faculty, University of Zagreb, Heinzelova 55, 10000, Zagreb, Croatia, (kusak@vef.hr)

Bio: Josip Kusak is a professor of Biology of the University in Zagreb, Croatia. He has studied wolf spatial ecology in Croatia for 15 years and is involved in conservation and management of wolves in Croatia and elsewhere. He got his initial training for wolf research at the Wolf and Deer Research Project in K-Lab near Ely, Minnesota, during 1996.

Abstract: We examined accelerometer activity data from 14 wolves fitted with Vectronic GPS Plus collars in three different parts of Croatia and collected 945,669 activity readings during 3,367 days. Wolves from Gorski kotar area showed activity peaks in the early hours of the morning. One wolf from Dalmatia was distinctly nocturnal. In Northern Velebit, lower daytime activity levels fluctuated smoothly to/from an early afternoon low. Activity was high throughout night, dawn and dusk. Wolves in Gorski kotar showed a period of high activity in the early hours of the morning, a steep decline before daylight and a similar gradual fluctuation in daytime activity to those of Northern Velebit. Activity levels fluctuated over the year with peaks coinciding with the birth of young or the onset of winter. Seasonal variations in diurnal patterns were also noted. Motion activated cameras were used to examine spatio-temporal activity patterns of wolves, prey species and humans in Gorski kotar. Wolves and humans used forest roads, while ungulates were found more frequently on hiking and animal trails where large carnivores were less prevalent. It appears ungulates adjust their activity according to that of humans and large carnivores. In a cascade of space-time displacement; humans displace large carnivores and ungulates, large carnivores displace ungulates, while ungulates try to find space/time windows between more dominant users. Ungulates were rarely present on primary and secondary forest roads, but active at dawn and dusk on tertiary forest roads and logging roads. In the least disturbed locations, ungulates could be active throughout the day with most activity occurring during daylight.



Wolf management in Montana: post-delisting

Lance, Nathan

Wolf Management Specialist, Montana Fish, Wildlife and Parks, Butte, MT, (NLance@mt.gov)

Bio: Nathan Lance received his B.S. in wildlife biology from the University of Montana and his M.S. in wildlife biology from Utah State University. For seven years he was a research biologist studying wolf and bear behavior and ecology. His research focused on human-wildlife conflicts and developing an understanding of the ecology and social context in which these problems existed. Nathan Lance has been a wolf management specialist with Montana Fish, Wildlife and Parks for the last five and a half years.

Abstract: In Montana, wolves are managed within the guidance of the Montana Gray Wolf Conservation and Management Plan which was finalized and approved by the U.S. Fish and Wildlife Service in 2005. The plan recognizes a threshold of ≥ 150 wolves and ≥ 15 breeding pairs while acknowledging hunting and trapping as appropriate and approved methods for wolf population management. Wolf season frameworks are presented annually to the Montana Department of Fish, Wildlife and Parks Commission, which has broad authority to set season frameworks. Montana held wolf hunting seasons during 2009, 2011-12, and 2012-13. Statewide harvest quotas increased over time: 2009 = 75, 2011-12 = 220, 2012-13 = no quota (no limit), and 2013-14 = no quota. Bag limits were one wolf per hunter during 2009 and 2011-12, 3 wolves/hunter in 2012-13, and 5 wolves/hunter in 2013-14. Montana was divided into Wolf Management Units (WMU's) with WMU specific quotas in 2009 and 2011-12. WMU quotas were largely eliminated during 2012-13, and retained in only 2 WMU's adjacent to Yellowstone and Glacier National Parks. WMU's quotas will be retained in the 3 WMU's for the 2013-14 season. Hunter harvest increased from 2009 (72) to 2011-12 (166), and declined during 2012-13 (128). Trapping was first authorized during the 2012-13 season, and the trapping harvest was 97. At the end of 2012, the minimum wolf count for Montana was 625 wolves, 147 packs and 37 breeding pairs. Montana Fish, Wildlife and Parks will continue to use an adaptive management approach to maintain a viable wolf population while minimizing impacts on livestock and big populations and maintaining hunter opportunity on wolves and other big game.

Selective harvest to improve the genetic status of a wolf population

Liberg, Olof, Pär Forslund, Mikael Åkeson, Petter Wabakken, Håkan Sand

Grimso Wildlife Research Station, Department of Ecology, Swedish University of Agricultural Sciences, SE-730 91, Riddarhyttan, Sweden (Olof.Liberg@slu.se)

Bio: Dr. Olof Liberg has worked with ecological research on large mammals in Africa and Scandinavia. Since 1999, he has been coordinator of the Scandinavian Wolf Research Network (SKANDULV).

Abstract: The Scandinavian wolf population is small (350 wolves in 2013) and based on only five founders. Average inbreeding level is at $F = 0,26$. The Swedish government is planning a program for improvement of the genetics of this population. As part of this program the Scandinavian Wolf Research Network SKANDULV provided a simulation study of the genetic effects of selective harvest in combination with bringing in unrelated wolves to the population. The simulation indicated that the positive effects of migrants could be significantly enhanced with a harvest that excluded migrants and their first generation offspring but with a random take among the rest of the population. A limit of the population size speeded up the time taken to get down to lower levels of inbreeding. Time taken to get down from our present level of $F = 0,26$ to an average level of $F = 0,10$, with a migration rate of one effective wolf per year was 87 years if the population was kept at 400 wolves with a completely random harvest, but only 14 years with a selective harvest excluding migrants and their offspring and limiting the population at 200. Further, the equilibrium between genetic drift and inbreeding level was almost halved by the selective harvest. The positive effect of migrants seems to be even further enhanced by a higher pair building and reproductive success among migrants and their offspring compared with the rest of the population, as demonstrated by data from the Scandinavian population.



Mexican wolf reintroduction in Chihuahua, Mexico: lessons learned

López, Carlos A. González, Nalleli E. Lara Díaz, Alejandro González Bernal, Zaira Y. González, Cristian Aguilar, Carmen García Chávez, Jesus Lizardo Cruz, Roberto A. Wolf Webels

Universidad Autónoma de Querétaro, Cerro de las Campanas S/N, Col. Las Campanas. Querétaro, Querétaro, Mexico 76010 (cats4mex@gmail.com)

Bio: Carlos González has been researching jaguars and other carnivore species in Mexico and the U.S. since 1992. He is co-author of *Borderland Jaguars*, the most comprehensive analysis of the historic presence of jaguars in the Southwest. Having received his Ph.D. in science from the Universidad Nacional Autónoma de México, Carlos is currently a research professor at the Universidad Autónoma de Querétaro. His main interests are in predator-prey interactions, vertebrate community ecology, and the behavior and conservation of large mammalian carnivores. Carlos has been associated with the reintroduction of Mexican wolves since 2002.

Abstract: A Mexican wolf pair was released in northwestern Chihuahua on October 11, 2012. The release site was chosen as part of a 300 km² patch of good quality habitat in a 12,000+ ha ranch. Both individuals had radio transmitters (UHF and VHF) to allow for remote and terrestrial relocation. In order to create site fidelity, expert opinion derived from Mexican National Commission for Protected Areas (CONANP) and the U.S. Fish and Wild Service (USFWS) recommended food supplementation that took place every 16 days on average, including carcasses of deer, domestic rabbits, collared peccaries and domestic pigs. This pair had a centralized foraging pattern around a core area (50% fixed kernel UD) with an average size of 19.57 km², with a 95% UD of 114.27 km² from October to January. Movement patterns seem to be food regulated: 1) food supplementation, 2) captured prey, and 3) livestock as carrion. Food habits of wolves included four items: deer, cottontail rabbit, juvenile collared peccaries and livestock carrion. Mexican wolves had interaction with humans within the release site; livestock use was documented as number of times carcasses were visited. Ungulate abundance was assessed in seven localities, two for Sonora and five for Chihuahua. Average deer abundance was 0.79 ind/km². Such ungulate index translates into 6.5 wolves/1000 km²; but there are other potential prey items that were not taken into consideration for such wolf carrying capacity estimation. Poor livestock husbandry practices and the threat of poisoning in the region may have significant impacts on the success of Mexican wolf reintroduction in Mexico.

Understanding the ecology of human-wolf conflict in winter pastures of semi-arid ecosystem of Georgia

Lortkipanidze, Bejan, Irakli Shavgulidze and Gareth Goldthorpe, FFI

NACRES, P. O. Box 20, 0179 Tbilisi, Georgia (bejan.lortkipanidze@nacres.org)

Bio: Bejan Lortkipanidze is the Conservation Program Coordinator at the Center for Biodiversity Conservation and Research (NACRES), a Georgian NGO. He has been active in large mammal conservation in Georgia for 15 years and mostly focused on large carnivore conservation issues. Over the last years, wolf ecology and human-wolf interactions have become his main interest.

Abstract: We studied wolf ecology in a semiarid ecosystem, in southeastern Georgia. The territories are extensively used by transhumant sheep farmers for sheep grazing during the winter season (October – May). In late spring sheep migrate back to the high mountains to the summer pastures. As sheep are one of the main prey items for wolves in the study area, we suspected that extraterritorial wolves could follow the migrating flocks to the mountains. Human-wolf conflict is severe there, especially in and around Vashlovani National Park. According to the local population, wolves intensively used the protected territories as a shelter. The local population also claimed that the government supported the growth of wolf numbers in the region. To find out aspects of wolf habitat use and their home range in relation to human activities in the study area, we carried out a wolf telemetry study. In 2010-2011, for the first time in south Caucasus, we collared 7 wolves with GPS/GSM collars. Wolves were monitored with varying success from 1 month up to 1.5 years. According to our results, wolf home range was from 600 to 1700 km² and the range size changed according to the seasons. None of the collared wolves followed sheep to the mountains. We found that young wolves leave remote areas of Vashlovani protected areas to spend some time close to villages during the summer months. Wolves used both open fields as well as badlands, but the intensity of habitat use depended on the season and on the status of the wolf.



Challenging a deadly paradigm: a look at the influence of values, perceptions and the North American Model on wolf management in western Canada

Lukasik, Victoria M. and Shelly M. Alexander

Department of Geography, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4 (vlukasik@ucalgary.ca)

Bio: Victoria Lukasik is a Montréal-area native who is passionate about wildlife, wilderness and conservation. She has a BSc in Wildlife Biology from McGill University and an MSc in Spatial Ecology from the University of Calgary. Her Master's research investigated urban coyote diet and human-coyote interaction in the city of Calgary, Alberta. She has worked and volunteered for various organizations including the SPCA-Montérégie, the Avian Science and Conservation Centre (in Montréal, Quebec), the Northern Lights Wildlife Wolf Centre (in Golden, British Columbia) and the Centre for Conservation Research at the Calgary Zoo, as well as on a variety of university research projects. Victoria is currently working on her Ph.D. at the University of Calgary, investigating the influences of perceptions and values on carnivore management in western Canada.

Abstract: Human perspectives toward wolves tend to be polarized; often people either love or hate wolves, with little in between. Historically, European views of the wolf have been centered on fear and hatred; these perceptions immigrated to North America along with the European explorers and settlers. Despite a vast body of scientific knowledge expressing their important ecological role, these negative perceptions toward wolves, as well as misinformation about wolves, continue among certain demographics. Provincial and state management of wolves have come under scrutiny by members of the public, environmental organizations and scientists, some of which suggest a needed shift from the current paradigm, greatly influenced by the North American Model, to one that better incorporates ecological knowledge, animal welfare and public values. Document analysis was conducted to review the management practices that took place historically in what is now British Columbia, Alberta and Yukon Territory. Historic practices were compared to current management practices in an effort to determine the influence of scientific knowledge and shifting public values on management practices. Practices have included poison campaigns, culls, trapping, bounties, relaxed hunting regulations and, more recently, sterilization. Values, perceptions and justifications for these actions, both in government documents and print media, were also analyzed. The authors suggest that management practices are plagued by the traditional culture of predator control and are primarily influenced by the values of certain interest groups, rather than reflecting the values of the Canadian public.

State management of wolves in Wisconsin

MacFarland, David

Wisconsin Department of Natural Resources, Rhinelander, WI (David.MacFarland@wisconsin.gov)

Bio: David MacFarland serves as the large carnivore specialist for the Wisconsin Department of Natural Resources. He holds a Bachelor of Science in environmental science from Messiah College, a Master of Science in conservation biology and sustainable development and a Ph.D. in wildlife ecology both from the University of Wisconsin. He works in Rhinelander where he lives with his wife and son.

Abstract: The federal government transferred management authority of wolves to Wisconsin on January 27, 2012. The state used this authority to implement the conflict management program outlined in its wolf management plan. Under this plan, trapping is initiated by USDA Wildlife Services agents under contract with the Wisconsin Department of Natural Resources (WI DNR) on farms with confirmed wolf conflict. Landowners are eligible for WI DNR- issued lethal control permits, or they can kill wolves in the act of depredate domestic animals. On April 2, 2012 wolves were designated a game species under Wisconsin Act 169. Wolves can be harvested by either hunting or trapping. Legal hunting methods include the use of bait, predator calls and the use of dogs to pursue wolves. Legal trapping methods include foot hold-traps and non-lethal cable restraints. The wolf harvest season opens October 15th and closes February 28th. The state has authority to close individual wolf harvest units when quotas are



reached or if deemed necessary to proper management. By treaty, Ojibwe tribes have the right to up to 50% of the harvest of all species within the Ceded Territory of Wisconsin. The signatory Tribes inform the state of their harvest intent through a declaration process. The state considers their declared intent and their demonstrated prior harvest performance and adjusts the state quota to prevent total harvest from exceeding harvest quotas. In 2012, 57 wolves were removed by USDA Wildlife Service agents, and 16 were removed by landowners under WI DNR permits. An additional 3 wolves were killed in the act of depredate domestic animals. The state held its first harvest season in 2012 with a quota of 201 animals. Ojibwe tribes claimed all living wolves in the Ceded Territory under their federal treaty rights. In response the state reduced the state-licensed quota by 50% within the Ceded Territory for a final state quota of 116. A total of 117 wolves were harvested by 895 license holders across 6 harvest units. The first units closed to harvest on November 16th, and the final unit closed on December 23rd.

Wisconsin's management objective is to begin putting downward pressure on the wolf population in accordance with the current wolf management plan. Population monitoring data suggest management actions in 2012 did not significantly impact wolf population levels. The late winter off-reservation population was estimated to be 774-845 in 2012 and 779-804 in 2013. In response, the 2013 quota was increased to 275. Based upon the quota declaration received from the Ojibwe tribes and their prior demonstrated harvest of 0 wolves in 2012, the state quota was reduced by 10% in the Ceded Territory to 251. Analysis of population modeling data anticipate a population reduction of 10-20% if harvest quotas are met and mortality levels from other sources are equivalent to 2012. The WI DNR was directed to write a new wolf management plan. All aspects of wolf management will be considered in this new plan including conflict management protocols and management objectives. We anticipate the new plan will begin influencing management decisions in 2015.

Understanding the limits to wolf predatory power

MacNulty, Dan

*Department of Wildland Resources, Utah State University, 5230 Old Main Hill, Logan, UT 84322-5230
(dan.macnulty@usu.edu)*

Bio: Dr. Dan MacNulty has studied wolves in Yellowstone National Park since 1995. He has a Ph.D. in Ecology and an M.S. in Wildlife Conservation from the University of Minnesota. He is currently an Assistant Professor of Wildlife Ecology in the Department of Wildland Resources at Utah State University.

Abstract: The spectacular and alarming way that the wolf catches its prey has long fostered the impression that it is a supremely powerful predator, capable of decimating prey numbers and scarring those that survive. Reviewing 18 years of research on wolf-elk interactions in Yellowstone National Park, I highlight how the biology of wolves fundamentally limits their predatory power. One result is that wolves can kill only a subset of available prey. In northern Yellowstone, the majority of elk killed by wolves are calves (<1 year old) and aging adults. The average age of adult female elk killed by wolves has been constantly high (>13 years old) since wolf reintroduction. Meanwhile, the survival rate of younger (2 to 8-year-old) female elk has been high ($\geq 90\%$) in most years that elk have been radio-tracked since 2000. Limited ability of wolves to kill younger female elk – which are the most reproductively valuable members of the population – is a key reason why wolves have a limited effect on elk numbers. Limits on wolf predatory ability likely also explain why elk continue to browse aspen, willow, and cottonwood despite apparent wolf predation risk. I argue that understanding the limits to wolf predatory power is vital to understanding the ecological consequences of wolf restoration.



Message received: effective techniques for delivering clear and memorable presentations

McLeer, Dorothy F.

Program Coordinator/Interpretive Naturalist, University of Michigan, Dearborn Environmental Interpretive Center, 4901 Evergreen Road, Dearborn, MI 48128 (natrlist@umich.edu)

Bio: Dorothy McLeer is the Program Coordinator/Interpretive Naturalist at the University of Michigan-Dearborn Environmental Interpretive Center where she has worked for twenty years. She is a Certified Interpretive Trainer and Guide through the National Association for Interpretation with extensive experience teaching university students and interpretive staff and developing and conducting programs for school groups and the general public. Dorothy is also part of the Timber Wolf Alliance's speakers' bureau, member of their Advisory Council, and their representative on Michigan's Wolf Forum.

Abstract: Wildlife researchers, managers, and stakeholder groups generally agree an informed public is important for successful wolf conservation and management. Michigan's 2008 Wolf Management Plan notes that at the series of wolf-focused public meetings hosted by the Michigan DNR in May 2005, a large portion of public comments underscored the need for an effective information and education program focused on wolves. Education about wolves will continue to play an important role in future wolf management, encourage understanding of the wolf's ecological role and public tolerance of wolves, and help explain the delisting and reclassification process. Currently, agency personnel and budgets are cut to the bone, hampering opportunities for public outreach. As a result, the responsibility to provide public programs should be shared more broadly with wildlife biologists, interpretive naturalists, and trained volunteers. Time is a valuable commodity for both presenter and audience members, so the presenter's mission is to capture the audience's attention by creating and delivering the most engaging, memorable program possible. Whether a committed volunteer or a polished public speaker, presenters who incorporate a variety of interpretive techniques into their presentations are more successful in holding the attention of their audience. The National Association for Interpretation has developed criteria to produce effective presentations that include constructing presentations around a consistent theme, making the information relevant to the audience, and addressing different learning styles. These techniques create meaningful connections with the audience, thereby achieving the goal of delivering clear and memorable presentations for a wide range of audiences.

Proportion of breeders by age class in wild female gray wolves

Mech, L. David and Shannon Barber-Meyer

Northern Prairie Wildlife Research Center, USGS, The Raptor Center, University of Minnesota, 1920 Fitch Ave., St. Paul, MN 55108 (mechx002@umn.edu)

Bio: Dr. L. David Mech is a Senior Research Scientist with the U.S. Geological Survey.

Abstract: Scant records exist regarding the age of first breeding in wild female gray wolves (*Canis lupus*). Single reports document breeding at 1 year and others not before 4 years. To better understand the proportion of female breeders in each age class, we analyzed 141 sets of nipples from wolves of known (18), estimated (63) and minimum (60) age live-trapped or necropsied during 1971-2011 in northeastern Minnesota. We categorized each wolf as a non-breeder, current breeder or former breeder based on nipple measurements following Mech et al. 1993. We also review genetics from other populations related to female breeding age and discuss pseudo-pregnancy implications.



Seasonal predation patterns of gray wolves on the northern range of Yellowstone National Park

Metz, Matthew, Douglas W. Smith, John A. Vucetich, Daniel R. Stahler, Rolf O. Peterson

Yellowstone Wolf Project, Yellowstone Center for Resources, P.O. Box 168, Yellowstone National Park, WY, 82190 (matt_metz@contractor.nps.gov)

Bio: Matt Metz is a Research Associate for the Yellowstone Wolf Project. He has worked for the Yellowstone Wolf Project since 2002 and held his current position since 2010.

Abstract: Predation is one of the fundamental relationships of ecological inquiry, and wolf (*Canis lupus*) predation is one of the most-studied and best-understood sets of predation relationships. Nevertheless, our understanding of wolf predation is limited almost entirely to winter, although seasonal variation in the ecology of wolf predation has long been expected. Here, we investigated the foraging ecology of wolves living on the Northern Range of Yellowstone National Park during winter (mid-November to mid-December and March) since 1995 and, during spring-summer (May-July), since 2004. Northern Range wolves primarily preyed upon elk (*Cervus elaphus*) throughout the year, although deer increased within the composition of wolf kills during spring and summer. Kill rate (number or biomass of prey killed per predator per day) patterns demonstrated important differences among the seasons of the year. Further, one's impression of seasonal variation in kill rate depends critically on the metric used to quantify kill rate. Specifically, kill rate was greatest in summer when quantified as the number of ungulates killed, and least during summer when quantified as the biomass of ungulates killed. Moreover, kill rates were not well correlated among seasons. For example, knowing that early winter kill rate is higher than average (compared to other early winters) provides little basis for anticipating whether kill rates a few months later during late winter will be higher or lower than average (compared to other late winters). Ultimately, our work allows for a better understanding of the causes and consequences of seasonal variation in wolf predation.

State management of wolves in Wyoming following delisting

Mills, Ken

Large Carnivore Biologist, Wyoming Game and Fish Department, P.O. Box 850, 432 East Mill Street, Pinedale, WY 82941 (Kenneth.mills@wyo.gov)

Bio: Ken Mills has worked as a large carnivore biologist focused on wolf monitoring and management for the Wyoming Game and Fish Department since 2008. Prior to joining the Wyoming Game and Fish Department, he worked on wolf management and research programs in New Mexico, Ontario, Michigan, and Isle Royale National Park. Ken earned an MSc degree researching wolf ecology and demography in Algonquin Provincial Park, Ontario in 2006.

Abstract: The U.S. Fish and Wildlife Service approved Wyoming's gray wolf management plan (Plan) in September 2011 and removed Endangered Species Act protections for wolves in Wyoming in September 2012, ten years after the population first met recovery levels. The Plan was developed to comply with the terms of an agreement made between the U.S. Fish and Wildlife Service and the Wyoming Governor's Office in August 2011, and was later set in state statutes, which outlined an acceptable wolf management framework for wolves in Wyoming. The Plan committed to maintain ≥ 100 wolves and ≥ 10 breeding pairs at the end of each calendar year in Wyoming outside Yellowstone National Park and the Wind River Reservation. The wolf population in Yellowstone and the Wind River Reservation is expected to contribute at least 50 wolves and 5 breeding pairs at the end of each calendar year to meet the U.S. Fish and Wildlife Service's requirement to maintain ≥ 150 wolves and ≥ 15 breeding pairs statewide. At the end of 2011 the statewide wolf population was ≥ 328 wolves and ≥ 27 breeding pairs, and the wolf population outside Yellowstone and the Wind River Reservation was ≥ 224 wolves and ≥ 19 breeding pairs (roughly twice the minimum delisting criteria). Wyoming's wolf management framework includes dual-classification of wolves depending primarily on habitat suitability. In areas of low habitat suitability with a history of chronic livestock depredation and wolf control mortality, wolves

continued on next page



are designated as predatory animals and can be taken by the public year-round in any legal manner. In areas of high habitat suitability in northwest Wyoming, wolves are designated as trophy game animals and are managed through regulated public hunting seasons. Hunting seasons were developed with an objective of reducing the wolf population in the trophy game area from 192 wolves at the end of 2011 to ~170 wolves and ~15 breeding pairs at the end of 2012. At the end of 2012, the wolf population in the trophy game area was ≥ 169 wolves and ≥ 15 breeding pairs, and the statewide population was ≥ 277 wolves and ≥ 21 breeding pairs. The Wyoming Game and Fish Department will continue to use an adaptive management approach to responsibly manage the wolf population in Wyoming outside Yellowstone and the Wind River Reservation to ensure the population remains above minimum recovery levels.

Parasites of wolves and their ecological correlates in Yellowstone (USA), Abruzzo (IT) and Mercantour (FR) National Parks

Molnar, Barbara

CP 16, 1921 Martigny-Croix, SH-Switzerland (Barbara.molnar@unine.ch)

Bio: Barbara Molnar's accomplishments and affiliations by year: 2005 - Master's thesis on social behaviour and stress hormones in a captive wolf pack. 2011 - Contractor for the Swiss Federal Institute of Technology Zürich and the Swiss Federal Office for the Environment, assessing socio-political aspects of wolf presence in France and northern areas of Italy (2 reports submitted). 2012 - Summer and fall: Field technician in a research project dedicated to mitigate wolf-livestock interactions, Alberta, Canada. 2012 – Ph.D. degree on social behaviour, stress, parasites and viruses of free-ranging wolves. 2013 - Post doc, University of Neuchâtel, Neuchâtel, Switzerland.

Abstract: The potentially highly damaging impact of infectious diseases on free-ranging carnivore populations has received increasing attention in the past fifteen years. Here, “parasite” specifically refers to helminths and protozoans. Most parasites cause host morbidity rather than host mortality, but impact on host health increases when parasitism is combined with other factors including viral or bacterial infection. To our knowledge, no previously published data exist on the parasites of wild wolves in France or in the northwestern United States, while the only study in Italy was done 20 years ago. In this work, we investigated eleven wolf packs belonging to three populations: in Italy (Abruzzo, Lazio e Molise National Park), France (Mercantour National Park) and the United States (Yellowstone National Park). We aimed to (1) document wolf endoparasites in the three study areas and (2) identify ecological correlates of parasite diversity and parasite prevalence in wolf fecal samples. We detected protozoan cysts and helminth eggs and larvae in wolf fecal samples. We report important differences between the three study areas in detected parasite taxa, parasite diversity and parasite prevalence in fecal samples. We discuss the potential effect of the origin of the studied wolf populations, the life-cycle of the detected endoparasites and the density of susceptible hosts on the measured variables. We also report the presence of a canid helminth not yet described in wolves. We advocate repeated large-scale monitoring of endoparasites of free-ranging wolves and other sympatric canids to better understand spread, transmission and impact of parasitism on wild populations.



Wolves, livestock, and livelihoods: seeking solutions to conflict in the arid steppes of Mongolia

Murdoch, James D., Hannah Davie, Patricia Stokowski, Andrea Lini, Richard Reading

Wildlife and Fisheries Biology Program, Rubenstein School of Environment and Natural Resources, University of Vermont, Aiken Center, Burlington, Vermont 05405 USA (jmurdoch@uvm.edu)

Bio: Jed Murdoch is an Assistant Professor in the Wildlife and Fisheries Biology Program at the University of Vermont. He also serves as Research Associate at the Denver Zoo and Programme Coordinator of the IUCN/SSC Canid Specialist Group. Much of his research has focused on carnivores, especially foxes and other canids, and issues related to wildlife conservation in Asia.

Abstract: Wolves live throughout Mongolia and represent an important component of Mongolian ecosystems, culture, and society. While culturally wolves represent a spiritual ancestor and protector, rural herders often kill wolves to protect their livestock and livelihoods and to demonstrate hunting prowess. As a consequence, wolves are declining throughout the region and tools are needed to reduce livestock-conflict to improve livelihoods and wolf populations. We examined patterns of livestock predation and the influence of household factors on the probability of livestock loss in Ikh Nart Nature Reserve. We conducted interviews with 102 families and collected data on the rates and locations of killed livestock and seven household factors related to demographics, household characteristics, and husbandry practices. We developed a landscape-level map of predation probability using a partitioned Mahalanobis D2 technique, and used that map as a prior to model the influence of each factor on predation probability in a Bayesian framework. Our results indicate the landscape characteristics associated with predation and the relative effect of each household factor on the likelihood of predation. These results will inform decision-making about livestock management at the landscape and individual household-levels. As a consequence, we expect that lower rates of predation will result in lower rates of persecution that will benefit wolves in Mongolia.

The practice of wolf control to protect livestock and halt decline of wild prey in Canada

Musiani, Marco

Faculties of Environmental Design and Veterinary Medicine (Joint Appointment), University of Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4 Canada, (mmusiani@ucalgary.ca)

Bio: Marco Musiani is an Associate Professor, tenured with the Faculties of Environmental Design and Veterinary Medicine at the University of Calgary. Dr. Musiani is currently analyzing ecological data on large carnivores and their prey (example, wolves, caribou), which were gathered throughout northern and western Canada. He has published books and papers in various theoretical and applied ecology journals, which also include articles on predator ecology, evolution and management. The issue of wolf control has been analyzed in detail by Dr. Musiani from both biological and human dimensions points of view.

Abstract: In Canada, wolf control occurs after calls for action by livestock producers and when hunters claim that prey populations (e.g., caribou) are depressed by wolves. However, control programs do not seem effective in diminishing wolf depredation occurrence or at increasing wild prey densities at a regional level or in the long-term. Control can extirpate wolf populations locally (an outcome opposed by many citizens, but supported by some locals), and then wolves recolonize such areas. Finally, aerial shooting and sometimes poisoning are also applied to diminish wolf predation on sensitive wild ungulates, including declining barren-ground caribou and declining and threatened woodland caribou. Such programs demonstrated some effectiveness (example, a caribou population not declining in the last year, but after 7 years of control), at the cost of wolf near-eradication, some poisoning of non-target species, and with use of significant taxpayers funds. For example, in a small 40x40-km area 500+ wolves may be killed by spending approximately one million dollars in 5 years. In addition, new data show how human-caused mortality also results in altered stress and reproductive hormones and in multiple litters in the wolf population. Without accompanying efforts to address underlying systemic issues of caribou decline (e.g., habitat loss), wolf control efforts remain an expensive, band-aid, short term approach to treat the symptom - not the problem. Ecological evaluations of wolf control programs are ongoing. Social, economic and ethical evaluations could also be conducted if the desired objective is to inform the public and to avoid settling on controversial management options.



Use of various types of crossing structures on highways by wolves in Poland

Myslajek, Robert W.

Association for Nature "Wolf", Twardorzeczka 229, 24-324, Lipowa, Poland (Robert.myslajek@gmail.pl)

Bio: Robert Myslajek holds an MSc in forestry and a Ph.D. in biology. He also finished postgraduate studies in molecular biology. He is a member of the National Ethical Commission for Experiments on Animals of the Polish Ministry of Sciences and Higher Education and is a vice-president of the Association for Nature "Wolf."

Abstract: Wildlife crossing structures are intended to maintain connectivity of animal populations across roads and railways. Most studies on the effectiveness of these mitigation measures in Europe were conducted in areas where large carnivores do not occur, but such information is crucial to make adequate decisions related to their conservation. After accession to the European Union development of transport infrastructure, Poland rapidly speeded up. However, to sustain ecological connectivity various crossing structures for wildlife were applied. We evaluated use of 7 widened bridges, 6 large overpasses and 3 underpasses by wolves and their primary prey on the newly built, 51 km-long section of the A-4 highway which goes through the Lower Silesian Forest (Western Poland, near Polish-German border). Data were collected during 36 months of monitoring (2010-2013) using sand-beds to get animal footprints and a complementary video camera system. Both wolves and various species of their prey utilized wildlife crossing structures. Fauna passages heavily used by humans were avoided by wild animals. Wolves used all kinds of wildlife crossing structures, but with preference for overpasses. There were also differences in behavior of individuals crossing overpasses and underpasses, with number of anxious behaviors observed in wolves using underpasses. We concluded that these wildlife crossing structures which are overused by humans are less suitable for fauna, even if the location and size of passes are optimal.

Recent trend of public attitude on wolf restoration in Japan

Nambu, Narumi

2-17-3 Renkoji, Tama City, Tokyo 206-0021 Japan (nambu@hotmail.co.jp)

Bio: Narumi Nambu is a member of the Japan Wolf Association. She conducts research about Japanese public attitudes on wolf restoration. Narumi graduated from Tohoku University with a major in psychology, and has completed the Tokyo University of Agriculture and Technology master's program.

Abstract: Wolves were eradicated from Japan by the early 20th century. Since the 1980s, hunters have remarkably decreased along with a decline of local mountain communities over the country. This resulted in an overabundance of wildlife such as sika deer (*Cervus nippon*), wild boar (*Sus scrofa*) and Japanese monkey (*Macaca fuscata*). Overabundant wildlife caused serious devastation of both terrestrial and aquatic ecosystems, heavy damages on agriculture and forestry, and both car and railway accidents. The wildlife administration has taken various countermeasures of controlling those overabundant animals without reintroducing wolves from abroad, but without success. The wildlife administration is hesitating to set about research on a wolf reintroduction plan. Nonetheless, many people are now interested in the return of wolves. Since 1993 a citizen movement by the Japan Wolf Association (JWA) has required the wildlife administration to restore wolves in Japan, and has conducted programs to get the public consensus on it. To know public opinion, JWA conducted a questionnaire survey with intervals of three years. The 7th survey is now ongoing. As for interim results (n=3000+), "yes" and "unknown" are passing the 40% level respectively, while "no" is around 10%. This survey will finish by the end of June of this year. Details will be presented in this symposium.



Reintroducing wolves: a chance for dingoes too?

Newsome, Thomas M. and William J. Ripple

Forest Ecosystems and Society, Oregon State University, Corvallis, OR 97333 (tnew5216@uni.sydney.edu.au)

Bio: Thomas Newsome is a Fulbright postdoctoral scholar from Australia. Through his Fulbright, Thomas is working with researchers from Oregon State University and the University of Washington on research linked to the reintroduction of wolves into Yellowstone National Park. Bringing together experts in the U.S. and Australia, Thomas' focus will be on whether there would be benefits for Australia in using similar measures with dingoes in areas where they have become locally extinct.

Abstract: The reintroduction of wolves (*Canis lupus*) into Yellowstone National Park has sparked worldwide interest in reintroducing top-predators into areas where they have been locally extinct. This is supported by the theory that higher-order predators can alter the abundance or behavioural traits of their subordinate predators or prey, thereby enhancing the survival of the next lower trophic level. In Australia, the dingo (*Canis lupus dingo*), a subspecies of the wolf, is considered a top predator and potential trophic regulator. If dingoes suppress the European red fox (*Vulpes vulpes*) and feral cat (*Felis catus*), they would potentially enhance mammalian prey populations. Yet, there is considerable debate about whether or not dingoes are trophic regulators and whether anthropogenic changes could prevent dingoes from fulfilling their pre-European settlement roles. In this talk, I provide a historical overview of the ecological role of the dingo in Australia. In doing so, I review the evidence for and against maintaining the dingo in the ecosystem and provide an overview of the scientific basis for the controversial proposal to reintroduce dingoes back into areas where they are now locally extinct.

Ecology and genetics of wolves recovering western Poland

Nowak, Sabina

Association for Nature "Wolf", Twardorzeczka 229, 24-324 Lipowa, Poland (sabina.nowak@polishwolf.org.pl)

Bio: Sabina Nowak completed her Ph.D. in ecology of wolves in the Carpathian Mountains. For the last twenty years, she has worked for conservation of large carnivores and mitigation of fragmentation of their habitats caused by transportation infrastructure in Poland. She is a president of the Association for Nature "Wolf" and a member of the Wolf Specialist Group IUCN. Dr. Nowak is also a member of the Large Carnivore Initiative for Europe, IUCN, and the National Council of Nature Conservation.

Abstract: After centuries of persecution and intensive hunting, wolves became strictly protected in Poland in 1998. In following years the population recovered in the western part of the country, where they had been almost entirely extirpated before. We studied population dynamic, diet, habitat preferences and genetics of wolves recolonizing western Poland. At least 22 resident wolf family groups and 2 scent-marking pairs, comprising 100-110 individuals, occurred there at the beginning of 2012. Initial genetic studies, based on analysis of mitochondrial and microsatellite DNA, revealed that the wolf population in western Poland was re-established by individuals which dispersed from the northeastern part of the country. However, recently some packs were also founded by individuals who migrated from eastern Germany, which has speeded up the recovery. Wolves settled almost exclusively in large managed forests and in active and abandoned military training areas. Wild ungulates made up 95% of the total biomass of food consumed, with the most common being roe deer *Capreolus capreolus* (43%), wild boar *Sus scrofa* (23%) and red deer *Cervus elaphus* (22%). Supplementary prey was: fallow deer *Dama dama*, brown hare *Lepus europaeus* and Eurasian beaver *Castor fiber*. Domestic animals, exclusively dogs and cats, made up 1.0% of food biomass. Wolves hunted wild ungulate species according to their relative abundance in the community. As wild ungulates are abundant and livestock density is low, the large forest tracts of western Poland seem to be very good habitat for wolves. Therefore, with more dispersing wolves from eastern Poland and eastern Germany, wolf recovery could significantly accelerate in the next few years in this region.



Factors related to pup production and recruitment of Mexican wolves in Arizona and New Mexico

Oakleaf, John K., Sherry Barrett, Maggie Dwire, Colby M. Gardner, Elizabeth A. Jozwiak

U.S. Fish and Wildlife Service, 2105 Osuna NE, Albuquerque, NM, 87113 (John_Oakleaf@fws.gov)

Bio: John Oakleaf grew up in Wyoming and graduated from the University of Wyoming in 1996 with a B.S. in Wildlife Management. He worked with grizzly bears, wolves, mule deer, and goshawks in Idaho, Montana, Wyoming, Utah and Colorado before attending graduate school at the University of Idaho in 1999 through 2002, where he researched wolf/cattle interactions and habitat selection patterns of wolves in Idaho, Montana and Wyoming. From 2002 to present, he has been employed with the U.S. Fish and Wildlife Service working on Mexican wolf recovery in the southwestern United States and Mexico. John is also currently working on his doctoral degree at Texas Tech University on population dynamics and reintroduction characteristics of Mexican wolves in Arizona and New Mexico.

Abstract: We have been actively reintroducing Mexican wolves to the wild to the Blue Range Wolf Recovery Area (BRWRA) for the last 15 years. Throughout the last 14 years, Mexican wolves have produced pups in the wild. Yet, there is a paucity of data investigating wild Mexican wolf pup production and possible correlates. Fredrickson et al (2007) correlated pup production in captivity and the wild to inbreeding values of either the dams, or the pups. Herein, we examine whether genetic values or wild characteristics dominate general linear models developed for pup production values based on a larger data set in the wild and an increased time period. Specifically, we will calculate the minimum number of pups counted in early (\leq June 30), mid-season (July 1 through September 30), and late-season (October 1 to December 31) in individual packs. These counts will be our dependent variables while genetic (i.e., inbreeding coefficients of the pups and adults) and wild characteristics of the pack (i.e., number of pack members, number of years in the territory, proportion of time in the wild for the dam or sire, and age of the breeders) will be our independent variables. While genetic factors (e.g., Fredrickson et al. 2007) may be the most important factor in early season count of pups, we predict that wild characteristics will be more important for the number of pups observed later in the season.

Evaluating the impact recovering gray wolves (*Canis lupus*) may have on coyote (*Canis latrans*) and whitetail deer (*Odocoileus virginianus*) populations in northeast Wisconsin

Olson, Erik R. and **Ronald N. Schultz**

Department of Natural Resources, Northland College, 1411 Ellis Avenue, Ashland, WI 54806 (eolson@northland.edu); University of Wisconsin-Madison (ronald.schultz@Wisconsin.gov)

Bio: Erik Olson is a native to northern Wisconsin who grew up hunting, fishing, paddling and exploring the wonders of Wisconsin. He recently received his Ph.D. in Environment and Resources from the Nelson Institute for Environmental Studies at the University of Wisconsin – Madison where he studied wolf-human conflicts and wolf ecology. Erik also received his Masters in Environment and Resources from the Nelson Institute at the UW and earned his Bachelor's degree in Science from the University of Wisconsin - Stevens Point. Currently, Erik is an Assistant Professor of Natural Resources at Northland College in Ashland, Wisconsin.

Bio: Ronald Schultz has worked as an endangered species/wildlife biologist for the Wisconsin DNR for the last 31 years. He has been actively involved in the wolf program all 31 years. He has been active in testing new techniques to prevent wolf and livestock conflicts in the Great Lakes states and in Montana. Ron has also been very active in the use of safe capturing devices and immobilization techniques to minimize injuries when research trapping and when collaring free-ranging gray wolves. Ron is a native of northern Wisconsin and resides on the edge of Chequamegon National Forest in Vilas County, Wisconsin.

Abstract: Gray wolf populations have recovered from 25 wolves in 5 packs in 1980 to 815 wolves in 213 packs by 2012. With the increasing number of animals comes the concerns about the impact they may have on other similar predators and their primary prey species. Using winter track surveys (16,172.9 miles, (735.1 average miles per year), we evaluated gray wolf (1,014 tracks cut) and coyote (3,275 tracks cut) populations between 1991 and 2012. We compared those data to white-tail deer harvest and deer per square mile from sex age kill (SAK) ratios in 11 deer management units (DMU) which encompassed 3,940 square miles. By comparing deer numbers to harvest rate and predator abundance, we were able to examine the influence a growing number of predators may have on deer populations.



Implications of the sociopolitical conflict over wolves

Olson, Erik R.

*Department of Natural Resources, Northland College, 1121 Ellis Avenue, Ashland, WI 54806
(eolson@northland.edu)*

Bio: Erik Olson is a native of northern Wisconsin who grew up hunting, fishing, paddling and exploring the wonders of Wisconsin. He recently received his Ph.D. (June 2013) in Environment and Resources from the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison where he studied wolf-human conflicts and wolf ecology. Erik also received his Master's degree in Environment and Resources from the Nelson Institute at the University of Wisconsin and earned his Bachelor's degree in Science from the University of Wisconsin-Stevens Point. Currently, Erik is an Assistant Professor of Natural Resources at Northland College in Ashland, Wisconsin.

Abstract: National and local sociopolitical conflict surrounding wolves has had local ramifications for both wolves and people. Using the case study of wolves and wolf management in the state of Wisconsin, USA, we demonstrate that during a period of intense sociopolitical conflict, a series of concurrent events occurred; wolf populations increased in number and distribution; negative interactions with wolves increased; the state was limited in its ability to control depredating wolves due to inconsistent management authority; attitudes toward wolves declined across wolf range and the inclination to participate in illegal killing of wolves increased for some; individuals in wolf range expressed frustration over wolf management and a lack of empowerment to deal with problem wolves; the proportion of dead wolves illegally killed was positively correlated to time periods when the state lost management authority; and the probability of a dead wolf being the result of illegal activity was higher in years with no lethal control. Value-based actions taken by stakeholders appear to have generated unintended outcomes. We propose instead that actions be based upon compromise to create policy that better aligns with broader public attitudes and species conservation goals. Moderating of the sociopolitical processes that perpetuate swings in policy over short periods is essential to allow wildlife managers greater flexibility in achieving species-specific goals.

Survey of attitudes toward, conflicts with, and management of wolves and bears in rural villages in Armenia

Ozbenian, Serda

8111 Garland Avenue, Takoma Park, MD 20912 (serda.ozbenian@gmail.com)

Bio: Serda Ozbenian is the Executive Director of an NGO called the Armenian Environmental Network and a recent graduate of the Environmental Science and Policy program at George Mason University. Serda recently conducted a baseline survey on human-carnivore conflicts in Armenia, specifically focusing on conflicts with gray wolves and brown bears. This was the first such survey on human-wildlife conflict in Armenia, and it provides some valuable information about the state of wolves and of human-wolf interactions in Armenia.

Abstract: As is the case in other regions of the world where wolves and humans interact, human-wolf interactions in Armenia often result in feelings of animosity and helplessness, dead livestock and dead wolves. The Armenian government annually endorses a wolf cull; however, the size of wolf populations in Armenia has never been quantified nor has the actual extent of human-wolf conflicts in Armenia been studied, until recently. During the summer of July 2012, I surveyed 23 communities in 4 regions of Armenia about their experiences with human-carnivore conflict. Using a combination of open-ended interviews, focus groups, community mapping and risk-ranking, I created a baseline for human-carnivore conflicts in the country. Among the topics explored were overall attitudes toward wolves and current strategies for dealing with human-wolf conflicts. Although the government has promised to compensate individuals who kill a wolf, they rarely follow through with this promise, and many villagers don't have guns, which has led to increasing frustrations, more livestock losses and unreported wolf kills. Although villagers throughout Armenia use a variety of strategies to avoid conflicts with wolves, including lethal removal, lights, noise, fencing, traps, and poisons, many of the surveyed villages reported increased conflicts with wolves in recent years, and many also expressed a need for support. This begs the question, what is the best strategy for avoiding conflicts for poor villagers in rural mountainous Armenia? How can we transform the current situation from constant conflict to peaceful coexistence and stewardship?



Iberian wolf howls: insights into their biological function and potential usefulness for monitoring wild populations

Palacios, Vicente, Enrique Font, José Vicente López-Bao, Rafael Márquez, Luis Llana, Carlos Fernández
*Instituto Cavanilles de Biodiversidad y Biología Evolutiva, Universidad de Valencia Apdo 22085,
46071-Valencia, Spain (v_palacios_s@hotmail.com)*

Bio: Vicente Palacios is a wildlife research biologist who began to study wolves in 1998, monitoring Iberian wolf populations. His professional work has focused on the conservation and management of wolves, and he is conducting in parallel a long-term research about acoustic communication in Iberian wolves. He is a pre-doctoral fellow at the University of Valencia.

Abstract: As part of an ongoing research program focusing on acoustic communication in the Iberian wolf, we studied Iberian wolf howling. Iberian wolf howls are long (up to 12.8 s) harmonic sounds, with a mean fundamental frequency between 270 and 720 Hz, quite similar to North American wolf howls. An analysis of the acoustic structure of howls revealed that several acoustic parameters of howls, namely the fundamental frequency (mean and maximum) and the coefficient of frequency modulation provide information that could potentially be used to discriminate individuals. Playback experiments demonstrate that wolves discriminate changes in the acoustic parameters of howls and confirm that wolves are capable of recognizing individuals by the acoustic structure of their howls. We have also investigated whether wolf chorus howls could transmit information of 1) the presence of pups and 2) pack size. Models obtained to determine the presence of pups classify 90% of choruses correctly, and some acoustic energy features vary according to the number of wolves vocalizing. These results suggest that 1) wolves could obtain information about individual identity, presence of pups and pack size from howls, and 2) the analysis of howl recordings may provide useful tools to collect information about ecological parameters essential for wolf conservation and management, such as distribution, abundance or reproductive success.

Mexican gray wolf recovery: missing the mark, so far

Parsons, David R. and Jean C. Ossorio
2723 Decker Ave NW, Albuquerque, NM 87107 (ellobodave@comcast.net)

Bio: Dave Parsons received his Bachelor of Science degree in Fisheries and Wildlife Biology from Iowa State University and his Master of Science degree in Wildlife Ecology from Oregon State University. Dave was a career Wildlife Biologist with the U.S. Fish and Wildlife Service, where from 1990 to 1999 he led the USFWS's Mexican Gray Wolf Recovery Program. Dave's interests include the ecology and conservation of large carnivores, protection and conservation of biodiversity, and wildlands conservation at scales that fully support ecological and evolutionary processes. He is the Rewilding Institute's Carnivore Conservation Biologist.

Abstract: On January 12, 1998, Interior Secretary Bruce Babbitt authorized the release and establishment of a nonessential experimental population of the endangered Mexican gray wolf (*Canis lupus baileyi*) into the Blue Range Wolf Recovery Area (BRWRA) in Arizona and New Mexico. The objective was to establish a wild population of at least 100 Mexican wolves within the BRWRA by 2006. From March 1998 to date, 102 wolves have been released. A special rule promulgated under authority of Section 10(j) of the Endangered Species Act specifies limited circumstances for "taking" wolves from this population. However, the Service committed in the final Environmental Impact Statement (pages 2-16) to limiting its use of discretionary authority under the Section 10(j) rule to "mitigate the potential impacts ... consistent with wolf recovery." By the end of 2006 the official population estimate was 59 wolves and 5 breeding pairs. The proposal anticipated the release of 66 wolves through 2002; however, unsustainable mortalities and management removals necessitated the release of 99 wolves through 2006. In 2007, the authors characterized the Mexican gray wolf reintroduction program as "take limited" and "release subsidized." While management-related take has been reduced significantly since 2008, so has the number of wolf releases. At last count, the wild BRWRA population was estimated at 75 wolves - still well short of the 2006 benchmark of 100 wolves. Recommendations are offered to improve the success of the Mexican Gray Wolf Recovery Program.



Eastern wolf (*Canis lycaon*) dispersal from Algonquin Provincial Park, Ontario: implications for population expansion in surrounding areas

Patterson, Brent R., John F. Benson, Ken J. Mills, Karen M. Loveless, Dennis L. Murray

Ontario Ministry of Natural Resources, DNA Building, Trent University, 2140 East Bank Drive, Peterborough, ON, K9J 7B8 (brent.patterson@ontario.ca)

Bio: Brent Patterson has been a Field Research Scientist with the Ontario Ministry of Natural Resources, and an adjunct professor at Trent University, since 2001. Brent's present research deals primarily with understanding the dynamics of coyote, wolf, and deer populations in temperate and boreal regions. Prior to this, Brent worked for 3 years as a biologist for the Government of Nunavut in the central Canadian Arctic. He holds a Masters degree in Wildlife and Conservation Biology from Acadia University, and a Ph.D. in biology from the University of Saskatchewan. When he's not working he enjoys and running, skiing, hunting, fishing, and spending time with his family.

Abstract: Along with births and deaths, dispersal plays a major role in determining population growth rates, and is the key driver of metapopulation dynamics. We estimated age and sex-specific dispersal rates of 281 radio-collared eastern wolves (*Canis lycaon*) in and around Algonquin Provincial Park (APP) from 2002–2011. Annual dispersal probabilities were 0.220 (95% CI = 0.108 – 0.318), 0.508 (0.341–0.633), and 0.144 (0.099 – 0.187) for pup, yearling and adult wolves respectively. There were no gender differences in dispersal probabilities for any of the 3 age classes. The probability of pups and yearlings dispersing peaked during October and then declined through spring. Most adult dispersal occurred from November – January. Lighter pups were more likely to disperse before their first birthday than their heavier littermates. Median dispersal distance was 32.0 km (n = 51) and was similar among age classes. Few wolves emigrated from the study area. There were no direction biases with respect to dispersal. Combined with recent research indicating poor survival of eastern wolves outside protected areas, our results suggest that it is unlikely that this genetically distinct wolf population will expand significantly in the unprotected matrix outside APP without additional protection from harvest.

Wolves brush with extinction at Isle Royale – again

Peterson, Rolf O. and John A. Vucetich

School of Forest Resources and Environmental Science, Michigan Technological University (ropeters@mtu.edu)

Bio: Rolf Peterson has studied wolves and moose at Isle Royale National Park for over four decades, most of the 55-year history of the world's longest predator-prey study. He is a research professor at Michigan Technological University and lives in Houghton, Michigan.

Abstract: For the second time in two decades, the wolf population in Isle Royale National Park (Michigan) reached a low level where extinction probability is very high – eight wolves in 2013, following a year when reproduction was apparently zero. In the early 1990s, with 12 wolves left, inbreeding and introduced disease (canine parvovirus) were emergent issues, but the population flourished as disease died out and an immigrant wolf brought new genetic diversity. Inbreeding is now a paramount issue once more. While popularly viewed as an ecosystem without important human impacts, indirect impacts include 80% reduction in ice bridges allowing wolf access to the island, long-term legacy of parvovirus, and a single event in 2011 in which 25% of the wolves died in a historic mine shaft. Responding to these circumstances requires careful attention to a complex set of competing values, including non-intervention, wilderness, ecosystem health, science, and education. Already, after two years of very low wolf density, correlated changes have been documented in several other species: moose (up), beaver (up), foxes (down), snowshoe hares (up), and ravens (down).



Facultative scavenging of cattle by wolves

Petroelje, Tyler R., Jerrold L. Belant, Dean E. Beyer, Jr., Nathan J. Svoboda

1309 W. Highway2, Crystal Falls, MI (tpetroelje@cfr.msstate.edu)

Bio: Tyler R. Petroelje is a graduate student at Mississippi State University working toward a Ph.D. under Dr. Jerrold Belant in the Carnivore Ecology Laboratory. Tyler has previously assisted in black bear research in Pictured Rocks National Lakeshore and coyote ecology in Michigan's Upper Peninsula. His current research focus is on predator-prey interactions in Michigan's Upper Peninsula.

Abstract: Causes of wolf-human interactions have been of interest to managers as wolves recolonize much of their former range. Livestock predation is a concern that has received considerable attention and monies. Previously, wolves have been found to feed at livestock carcass dumps (LCD) seasonally and increase potential for wolf-human conflict on cattle range lands. We examined the influences of LCD on wolf space use, depredation occasions and diet in the south-central Upper Peninsula of Michigan. We captured and collared 8 wolves with global positioning system collars during May–August of 2009–2011. We examined 15 minute telemetry locations to identify spatial use near known LCD and reports of depredation within each collared wolf range. We also collected wolf scat to estimate proportion of diet provided by scavenging at LCD. Wolves used areas near LCD significantly more than other areas of their occupied range. Of 3 depredation events, 2 occurred within a wolf range containing LCD. Cattle composed 20% of the wolves' diet. Livestock carcass dumps appear to serve as attractants for wolves as they use these areas significantly more than at random. Additionally, a greater proportion of cattle was found in their diet than can be explained by depredation. In Michigan open pit LCD are illegal but prevalent. Scavenging at LCD by wolves can be reduced by removing or burying these sites and may reduce the possibility for wolf-human conflict near these sites.

Factors affecting wolf presence in the Iberian Peninsula

Petrucci-Fonseca, Francisco, Mariana Seara, Gonçalo Ferrão da Costa, Clara Grilo

Centro de Biologia Ambiental (CBA), Faculdade de Ciências Environment, Universidade de Lisboa 1749-016 Lisboa, Portugal (fpfonseca@fc.ul.pt)

Bio: Dr. Francisco Petrucci-Fonseca is an assistant professor at the University of Lisbon in Lisbon, Portugal. He holds a Ph.D. in Ecology and Systematics from the University of Lisbon. His main research interests are wolf ecology and conservation. One of his major research goals is to contribute to Iberian wolf conservation. The relation between scientific research and environmental education is very connected. He is president of the board of Grupo Lobo, an NGO in Portugal and director of the Iberian Wolf Recovery Center in Portugal.

Abstract: The Iberian wolf population size is estimated to be around 2500 individuals based on recent Portuguese and Spanish wolf censuses. Total wolf range currently reaches 140 000km², an area which has grown in recent years, with wolf expansion being observed south of Douro river and from the Pyrenees in France. We aimed to study environmental conditions that allowed Iberian wolf to survive and be restricted to the Northwestern quadrant of the Peninsula, from where they are now starting to expand. We used a Generalized Linear Model (GLM) with wolf presence data from national census (n=953 at a 10x10km scale) and pseudo-absences from a 100km buffer around the known wolf range. Variables used in modeling were of three types: Landscape, Human-related and Prey-related. The best model created with stepwise forward method (AUC=0.88) was positively correlated with altitude, percentage of open areas, cattle density and road density, and was negatively correlated with human density, percentage of forest, and goat and sheep density. Contrarily to other wolf distribution areas, road density was positively correlated with wolf presence, since the northwestern quadrant of Iberia (where wolf is mostly present) has a much higher roadway density than central areas of Portugal and Spain. These results show that the wolf in Iberia can accommodate a certain level of human disturbance (provided that other factors are present, such as altitude), and this threshold can be a key factor on its current presence and expansion. Human-wolf interactions were and will be present in Iberian Peninsula, since livestock is the main prey of this top predator. The way humans perceive wolf presence and are able to support some level of livestock predation is a vital factor in shaping wolf distribution in Portugal and Spain.



Mexican wolf recovery region

Phillips, Mike

Turner Endangered Species Fund, 1123 Research Drive, Bozeman, MT 59715 (Mike.Phillips@tedturner.com)

Bio: Mike Phillips has a long history of working with threatened and endangered species in the research, management, and policy realms. He led the effort to restore red wolves to the Southeast and gray wolves to the Greater Yellowstone Ecosystem. He has served on every Mexican Wolf Recovery Team convened since 1995. He has directed the Turner Endangered Species Fund since its inception in June 1997.

Abstract: The Mexican wolf has been the focus of a recovery program for over 30 years. Historically the subspecies was most common in southern Arizona and southern New Mexico and Mexico. Due to chronic concerns over the extent of suitable habitat in the core region of the Mexican wolf's historical range, the Science and Planning Subgroup of the current Mexican Wolf Recovery Team undertook a comprehensive assessment of the best available science concerning current and future habitat conditions throughout the southwestern United States and most of Mexico. Given that the Mexican wolf is represented in the wild by only one restored population in the Blue Range Wolf Recovery Area (BRWRA), new reintroduction projects will be needed to recover the subspecies. Consequently, identifying high quality, secure tracts of suitable habitat is of central importance. The subgroup has recommended that the Mexican wolf recovery region include Mexico, extreme western Texas, Arizona, New Mexico, southern Utah (as circumscribed by Interstate highways 15 and 70), and southern Colorado (as circumscribed by Interstate highways 70 and 25). Three core areas of suitable habitat exist within this recovery region and include: 1) the BRWRA and adjacent public lands, 2) the Grand Canyon and adjacent public lands in northern Arizona and southern Utah (circumscribed by Interstate highways 15 and 70), and 3) Carson and San Juan National Forests and other connected areas of public lands and private lands with conservation management in northern New Mexico and southern Colorado (circumscribed by Interstate highways 70 and 25).

Predicting abundance of gray wolves in Montana using hunter observations and field monitoring

Podruzny, Kevin M., Justin A. Gude, George R. Pauley, Michael S. Mitchell, Elizabeth H. Bradley, Nathan Lance, Kent J. Laudon, Abigail A. Nelson, Michael S. Ross, Ty D. Smucker

*Montana Department of Fish, Wildlife, and Parks, 1420 East 6th Avenue, Helena, MT 59620, USA
(kpodruzny@mt.gov)*

Bio: Kevin Podruzny is a wildlife biometrician with Montana Fish, Wildlife and Parks. He is presently a Ph.D. candidate in the department of Fish and Wildlife Biology at Montana State University. He has a B.S. in wildlife biology from the University of Montana and an M.S. in wildlife management from Montana State. Kevin's interests include hunting, fishing and building traditional muzzleloaders.

Abstract: From the early 1980s to present, wolf numbers in Montana have been documented by attempting to locate and count all individuals. These counts represented minimums with unknown error. We describe a method using observations by hunters in conjunction with field monitoring to estimate wolf population size and distribution in a more systematic way. Our method consists of three general steps: 1) use a multi-season occupancy model to estimate the area occupied by wolves in packs using locations reported by a random sample of hunters, 2) estimate the numbers of wolf packs by dividing area occupied by average territory size from field monitoring, then 3) estimate the numbers of wolves by multiplying the number of estimated packs by average pack size from field monitoring.



Group composition effects on inter-pack aggressive interactions of Yellowstone gray wolves

Quimby, Kira A.

P.O. Box 1157, Gardiner, MT 59030 (kcassidyquimby@gmail.com)

Bio: Kira A. Quimby graduated from Southern Illinois University in 2007 and has worked for the Yellowstone Wolf Project since 2008. Kira attended the University of Minnesota (M.S.) under advisor Dr. Dave Mech and focused on the effects of group composition and the division of behavioral sexual dimorphism during aggressive inter-pack interactions of Yellowstone gray wolves.

Abstract: Gray wolves (*Canis lupus*) are group-living carnivores that defend group territories and direct aggression against conspecifics. Despite intraspecific strife accounting for a large proportion of natural mortality, aggressive interactions with other packs have rarely been observed. We documented 292 inter-pack aggressive interactions during 16 years of observation in Yellowstone National Park, Wyoming. By directly observing these interactions, we were able to record pack sizes, compositions, and residency status at the interaction location. We also documented the outcomes of the interactions by determining which pack was able to successfully displace the other. We found that while pack size relative to the opponent is an important factor in predicting successful inter-pack aggressive interactions, pack composition also had significant effects. Packs with relatively higher numbers of old adults (six years and older) or adult males had an advantage over their opponents, making them more likely to win an interaction. While the importance of pack size in inter-pack conflict suggests that the evolution and maintenance of group-living may be due to larger packs' superior abilities to protect themselves and their resources, the influence of group composition highlights our findings that some individuals are more effective than others during aggressive inter-pack interactions.

Applied adaptive management in the recovery of red wolves (*Canis rufus*): successful use of sterilized coyote (*Canis latrans*) placeholders

Rabon, David R., Becky Bartel, Art Beyer

Red Wolf Recovery Program, U.S. Fish and Wildlife Service, PO Box 1969, Manteo, NC 27954 (david_rabon@fws.gov)

Bio: Dr. David Rabon is the Coordinator of the U.S. Fish and Wildlife Service's Red Wolf Recovery Program. Dr. Rabon's research interests include the restoration, conservation, and management of endangered species, particularly wild canids and other carnivores. His focal research/study areas include the behavioral ecology, reproduction, and social behavior of wild canids; intra- and inter-species relationships; population assessment and species-habitat relationships; mitigation of human-predator conflicts; and resolution of complex problems related to carnivore management.

Abstract: The recovery and restoration of red wolves (*Canis rufus*) requires the careful management of coyotes (*Canis latrans*) and occasionally red wolf-coyote hybrids in the red wolf re-introduction area. While originally not found in the northeastern North Carolina red wolf recovery area, non-native coyotes were first detected there in the early 1990s. It soon was recognized that interbreeding between red wolves and coyotes would produce hybrid offspring resulting in coyote gene introgression into the wild red wolf population, and that this introgression could threaten the restoration of red wolves. An adaptive management plan was developed to reduce interbreeding and introgression while simultaneously building the red wolf population. The adaptive management plan effectively uses techniques to capture and sterilize hormonally intact coyotes via vasectomy or tubal ligation, then releases the sterile canid at its place of capture to act as a territorial "placeholder" until the animal is replaced by wild red wolves. Sterile coyotes are not capable of breeding with other coyotes, effectively limiting the growth of the coyote population, nor are they capable of interbreeding with wild red wolves, limiting hybridization events. In addition, the sterile canid will exclude other coyotes from its territory. Ultimately, the placeholder coyotes are replaced by the larger red wolves either naturally by displacing the coyote or via management actions. From 1999-2012, the Red Wolf Recovery Program sterilized and radio-collared approximately 212 coyotes and/or hybrids. The fate of these animals and the observed interactions with red wolves are discussed.



Wolf management in Idaho since delisting in 2009 (...and re-listing, and re-listing...)

Rachael, Jon

*State Wildlife Manager, Idaho Department of Fish and Game, P.O. Box 25, Boise, ID 83807
(Jon.rachael@idfg.idaho.gov)*

Bio: Jon Rachael has a B.S. in Wildlife Science from Penn State and an M.S. in Wildlife Biology from the University of Montana where his involvement with wolves began with his graduate project in 1988. Jon began working for the Idaho Department of Fish and Game (IDFG) in 1992 where he served on the team that developed the "Environmental Impact Statement on Reintroduction of Wolves into Yellowstone National Park and Central Idaho." Jon worked on a variety of statewide big game management issues and served as IDFG's liaison on wolf issues until 2001. From 2001 to 2009 he was Regional Wildlife Manager for Fish and Game's Southwest Region and had lead responsibility for all wildlife in the region. Since May 2009, Jon has been IDFG's State Wildlife Manager. He supervises the management programs for all game species, including gray wolves, and managed Idaho's first wolf hunt in 2009 and the 2 subsequent wolf hunting and trapping seasons in 2011-2012 and 2012-2013.

Abstract: Fifteen wolves were translocated from Canada into central Idaho in 1995, and an additional 20 wolves were released in 1996. The state wolf population initially met the established criteria required to initiate delisting from the Endangered Species Act at the end of 2000 after exceeding 100 wolves and at least 10 breeding pairs for 3 consecutive years. In anticipation of future delisting, a legislatively-established Wolf Oversight Committee completed a wolf conservation and management plan in cooperation with the Idaho Department of Fish and Game in early 2002. The plan was subsequently amended and adopted by the Idaho Legislature and approved by the U.S. Fish and Wildlife Service (USFWS). The Idaho Department of Fish and Game (IDFG) and the Idaho Fish and Game Commission completed and adopted a more prescriptive wolf population management plan in 2008 to guide wolf management after delisting. By the time wolves were delisted in Idaho and Montana in May 2009, the Idaho population was estimated at over 1,000 wolves (including pups born in spring 2009), and IDFG conducted its first regulated wolf harvest season. The primary objective of this initial season was to stop population growth. Harvest limits were set in each of 12 wolf management zones, and a statewide limit was set at 220 wolves as a protective measure. Over 31,400 hunters purchased a wolf tag during this initial 2009-2010 season, and 188 wolves were killed. Wolves were relisted in response to legal action in August 2010 just as IDFG was planning to implement a second harvest season. Consequently, no wolf harvest was permitted during the 2010-2011 hunting season. The relisting action compounded existing frustration among hunters, the agriculture community, Fish and Game Commissioners, legislators, and members of the state executive branch, up to and including the Governor. In response, the Governor withdrew IDFG's participation in wolf management and monitoring as a designated agent of the USFWS, and the Idaho Fish and Game Commission suspended IDFG's 2008 wolf population management plan, largely because it prescribed that wolves would be managed at a population level 5-7 times the delisting threshold. Wolves were again delisted in Idaho and Montana in May 2011, and IDFG reestablished regulated harvest seasons with the intent of reducing wolf numbers, particularly where conflicts were occurring with livestock and where wolf predation was implicated as a primary factor in elk population declines or suppressing recovery of elk in zones below management objectives. Harvest opportunity has been expanded incrementally based on results and experience during prior wolf harvest seasons, including the addition of a trapping season in parts of the state beginning in 2011, and the option for hunters and trappers to purchase multiple tags. During 2011, 30,196 hunters purchased 32,273 wolf hunting tags and 255 trappers purchased 528 wolf trapping tags. In 2012, 31,834 hunters purchased 35,144 wolf hunting tags and 230 trappers purchased 473 wolf trapping tags. Three hundred seventy-nine (379) wolves were killed during the 2011-2012 season, and 314 wolves were killed during the 2012-2013 season. Trapping accounted for 33% of the total wolf harvest during the 2011-2012 season and 38% of the harvest during the 2012-2013 season. Hunting and trapping seasons, combined with aggressive agency control actions in response to livestock depredations, have resulted in a reduction in wolf numbers, particularly in management zones with higher road and hunter densities and areas with lower vegetative cover. However, to date, harvest seasons do not appear to have appreciably reduced wolf numbers in zones with lower hunter densities, low road densities, high vegetative cover, or severe topography that impedes hunter access. Agency-directed control efforts have been focused on reducing wolf numbers in these areas where elk populations remain below management objectives.



Moving from recovery to state management of wolves

Ream, Robert A.

Montana Department of Fish, Wildlife, and Parks Commission, 1420 East 6th Avenue, Helena, MT 59620, USA, and Wildlife Biology Program, University of Montana, College of Forestry and Conservation, Missoula, MT 59812, USA (bobream@mt.net)

Bio: Bob Ream started studying wolves with L. David Mech in 1968 as a research ecologist at the North Central Forest Experiment Station. He started the Wolf Ecology Project at the University of Montana 40 years ago (1973) with the naturally recovering wolves in northwest Montana. He served on the Northern Rocky Mountain Wolf Recovery Team from 1974 to 1988. Ream is Professor Emeritus of Wildlife Biology, College of Forestry and Natural Resources, University of Montana. He served in the Montana House of Representatives from 1983 through 1997, and chaired its Fish and Game Committee twice. Ream most recently chaired the Montana Fish, Wildlife and Parks Commission from 2009-2013, where he dealt with the beginning of state wolf management.

Abstract – Panel Introduction: State management of gray wolves, more than any other species, has been affected by the legislative, executive and judiciary branches of government at both federal and state levels. The Endangered Species Act encourages post-recovery state management after approval of state plans by the U.S. Fish and Wildlife Service. However, population recovery goals in the Northern Rocky Mountains and Great Lakes populations were reached long before delisting occurred, in some cases by a factor of 5-6 times the goal. The delays have angered state governors, legislators and many residents of these states. Upon delisting, state legislatures and governors have mandated wolf management decisions for state wildlife agencies, micro-managing tools and strategies wildlife managers might otherwise use. Idaho and Montana started their first hunting seasons following delisting in 2009. The federal court re-listed wolves in 2010 - thus, no season. After delisting again in 2011, harvests resumed in 2011 and 2012. Wyoming held its first season in 2012, along with the Great Lakes states of Minnesota and Wisconsin. All five of these states and Michigan are currently initiating a 2013-14 season. Controversial topics, such as trapping, use of dogs, electronic calls, baits, bag limits, and length of seasons have often been mandated by legislative bodies or governors, resulting in differences in harvest strategies between states. The six state biologists on this panel will present harvest strategies used and harvest data for these initial efforts in wolf management. With 6,000 wolves in these six states, wolves are here to stay, and are rapidly expanding into adjacent states. Oregon and Washington will soon face similar decisions.

Importance of recruitment to accurately predict the impacts of human-caused mortality on wolf populations

Ream, Robert A., Justin A. Gude, Michael S. Mitchell, Robin E. Russell, Carolyn A. Sime, Edward E. Bangs, L. David Mech

Montana Department of Fish, Wildlife, and Parks Commission, 1420 East 6th Avenue, Helena, MT 59620, USA, and Wildlife Biology Program, University of Montana, College of Forestry and Conservation, Missoula, MT 59812, USA (bobream@mt.net)

Bio: Bob Ream started studying wolves with L. David Mech in 1968 as a research ecologist at the North Central Forest Experiment Station. He started the Wolf Ecology Project at the University of Montana 40 years ago (1973) with the naturally recovering wolves in northwest Montana. He served on the Northern Rocky Mountain Wolf Recovery Team from 1974 to 1988. Ream is Professor Emeritus of Wildlife Biology, College of Forestry and Natural Resources, University of Montana. He served in the Montana House of Representatives from 1983 through 1997, and chaired its Fish and Game Committee twice. Ream most recently chaired the Montana Fish, Wildlife and Parks Commission from 2009-2013, where he dealt with the beginning of state wolf management.

Abstract: Reliable analyses can help wildlife managers make good decisions, which are particularly critical for controversial decisions such as wolf (*Canis lupus*) harvest. Creel and Rotella (2010) recently predicted substantial population declines in Montana wolf populations due to harvest, in contrast to predictions made by Montana Fish, Wildlife and Parks (MFWP). Here we replicate their analyses



considering only those years in which field monitoring was consistent, and we consider the effect of annual variation in recruitment on wolf population growth. We also use model selection to evaluate models of recruitment and human-caused mortality rates in wolf populations in the Northern Rocky Mountains. Using data from 27 area-years of intensive wolf monitoring, we show that variation in both recruitment and human-caused mortality affect annual wolf population growth rates and that human-caused mortality rates have increased with the sizes of wolf populations. We also show that either recruitment rates have decreased with population sizes or that the ability of current field resources to document recruitment rates has recently become less successful as the number of wolves in the region has increased. Predictions of wolf population growth in Montana from our top models are consistent with field observations and estimates previously made by MFWP. Familiarity with limitations of raw data helps generate more reliable inferences and conclusions in analyses of publicly-available datasets. Additionally, development of efficient monitoring methods for wolves is a pressing need, so that analyses such as ours will be possible in future years when fewer resources will be available for monitoring.

Wolf recovery in California

Richie, Lauren

Associate Director, Northern California, California Wolf Center, 1280 Pine Street, #502, San Francisco, CA 94109 (lauren.richie@californiawolfcenter.org)

Bio: Lauren Richie is Associate Director of Northern California for the California Wolf Center. A conservation biologist, Lauren previously worked to advance human-wildlife coexistence at Defenders of Wildlife. She holds a B.A. in biology from Swarthmore College and an M.E.M. in the human dimensions of wildlife conservation from the Yale School of Forestry and Environmental Studies.

Abstract: More than fifteen years after the first wolves were reintroduced into the Northern Rockies, a single wolf crossed into California, the first wolf to be documented in the state in nearly 90 years. After first documenting wolf packs in 2008, Washington and Oregon now each have several established packs. As those populations continue to recover, more wolves are likely to disperse to California. The California Department of Fish and Wildlife is planning for wolves' return by developing a management plan and convening a group of stakeholders to provide input. Initiated in 2012, this group includes representatives from state and federal agencies and environmental, animal protection, agricultural, sportsmen, and recreational groups. The California Wolf Center is paving the way for wolf recovery through outreach, education, partnerships, and collaboration. What wolf recovery will look like in California is still unfolding, and will be for years to come. How will California learn from the experience of wolf recovery in other states? Will California create a new model for wolf conservation and management? This presentation will discuss the unique challenges and opportunities facing California as wolves begin to enter the state.



State management of wolves in Michigan

Roell, Brian J.

Michigan Department of Natural Resources, Marquette, MI (ROELLB@michigan.gov)

Bio: Brian J. Roell is a wildlife biologist for the Michigan Department of Natural Resources covering the Gwinn and Baraga forest units. During his career he has become a wolf specialist for the state of Michigan. He received his B.S. from Northern Michigan University and his M.S. from the University of Northern Colorado. His other professional interests include furbearer and moose ecology, and human-wildlife conflicts.

Abstract: In Michigan, the gray wolf was protected under federal and state endangered species protection statutes in 1974 and 1976, respectively. Recovery of the population began in the late 1980s when the state documented three wolves in Dickinson County. In March 2006, the U.S. Fish and Wildlife Service (USFWS) determined that wolves in this region had met the predetermined recovery criteria in 1999 and were no longer at risk and began the process for delisting wolves from the Western Great Lakes Distinct Population Segment. However, because of legal challenges, the USFWS did not remove wolves from the federal list of threatened and endangered species until January 27, 2012, thirteen years after they met the criteria for delisting. After biological recovery, the Michigan Wolf Management Plan (2008) has guided wolf management. The management plan was developed to help: 1) maintain a viable Michigan wolf population above a level that would warrant its classification as threatened or endangered; 2) facilitate wolf-related benefits; 3) minimize wolf-related conflicts; and 4) conduct science-based wolf management with socially acceptable methods. The management plan does not establish a maximum population level for wolves; rather it ensures a self-sustaining wolf population, which performs its ecological function on the landscape, while minimizing public intolerance. The management plan supports the development and implementation of a policy regarding public wolf harvest for the purpose of reducing wolf-related conflicts, but it does not provide guiding principles for the recreational harvest of wolves. Under this framework Michigan has proposed a season for the fall of 2013 that has a target harvest of 43 wolves in three units which have had persistent wolf-related conflicts despite the continued application of non-lethal and targeted lethal methods. The three hunt units only encompass about 12% of the Upper Peninsula, and we do not expect the harvest quota to affect the growth rate of the wolf population. The continued use of a wolf-hunting season as a management tool is uncertain because opponents to hunting are challenging the laws designating wolves as a game species through Michigan's voter referendum process. In addition, pending litigation over the federal delisting of wolves in the Great Lakes region could result in wolves being placed back on the federal endangered species list.

Relations between wolves and black bears

Rogers, Lynn and Mansfield, Susan A.

Wildlife Research Institute, 1482 Trygg Road, Ely, MN 55731 (lrogers@bearstudy.org); Wildlife Research Institute, 1482 Trygg Rd, Ely, MN 55731 (smansfield@bearstudy.org)

Bio: Lynn Rogers has studied black bear behavior and ecology since 1967, working for various government agencies and the Wildlife Research Institute. He and co-presenter Sue Mansfield have special interests in the language of black bears and how it differs from that of wolves.

Bio: Sue Mansfield, after 20+ years as a data analyst, parlayed her interest in tracking and natural history into a master's degree in Environmental Studies from Antioch University New England. Since the summer of 2004, Mansfield has conducted field research through the Wildlife Research Institute under the direction of Lynn Rogers, Ph.D. and currently co-teaches the Black Bear Field Study course. Mansfield's research work has included walking with bears for up to 14 hours at a time to collect detailed information on behaviors and food choices. Her video footage of intimate bear behavior has been featured in the BBC's "Bearwalker of the Northwoods," "The Bear Family and Me," and "Planet Earth Live."

Abstract: We report black bear (*Ursus americanus*) reactions to wolves (*Canis lupus*) and summarize wolf predation on denning black bears. On August 7, 1989, we watched a black bear detect a wolf, stand up, and immediately lead her cubs ~200 m across a highway to an old white pine. The wolf circled the tree, looking up at the family and moved on. Fifty minutes later, the family descended and moved



a mile to another large white pine for the night. Another mother chased a wolf away from a tree that held her cubs. Black bears commonly chase lone wolves, but a lone wolf treed a black bear near a wolf den. A black bear killed (but did not eat) a wolf near a wolf den. Black bears are not known to prey on wolves, and wolves seldom prey on hibernating black bears despite the apparent vulnerability of bears in shallow, exposed dens. In visiting 206 dens, we found wolf sign at only 2. One held a dying, gut-shot bear. The other was an exposed den where 6-9 wolves had attacked from 2 sides, killing and eating a 16-year-old mother and her newborn cubs in February 1977, a year of low deer numbers. Signs of fighting in that case included wolf fur, bear fur, part of a wolf tooth, and a pool of blood. Five other reports of predation at dens include packs of 2-10 wolves killing dened bears (one previously wounded) in easily accessible dens with sparse snow cover.

Contrasts in the languages of wolves and black bears

Rogers, Lynn and Susan A. Mansfield

Wildlife Research Institute, 1482 Trygg Road, Ely, MN 55731 (lrogers@bearstudy.org); Wildlife Research Institute, 1482 Trygg Rd, Ely, MN 55731 (smansfield@bearstudy.org)

Bio: Lynn Rogers has studied black bear behavior and ecology since 1967, working for various government agencies and the Wildlife Research Institute. He and co-presenter Sue Mansfield have special interests in the language of black bears and how it differs from that of wolves.

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Abstract: Differences in wolf (*Canis lupus*) and black bear (*Ursus americanus*) diets coincide with other differences in their lives. Although both species are members of the superfamily Canoidea in the order Carnivora, wolves cooperatively hunt large ungulates, while black bears generally forage for small items (berries, nuts, greens, and insect larvae) in food patches too small to support group living. In wolf packs, social communication includes snarls, growls, dominant and submissive postures, and biting behaviors that look and sound ferocious—all of which are unlike anything seen among black bears. Bites used as communication among pack members are typically inhibited; pack members rely on each other for survival. The more solitary black bear also uses inhibited bites in communication at times, but without the accompanying vocalizations and facial expressions typical of wolves. Black bears do not snarl or growl except in taxidermy, artist renditions, or TV programs that add computer-generated growls to videos of trained bears quietly opening their mouths on command for food rewards. In reality, instead of showing their teeth, stressed black bears narrow their muzzles, extend their lips, and blow as they lunge, slap the ground or trees, or clack their teeth. These common, ritualized displays by black bears are defensive expressions of anxiety that have not turned into attacks in hundreds of instances during our 46 years of study. Black bears have no long-range vocalizations like howling or barking.



Reservation wolves and border wolves: embracing cooperative wolf management and buffer zones

Sanders, Jason D. and Erik R. Olson

University of Wisconsin Law School, 975 Bascom Mall, Madison, WI 53706 (jdsanders@wisc.edu); Department of Natural Resources, Northland College, 1411 Ellis Avenue, Ashland, WI 54806 (eolson@northland.edu)

Bio: Jason D. Sanders is an enrolled member of the Bad River Ojibwe and will graduate from the University of Wisconsin Law School with the Class of 2014. Jason is an editor of the Wisconsin Law Review where he authored the student comment "Wolves, Lone and Pack: Ojibwe Treaty Rights and the Wisconsin Wolf Hunt," analyzing the tribal right to protect wolves on and off the reservation. Prior to enrolling in law school, Jason spent five years as a project director and adjunct instructor of English and Native American Studies at Lac Courte Oreilles Ojibwa Community College on the LCO reservation.

Bio: Erik R. Olson is native to northern Wisconsin where he grew up hunting, fishing, paddling and exploring the wonders of Wisconsin. He recently received his Ph.D. (June 2013) in Environment and Resources from the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison (UW) where he studied wolf-human conflicts and wolf ecology. He also received his master's degree in Environment and Resources from the Nelson Institute at the UW. Prior to enrolling at the UW, Erik worked as a Natural Resource Specialist/Water Quality Educator and adjunct instructor of Environmental Science for the Lac Courte Oreilles Ojibwa Community College on the LCO reservation. Erik earned his Bachelor's degree in Science from the University of Wisconsin-Stevens Point. Currently, Erik is an Assistant Professor of Natural Resources at Northland College in Ashland, WI.

Abstract: In the winter of 2011-2012, a minimum of 815 wolves lived in the state of Wisconsin. Eighty-three percent of those wolves lived on Ojibwe reservations or within the ceded territory, where the Tribes retain some resource rights. Those wolves are resources shared between the Tribes and the State. The Ojibwe maintain a strong cultural kinship with wolves, considering ma'iingan (wolf) a brother. Tribes have traditionally prohibited wolf hunting and recently named wolves a "tribally protected species," asserting a right to protect all the wolves shared with Wisconsin. Historically, the Tribes and the State cooperatively managed shared resources. However, over tribal protestations, the State initiated the first wolf hunt in 2012, instigating the first major break from cooperative management in decades. The Tribes have since requested that the State work with them to develop a buffer zone around reservation lands to protect wolves that use reservation lands. To date, the State has refused to do so. We explore the scope of the Tribes' claim to these wolves, why the State must embrace cooperative border wolf management, and the legal, biological, spatial, and conflict management considerations for the development of buffer zones around tribal lands.

Cross-fostering in gray wolves (*Canis lupus*)

Scharis, Inger

Hagahallvagen 2, S-617 34 Skarblacka, Sweden (ingerscharis@gmail.com)

Bio: Inger Scharis is a wildlife biologist and writer with focus on conservation, endangered species and wild canids.

Abstract: Cross-fostering in canids, with captive-bred pups introduced into endangered wild populations, might aid conservation efforts by increasing genetic diversity and lowering the risk of inbreeding depression. The gray wolf (*Canis lupus lupus*) population in Scandinavia suffers from severe inbreeding due to a narrow genetic base and geographical isolation. The Swedish government therefore decided that natural immigration has to be supplemented by artificial introduction of new genes. My research evaluated the method to cross-foster wolf pups from zoo-born to wild-born litters. The following was assessed: female initial acceptance of foster pups, growth rate in relation to age difference between foster pups and pups in recipient litters and survival over the first 33 weeks. The study included four litters; two foster pups were added to each litter. The age differences between the foster pups and the recipient litters were 2-8 days. After augmentation, all four females accepted the foster pups, demonstrated by their moving their entire litter to a new den site. Growth rate was dependent on the age difference of the pups in the foster litters, with a considerably slower growth rate in the 8 days younger pups. However, these pups later appeared to be at no disadvantage. Foster pups had a slightly, albeit non-significantly higher survival rate than the females' pups; however, the causes of death were probably not kin or non-kin related. The results indicate that cross-fostering works in gray wolves and that this might be a plausible way to introduce new potential founder genes in the wild population.



Gray wolf (*Canis lupus*) movement patterns in Manitoba: implications for wolf management plans

Scurrah, Fiona

Senior Environmental Assessment Officer, Manitoba Hydro, 820 Taylor Avenue, 3rd Floor, Winnipeg, Manitoba, Canada, R3C 2P4 (fscurrah@hydro.mb.ca)

Bio: Fiona Scurrah is the Senior Environmental Assessment Officer at Manitoba Hydro in Winnipeg, Manitoba, Canada.

Abstract: In 2010 and 2011, Manitoba Hydro, in collaboration with Manitoba Conservation, collared 65 gray wolves (*Canis lupus*) as part of a larger multi-year boreal woodland caribou research project. There are insufficient data regarding populations of gray wolves in Manitoba or their movements throughout the province. The objective of this study was to typify wolf movements in Manitoba to provide recommendations for industry and government for the development of policy and integrated resource management plans for this species. Of 65 collared wolves, 11 were selected to examine their movements in three regions of the Province. It was found that wolf populations overlap one another in the study area, to varying degrees. Their ability to move long distances creates challenges for resource managers, as most management plans only consider management at a regional scale rather than a multi-jurisdictional level. In addition, this examination of gray wolf movements will assist in understanding their role as predators on the protected boreal woodland caribou and depressed moose populations within the Province.

Social perception of the Mexican gray wolf (*Canis lupus baileyi*) in areas chosen for reintroduction in the Sierra Madre Occidental, Mexico

Servin, Jorge and Dora Carreon, Miguel A. Armella

Laboratorio de Ecología y Conservación de Fauna Silvestre, Depto. El Hombre y su Ambiente, Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico City, Mexico; (jservin@correo.xoc.uam.mx); Programa de Maestría en Biología, Universidad Autónoma Metropolitana Unidad Iztapalapa, Departamento de Biología de Fauna Silvestre, Mexico City, Mexico (dk_mors@hotmail.com)

Bio: Jorge Servin represents Mexico on the IUCN Wolf Specialist Group. He has been the leader for the Mexican Wolf Conservation Project in Mexico and an active member of the Mexican Wolf SSP (Species Survival Program). He is Professor of Animal Ecology, Biological Conservation and Wildlife Management, at the Universidad Autónoma Metropolitana campus Xochimilco in Mexico. He has been working on Mexican Wolf conservation since 1983.

Bio: Dora Carreon is a Master's degree student in Biological Sciences from the Universidad Autónoma Metropolitana, Her main interest is Animal Ecology and Biological Conservation. She is describing and analyzing the social perceptions of rural communities in Mexico's reintroduction areas for the Mexican wolf and has been involved with their conservation since 2008.

Abstract: Rejection of wolves becomes apparent when the possibility is raised of a reintroduction of the species in areas where it has disappeared. Because of the negative opinions and dangers to livestock, many residents and ranchers oppose efforts for wolf recovery. To evaluate the response and social perception of rural communities in selected areas to carry out a potential reintroduction of the Mexican wolf, we developed interview surveys with three sections: a) knowledge and previous experiences, b) perceptions and attitudes and c) feasibility. These interviews were implemented in three remote regions, selected for reintroduction (North, Center and South of the Sierra Madre Occidental), a total of 243 interviews (121 South, 67 Center and 55 North), using statistics to describe and evaluate the perception and response about acceptance or rejection of wolf reintroduction in Mexico. The factors involved in the acceptance or rejection of wolf reintroduction were influenced by age, education and economic activities. We identified that training and education of the rural people would contribute to a change of attitude toward wolves, benefiting their recovery (19%). It is suggested that wolves should be kept in the mountains (12%), with enough wild prey (33%), to avoid attacks on livestock and potential conflicts with farmers and local communities, and restitution should be paid for wolf predation on cattle. The presence of wolves would be more tolerable, further recognizing that it is necessary to develop more effective ways to manage cattle (20%) to avoid conflicts.



Wolf predation on overwintering livestock in the semi-arid Vashlovani National Park, Georgia

Shavgulidze, Irakli

NACRES - Center for Biodiversity Conservation and Research, 7 Larsi Lane, Tbilisi 0179, Republic of Georgia (irakli.shavgulidze@nacres.org)

Bio: Irakli Shavgulidze graduated from the faculty of Biology of Tbilisi State University, Georgia, in 1991 and did his masters in Ecology at the University of Aberdeen, Scotland, UK, in 1999-2000. He joined Noah's Ark Center for the Recovery of Endangered Species (NACRES) in 1996 as a volunteer and worked his way to the top job within the organization, Director and Chair of the Board. He misses the time when he spent more time out in the field and less at the office.

Abstract: Nomadic Tushetian pastoralists over-winter their sheep and cattle in the semi-arid grasslands of East Georgia in the central Caucasus where grey wolves (*Canis lupus*) are common. Where human-carnivore conflict is prevalent, conservation measures may be compromised with potential consequences for the area's globally important biological diversity. In 2010 the Georgia Carnivore Conservation Project carried out a study to quantify conflict issues between pastoralists and large carnivores in and around Vashlovani Protected Areas and to identify possible mitigation measures. Livestock owners and herders at 69 farms were interviewed using a semi-structured interview protocol covering details of livestock, farm facilities, husbandry practices and levels of mortality. Predation was reported to be the biggest cause of livestock mortality, followed by disease. Grey wolves, reported as being the main problem species, most often attacked sheep, the most commonly farmed species, but also killed or injured cattle, horses and donkeys. Most livestock losses were experienced in winter, particularly during the lambing season. Three quarters of 105 documented attacks on livestock reportedly occurred in the afternoon or at dusk, normally when the flocks were in pastures. Only 15% of attacks occurred at night, when flocks were usually confined to a corral in the vicinity of farm buildings. Farms had a mean of eight livestock guarding dogs, which were considered an effective means to limit losses. Based on this survey a conflict mitigation toolbox was designed to frame a strategy for management.

Age structure and pack composition of an unexploited wolf population in Yellowstone: Does pack complexity affect sociality and fitness?

Smith, Douglas W., Kira Quimby, Daniel R. Stahler, Matthew Metz, Erin Stahler, Rick McIntyre, Daniel MacNulty

P.O. Box 168, Officer's Row, Building 27, Yellowstone National Park, WY 82180 (doug_smith@nps.gov)

Bio: Dr. Douglas Smith is currently the Wolf Project Leader. He has been in Yellowstone 19 years and has studied wolves for 34 years. He has been responsible for the capture of about 500 wolves. Doug has worked in Yellowstone, Isle Royale and Wolf Park and has collaborated with researchers from Alaska, Canada and Europe. He is a member of Reintroduction IUCN, Reintroduction Specialist Group, Mexican Wolf Recovery Team and Northern Rocky Mountain Recovery Team.

Abstract: The hallmark of wolves is their adaptability. Harvest and even control often have little lasting effect on abundance, especially if they are not routine and frequent. Yet, when protected, most wolf packs organize themselves into socially complex groups that function dissimilarly to simpler groups which are common to exploited populations. A survey of the literature found that most research focuses on the population effect of human mortality but rarely social effects (or pack complexity), and that studies of unexploited wolf populations are relatively rare. In these studies wolf age of exploited wolves' age structure is skewed left (young) and population turnover high. Yet, protected populations are not like this at all, as evidenced by data from Yellowstone National Park. We use 18 years of data on pack com-



position and age structure in a protected population of wolves in Yellowstone National Park to discern natural pack organization and functioning. We found that through time, pack complexity increases significantly, and this affects fitness, competitive ability, hunting behavior and likelihood of dispersal. Such findings suggest that in addition to recommendations of heavy harvest to manage wolf populations, managers may want to consider a range of options. Some of these might include light-to-no harvest which allows for natural pack structure, but also achieves connectivity between populations. Such policies are now being tested in the Yukon Territory, and Yellowstone National Park is another example in the northern Rocky Mountains of the U.S.

Prey of the Mexican wolf: enough, the right kind and how many will they eat?

Smith, Douglas W., John. K. Oakleaf and the Science Planning Sub-Group of the Mexican Wolf Recovery Team

Senior Wolf Biologist, YCR, Officers' Row, Building 27, Yellowstone National Park, WY 82190
(doug_smith@nps.gov)

Bio: Doug Smith is currently the Yellowstone Wolf Project Leader. He has been in Yellowstone 19 years and has studied wolves for 34 years. He has been responsible for the capture of about 500 wolves. He has worked in Yellowstone, Isle Royale and Wolf Park, and he has collaborated with researchers from Alaska, Canada and Europe. He is a member of Reintroduction IUCN, Reintroduction Specialist Group, Mexican Wolf Recovery Team and Northern Rocky Mountain Recovery Team.

Abstract: Mexican wolf recovery in the Blue Range of Arizona and New Mexico has been slowed by numerous biological and administrative setbacks. Poor population performance has been blamed on several factors, but one of them is that the presumed natural prey of Mexican wolves is deer-sized or smaller, yet extant wolves are preying primarily on elk despite deer being available. Data from Mexican wolves indicate that biomass consumption (8.59 kgs/wolf/day) is within the range (0.5-24.8 kgs/wolf/day) of other North American gray wolf populations which is above maintenance requirements (3.25 kgs/wolf/day for a Mexican wolf) and adequate for reproduction. Preference for elk (calves particularly) may be due to the greater profitability, gregariousness, abundance and habitat use and the adapted group hunting capabilities of wolves. Moreover, wolf:prey size ratios are no more disparate for Mexican wolves and elk (1:11) than they are for wolf:moose (1:10) and wolf:bison (1:20) ratios on Isle Royale and in Yellowstone. Therefore, like other gray wolf populations, Mexican wolves are large-prey generalists, and depending on larger elk is not the reason for poor population performance. Besides appropriate prey, some predict that wolf impacts on prey in desert ecosystems are incompatible with human hunting due to low productivity. However, almost all of the areas where elk occupy or where wolves are predicted to occur are above 5,000 ft (1,524 m), which are the most productive habitats in Arizona and New Mexico. Another positive aspect of the prey dynamic is the general lack of winter-caused mortality because wintering areas being relatively snow-free in comparison to more northern clines. Regardless, predicting wolf-prey dynamics has proven difficult in other systems, and a fully recovered wolf population will be of such modest size over a large area that widespread impacts on prey are unlikely, except possibly in small areas with multiple carnivores.



Project WOLFF and Project Wild Wise, coexisting with carnivores: a contrast in middle school carnivore awareness – classroom projects on the west and east side of Washington state

Smith, Lorna and Darrell Smith

Western Wildlife Outreach, 141 Maple Drive, Port Townsend, WA 98368 (lorna@westernwildlife.org); (darrell@westernwildlife.org)

Bio: Lorna Smith is a career ecologist who has worked extensively on wildlife habitat issues, development of environmental regulations, and in education and outreach projects both inside government, and for nonprofits. She has been the Executive Director of Western Wildlife Outreach for the past year and a half. Western Wildlife Outreach is a non-advocacy, science-based, nonprofit organization dedicated to informing the public about the ecology of gray wolves, grizzly bears, cougars, and black bears in Washington and Idaho, and promoting methods for safe coexistence between people and carnivores.

Bio: Darrell Smith is a wildlife and fisheries biologist and scientist who spent much of his professional career working for Snohomish County in Washington State promoting habitat preservation and developing science-based habitat protection guidelines. He has worked since the mid-80s to educate the public about coexisting with large, native carnivores. He now volunteers about half of his time and effort to support Western Wildlife Outreach as a Wildlife Biologist and Wildlife Science advisor.

Abstract: Washington is home to four species of large, often controversial and misunderstood carnivores. Those species are gray wolf, cougar, grizzly bear and black bear. Of the four species, gray wolves, recently returning to Washington after an absence of 70 years, are the most misunderstood and stir the most controversy. During the 2012-2013 school year Western Wildlife Outreach (WWO) and the Woodland Park Zoo (WPZ) co-sponsored two middle school carnivore outreach and education programs in two different regions of the state. Project Wild Wise: Coexisting with Carnivores, was carried out in 7 classrooms in the Issaquah Middle School near Seattle in a rapidly urbanizing area, and Project WOLFF (Wildlife Observation Learning and Fieldwork Fundamentals) was carried out in several middle schools throughout the Yakima Basin, a far more rural area in eastern Washington. Both approaches were pilot projects in their first year. We had two additional partners with Project WOLFF: the Yakima Basin Environmental Education Program and the Washington Department of Fish and Wildlife. WWO and WPZ have examined the results of the two very different classroom approaches and have measured the results of each in a qualitative way, through teacher and participant surveys and have done a preliminary analysis of what has worked well. These results will be presented with recommendations on changes to include for the upcoming (September 2013) school year and beyond.

Reproductive consequences of life history traits, morphology, pack composition, and environmental conditions for female wolves

Stahler, Daniel R., Dan MacNulty, Douglas Smith, Bridgett vonHoldt, Robert Wayne

Yellowstone Wolf Project, PO Box 168, Yellowstone National Park, WY 82190; (Dan_Stahler@nps.gov)

Bio: Dr. Daniel Stahler is a wildlife biologist employed by the National Park Service at Yellowstone National Park. Since 2002, he has served as the project biologist for the Yellowstone Wolf Project. In addition, Dan is the Threatened and Endangered Species Coordinator for Yellowstone working with species such as lynx, wolverine, and grizzly bears. Born and raised in Vermont, he received his B.A. in Conservation Biology from Middlebury College in 1996. From 1997-2000, Dan conducted graduate work in Yellowstone on the behavioral ecology of wolves and scavengers, earning an M.S. from the University of Vermont. From 2006-2011, he continued his long-term wolf research while working for the National Park Service, earning a Ph.D. in Ecology, Evolution, and Behavior through the University of California, Los Angeles studying genetics, life history, and behavior of Yellowstone's wolves. Over the last 17 years, Stahler has produced numerous scientific publications and contributed many hours of lecture time on wolf ecology, conservation, and their role in ecosystems. Dan and his wife Erin Stahler, also a biologist with the Wolf Project, live in Gardiner, Montana.

Abstract: Reproduction in social organisms is shaped by numerous morphological, behavioral and life-history traits. Little is known, however, about the relative influence of traits on reproduction, particularly in the context of environmental conditions that determine their adaptive value. Here, we use 14 years of data from Yellowstone National Park to evaluate the effects of different traits and ecological



factors on female wolf reproduction. At the individual level, litter size and survival improved with body mass and declined with age. Grey-colored females had more surviving pups than black females, likely contributing to maintenance of color polymorphism in this system. The effect of pack size was nonlinear as litter size peaked at eight wolves and then declined, and litter survival increased rapidly up to three wolves, beyond which it increased more gradually. Pack composition (sex, age, and breeder numbers) data indicated that females who monopolized breeding in packs with more prime-age males had greater success. At the population level, litter size and survival decreased with increasing wolf population size and disease outbreaks. Evaluating the relative influence of different-level factors revealed that body mass was the primary determinant of litter size, followed by pack size and population size. Body mass was also the main driver of litter survival, followed by pack size and disease. Reproductive gains because of larger body size and cooperative breeding may mitigate reproductive losses because of negative density dependence and disease. These findings highlight the adaptive value of large body size and sociality in promoting individual fitness in stochastic and competitive environments.

Wolf management and monitoring in Minnesota

Stark, Dan

Minnesota Department of Natural Resources (Dan.Stark@dnr.state.mn.us)

Bio: Dan Stark is the Large Carnivore Specialist for the Minnesota Department of Natural Resources, Division of Fish and Wildlife. Dan works as the state's wolf specialist in overseeing the transition of wolf management from the federal government to the Minnesota DNR and implementing the state wolf management plan. Dan also works on bear season and policy issues for the DNR. Dan is a Minnesota native and grew up in central Minnesota. He currently resides with his family in Grand Rapids, Minnesota.

Abstract: The goal of the Minnesota Wolf Management Plan is to ensure the long-term survival of wolves (*Canis lupus*) in Minnesota while addressing wolf-human conflicts. The plan was developed through an intensive public input process in the late 1990s and adopted by the Minnesota Department of Natural Resources (DNR) in 2001 following passage of wolf management legislation in 2000. It incorporates many important components of wolf conservation including: population monitoring, depredation management, law enforcement and education. Wolf season authorization was enacted by the passage of legislation in 2011 and further guidance and authority for wolf season implementation was provided by the Minnesota Legislature and Governor in 2012. The 35+ years of federal legal protection of wolves and management for a healthy prey base contributed to a threefold increase in wolf numbers in Minnesota. As a result, the federal government removed Endangered Species Act protections for wolves in January of 2012 and transferred management authority to state and tribal authorities in Minnesota. In 2012 the DNR fully implemented the Minnesota Wolf Management Plan and kept in place some wolf management activities that were available under federal management, while enhancing and adding others. A depredation control program continued under state management, and the level of wolf depredation on livestock in Minnesota as determined by the number of complaints verified and wolves killed (296) reached an all-time high. As has been consistent over time, depredation rates have been largely explained by variation in severity of winter before the depredation season (inverse relation). In stark contrast, Minnesota's 2013 wolf depredation season has been markedly lower following the severe winter of 2012-13. Minnesota implemented the first ever regulated wolf season in the state in fall of 2012. The state implemented a limited quota system to close the season when the target harvest was reached. Six-thousand licenses were offered through a lottery application process to over 24,000 applicants. A total of 413 wolves were killed by licensed hunters and trappers, and the season closed on January 3, 2013. The DNR completed a winter wolf population survey in April 2013 and estimated 438 packs and 2,211 wolves across 27,000 square miles of occupied wolf range. Although lower than the 2008 wolf population survey estimate of 2,921 wolves, the population exceeds the state's minimum population goal of at least 1,600 wolves. Periodic wolf population surveys have been conducted recently in Minnesota at five-year intervals; however the DNR will more closely monitor pack and territory size in the next few years through more frequent radio collaring of wolf packs to provide data on the population's response to wolf season harvest.



Ojibwe relations with brother Ma'iingan (wolf): an overview of the traditional relationship and contemporary stewardship

Stark, Kekek Jason and Peter David

GLIFWC, P.O. Box 9, Odanah, WI 54861 (jstark@glifwc.org); GLIFWC, P.O. Box 9, Odanah, WI 54861 (pdavid@glifwc.org)

Bio: Kekek Jason Stark is an Attorney/Policy Analyst for the Great Lakes Indian Fish and Wildlife Commission. His work at the Commission involves the preservation, implementation and utilization of treaty-reserved rights for eleven Ojibwe bands encompassing Minnesota, Wisconsin and Michigan. Kekek is a Turtle Mountain Ojibwe and member of the Bizhiw (Lynx) Clan. He is a former president of the Minnesota American Indian Bar Association and is a former Bush Foundation Leadership Fellow and alumnus of Hamline University School of Law. Kekek has served on a variety of boards and has also served as an instructor at Nawayee Center School, Lac Courte Oreilles Ojibwa Community College, the University of Wisconsin - Superior and the University of Minnesota – Duluth.

Bio: Peter David is a wildlife biologist with the Great Lakes Indian Fish and Wildlife Commission. He received his education (bachelor's and master's degrees in Wildlife Ecology) from the University of Wisconsin-Madison, and from the tribal elders and members for whom he has worked for the last 25 years. At the Commission, he works on a variety of natural resources, with a special emphasis on wild rice and wolves.

Abstract: Contemporary Ojibwe ma'iingan stewardship is founded upon the traditional understanding of the unique relationship that exists between the tribes and ma'iingan. This relationship was initiated in the Ojibwe's Creation Story, which explains man's place in the order of creation and the intertwined fate of the Ojibwe and ma'iingan that has been repeatedly observed throughout history. In this world view, the wolf is understood to be a brother and a teacher who helped the People survive in the sometimes harsh conditions that can be found in the Western Great Lakes region. As a brother, Ma'iingan is also a benefactor to the people, a force that helps maintain health in the deer herd the tribes depend on, while helping to keep that herd in balance so that medicinal plants needed for community health are also available. This world view promotes perspectives towards ma'iingan that are better described in terms of stewardship than dominion or management, since the tribe's desires for ma'iingan are parallel to their desires for their own communities. The contrast between this world view and that of much of the non-Indian community has been highlighted by the regional delisting of ma'iingan populations and the subsequent initiation of recreational harvest programs. This presentation will conclude by discussing how tribal goals compare with state goals in addressing topics such as federal delisting, sport and depredation harvest, and population goals, and by explaining the need for cooperative management/stewardship near tribal reservations and on ceded lands where the tribes retained off-reservation treaty rights.



Mate-finding and spatial variation in mortality cause a demographic Allee effect in Great Lakes wolves

Stenglein, Jennifer

University of Wisconsin-Madison, 1630 Linden Drive, Madison, WI 53706 (jstenglein@wisc.edu)

Bio: Jennifer Stenglein is a Ph.D. candidate at the University of Wisconsin - Madison where she studies Wisconsin's wolf population dynamics with Tim Van Deelen. Previously, Jennifer earned her Master's in Environmental Science from the University of Idaho and her B.S. in Biology from Grove City College.

Abstract: Recovering populations of social carnivores suffering from Allee effects are prone to extinction because optimal population growth requires a minimum number of cooperating individuals. Conservationists seldom incorporate these issues into recovery efforts because of data limitations, but ignoring Allee effects could lead to extended periods of recovery or even extinctions. We documented a demographic Allee effect in the time series of gray wolf (*Canis lupus*) population counts from 1980 – 2011 in the southern Lake Superior region (SLS), Wisconsin and the Upper Peninsula of Michigan of North America with change-point models and determined that growth was depensatory below 50 wolves. Using a risk landscape describing spatial variation in mortality associated with road density and amount of agriculture, we used an individual-based model to evaluate an Allee effect due to reduced ability of SLS wolves to find mates in a variably risky landscape. Simulated wolves could only perceive mates within some radius of their location (perception neighborhood). Simulations where wolves perceived mates within 1 or 2 territories (15 – 30 km away) most closely matched observed growth, and growth in a simulated null landscape (without variable risk) differed most from observed time series, suggesting that landscape variation and configuration contributed to reduced population growth in early recovery.

The Idaho Wood River Wolf Project: resolving wolf and livestock conflicts with non-lethal methods using a community stakeholder model

Stone, Suzanne Asha

P.O. Box 773, Boise, ID 83702 (sstone@defenders.org);

Bio: Suzanne Asha Stone has worked in wolf restoration in the Northern Rockies since 1988, including serving as a member of the 1995/1996 USA/Canadian wolf reintroduction team. She currently oversees Defenders of Wildlife's programs for wolf conservation and restoration in Idaho, Montana, Oregon, Washington, and Wyoming. Suzanne is the lead author of Defenders' publication *Livestock and Wolves: A Guide to Nonlethal Tools and Methods to Reduce Conflict*, and she authored a chapter titled "Building Tolerance for Wolf Restoration in the Rockies: Compensation and Nonlethal Deterrent Programs" in the University of Calgary's new publication: *The World of Wolves: New Perspectives on Ecology, Behaviour and Policy*. Suzanne holds a Master's degree in Wildlife Conservation and Conflict Management from Prescott College in Arizona.

Abstract: In the USA Northern Rockies, nearly 2,000 wolves have been killed in attempts to address losses of more than 3,000 sheep and 1,500 cattle over the last quarter century. However, regional research indicates lethal wolf control alone may serve to temporarily reduce losses but fail to prevent future livestock losses and ultimately increase social conflicts concerning wolf losses. In 2007, a newly-formed wolf pack began killing sheep in central Idaho's "sheep superhighway" of the Sawtooth National Forest during the summer grazing season. Wolf advocates, ranchers, scientists and county officials collaborated to implement nonlethal deterrents to reduce losses in our 2,589 kilometer square study area containing more than 27,000 sheep and several resident wolf packs. Based on the new partnership called the Wood River Wolf Project, state and federal wolf managers granted the pack a second chance while these methods were tested. Five years later, documented sheep losses to wolves in the project area are significantly lower than any other area of the state with similar sheep and wolf densities. Specifically, our loss rate averaged 0.01% compared to 0.54% reported estimates statewide during the same period. Additionally, no wolves within the project area have been lethally removed because of depredation conflicts. Benefits of the project also include reduced social conflict and management costs and increased wolf pack stability. Our presentation highlights the project's range of deterrents, stakeholder empowerment and trust-building methods, and offers strategies for addressing chronic conflict areas using a community-based conflict transformation model.



Longitudinal change in human attitudes and behavior toward wolves

Treves, Adrian, Lisa Naughton

Associate Professor of Environmental Studies, University of Wisconsin-Madison, OA Science Hall, Madison, WI 53706 (atreves@wisc.edu)

Bio: Adrian Treves earned his Ph.D. at Harvard University in 1997 and is now an associate professor of Environmental Studies at the University of Wisconsin-Madison. He has worked on bears and wolves in the USA, Andean bears in Ecuador, and big cats in Uganda and Chile. Dr. Treves founded the Carnivore Coexistence Lab to understand and manage the balance between carnivore conservation and human needs. He has published >90 scientific articles about animal behavior and ecology, carnivores in human-dominated ecosystems, and the perceptions and behaviors of the people who live alongside wildlife.

Abstract: Measures of attitudes toward wolves help predict human behavior and support for wolf conservation. We present the first longitudinal study of attitudes toward wolves in which respondents were resampled over a 13-year period. We also present the first correlation of attitude measures to human-caused mortality. Analyzing data from Wisconsin's wolves 1979–2013, we found decreasing tolerance among residents of wolf range, and stable or increasing tolerance among residents outside of wolf range. We found little evidence for the role of personal experience. We found no evidence that state-sponsored lethal control reduced poaching of wolves. Wolf policy remains controversial and polarized in Wisconsin, so the prospect of wolves being managed as any other game animal seems unlikely.

Wolf hunting in Michigan and the North American Model

Vucetich, John A.

Michigan Technological University, School of Forest Resources and Environmental Sciences, Houghton, MI 49931, USA (javuceti@mtu.edu)

Bio: John Vucetich is an Associate Professor of Wildlife Ecology and has authored more than 75 scholarly publications on a range of topics, including wolf-prey ecology, extinction risk, and the human-dimensions of natural resource management. He co- leads the Isle Royale wolf-moose project and co-leads the conservation ethics group.

Abstract: The best-available scholarship provides an exceedingly clear explanation that good wildlife management is a judicious balance between best-available science and democratic principles. Wildlife is also widely understood to be held in the public trust, which means all citizens have a stake in how various species are managed. These ideas are also explicitly recognized by the North American Model of Wildlife Management, which is a kind of philosophy for how wildlife should be managed. That philosophy is held in high regard by many hunting organizations, wildlife professionals, and state agencies. Another principle of this philosophy is that wildlife should not be killed without an adequate reason. I review how plans and political activities in support of wolf hunting in Michigan may be in gross violation of the principles of the North American Model of Wildlife Management.



The effect of human-caused mortality on wolf populations and the importance of accounting for such losses in recovery criteria

Vucetich, John A.

*Michigan Technological University, School of Forest Resources and Environmental Sciences,
Houghton, MI 49931, USA (javuceti@mtu.edu)*

Bio: John Vucetich is an Associate Professor of Wildlife Ecology and has authored more than 75 scholarly publications on a range of topics, including wolf-prey ecology, extinction risk, and the human-dimensions of natural resource management. He co- leads the Isle Royale wolf-moose project and co-leads the conservation ethics group.

Abstract: While the population ecology of wolves is extremely well studied, researchers and managers have inexplicably disparate views on the effect that human-caused mortality has on wolf populations. For example, Creel & Rotella (2010) estimated m_a^* (the rate of anthropogenic mortality that a wolf population can endure without expecting it to decline) to be ~ 0.22 for wolf populations in the Northern Rocky Mountains of the United States. Using the same data, Gude et al. (2011) concluded that $m_a^* \approx 0.48$. Because the belief that $m_a^* \approx 0.48$ is influential among managers, they risk the overexploitation of recovering wolf populations if m_a^* is overestimated. Here I show that the disparity between these estimates is explained by Gude et al. (2011) having overestimated the rate of anthropogenic mortality. I also show how m_a^* has been overestimated inasmuch as estimates have failed to account for stochasticity in population growth rates, measurement error in estimates of rates of anthropogenic mortality, and the precautionary principle. The techniques used to account for these factors would be widely applicable to other species. In addition to the ecological effects of human-caused mortality, there is also controversy about how human-caused mortality should be addressed in recovery plans and the role of wolf hunting in a post-delisting environment. I also review some of the issues associated with these concerns.

Wolf recovery, zoning and management challenges on the Scandinavian Peninsula

Wabakken, Petter, Olof Liberg, Håkan Sand, Øystein Flagstad, Mikael Åkesson

*Associate Professor, Faculty of Applied Ecology and Agricultural Sciences, Hedmark University College,
Campus Evensta, NO-2480 Koppang, Norway (petter.wabakken@hihm.no)*

Bio: Petter Wabakken works as an Associate Professor and large carnivore scientist at Hedmark University College, Norway. He has monitored and studied the Scandinavian wolf recovery closely during 35 years, 1978-2013. Wabakken is a project leader of the national wolf monitoring in Norway. Moreover, he is the Norwegian project leader of the joint Scandinavian Wolf Research Network, SKANDULV (in close cooperation with the Swedish project leader Håkan Sand, and the Scandinavian coordinator Olof Liberg). In addition, the presenter is also a member of the IUCN Wolf Specialist Group.

Abstract: During a 35-year-period of re-colonization and reproduction, the joint Swedish-Norwegian wolf population has increased from fewer than ten individuals to more than 300 wolves on the Scandinavian Peninsula. To reduce the conflicts, and to achieve the politically decided goal of a long-term viable population, zoning management has been a main tool by “no wolf areas” (northern Sweden, most of Norway) and the establishment of a wolf protection zone (Norway). Several management challenges are pointed out and discussed. The main challenges are poaching, severe inbreeding (5 founders), and the lack of a politically negotiated Swedish-Norwegian total population goal of these cross-border Scandinavian wolves. Wolf-depredated livestock in Norway are mainly killed by young dispersing wolves from Sweden, wolves in cross-border packs protected in Norway may legally be killed in Sweden, and genetically important Finnish-Russian immigrants have been eliminated legally in both countries. Moreover, the success of establishing the Norwegian wolf protection zone is doubtful. In spite of nine years with no legal wolf killing inside the zone, and superabundance of ungulate prey, the number of successful reproductions has not increased. On the contrary, in neighboring Sweden reproduction has steadily increased under a management regime of partly hunted wolf packs. Due to reduced adult survival caused by cryptic poaching, the Norwegian sub-population within the wolf protection zone seems to be a non-sustainable sink, dependent on immigrants from the Swedish source population. Among resident adult breeders or potential breeders within the zone, an annual mortality of up to 48% has been recorded.



West coast wolves: can things be different here?

Weiss, Amaroq

*West Coast Wolf Organizer, Center for Biological Diversity, 925 Lakeville Street, #333, Petaluma, CA 94952
(aweiss@biologicaldiversity.org)*

Bio: Amaroq Weiss is a biologist and former attorney and has worked in wolf conservation and recovery for 17 years. Her focus is on wolf conservation policy, legislation and litigation, and engaging the public to advocate for wolves.

Abstract: Wolves returning to the West Coast states of Washington, Oregon and California are finding good wolf habitat and strong public support, but are also facing political challenges wolves experience elsewhere. In the West Coast states, urban population centers comprise the bulk of each state's population and their support for wolves and other environmental protection issues is significant. The West Coast is not immune to traditional "western" values that view wolves as a threat to ranching livelihoods, wild ungulate populations and civilization. In particular, the east-west cultural divide in Washington and Oregon is emblematic of these warring cultural values. Yet West Coast states, especially California, have legislated protections for wildlife - and especially for predators - that are significantly more protective than in other states. We foresee this cultural view of wolves and other predators as having intrinsic value and a right to exist in habitat where they are returning will continue to expand and drive the reestablishment of wolves in this region. This presentation will discuss the return of wolves to each of the three West Coast states and the demographic features and political landscapes they are encountering.

Comparing genetic ancestry and morphology of wolves in Western Great Lakes states

Wheeldon, Tyler

Trent University, 2140 East Bank Drive, Peterborough, ON, Canada, K9J 7B8 (twheeldon@gmail.com)

Bio: Tyler Wheeldon obtained his Master's degree at Trent University in Ontario, Canada, studying wolf-coyote hybridization in the Western Great Lakes region. He is currently pursuing a doctoral degree at Trent University studying population dynamics and activity patterns of eastern coyotes in Ontario.

Abstract: The taxonomy of wolves in the Western Great Lakes states (WGLS) has been investigated both genetically and morphologically. Genetic studies have demonstrated that these wolves exhibit mixed ancestry derived from hybridization between gray wolves and eastern wolves, although the taxonomic status of the eastern wolf remains controversial. Morphological studies have demonstrated that these wolves exhibit variability in body mass and skull dimensions attributable to hybridization. However, to date, no studies have compared the genetics and morphology of WGLS wolves to assess if their morphology differs with respect to their genetic ancestry. Furthermore, the extent to which non-hybridized gray wolves and eastern wolves occur in the WGLS is unknown. Accordingly, we genetically and morphologically analyzed a sample of wolves from the WGLS to clarify these issues. We measured body mass, body length and shoulder height of wolves aged one year or older. We generated microsatellite genotypes to assess population genetic structure and we generated mitochondrial DNA sequences and Y-chromosome microsatellite genotypes to assess individual genetic ancestry. We observed no significant differences in body mass, body length or shoulder height with respect to genetic ancestry, and we detected no population genetic structure in WGLS wolves that corresponded with genetic ancestry. We suggest that wolves in the WGLS constitute a single interbreeding population with variable morphology. Furthermore, we suggest non-hybridized gray wolves and eastern wolves probably do not occur in the region, except as rare migrants; thus separate management of these wolf types in the WGLS is not practical or necessary.



Genetic and morphological differentiation of wolves and coyotes in northeastern Ontario

Wheeldon, Tyler

Trent University, 2140 East Bank Drive, Peterborough, ON, Canada, K9J 7B8 (twheeldon@gmail.com)

Bio: Tyler Wheeldon obtained his Master's degree at Trent University in Ontario, Canada, studying wolf-coyote hybridization in the Western Great Lakes region. He is currently pursuing a doctoral degree at Trent University studying population dynamics and activity patterns of eastern coyotes in Ontario.

Abstract: Gray wolves (*Canis lupus*), eastern wolves (*Canis lycaon*) and coyotes (*Canis latrans*) are presently managed as a single biological population in primary wolf range in Ontario with the intent of minimizing incidental harvest of wolves. This management strategy is based on the assumption that wolves and coyotes cannot be reliably distinguished because of hybridization, and the resulting restrictions on coyote harvest are unpopular with hunters and farmers. We genetically and morphologically characterized a sample of sympatric wolves and coyotes harvested in the Lesser Clay Belt area of northeastern Ontario in 2006–2009 to test the hypothesis that these species cannot be reliably distinguished. We found that wolves and coyotes were genetically and morphologically distinct, with minimal hybridization between them. Our findings suggest that wolves and coyotes in the sampled area can be reliably distinguished, but further sampling is required to determine the full extent of areas in Ontario where wolves and coyotes are reliably distinguishable. We discuss unresolved issues regarding the feasibility of separate management for these species. We also discuss implications of our findings regarding wolf recovery in the northeastern United States.

The challenge of connecting local people to red wolf restoration

Wheeler, Kim

Red Wolf Coalition, Inc., 212 Main Street, P.O. Box 96, Columbia, NC 27925 (kwheeler@redwolves.com)

Bio: Kim Wheeler has been the Executive Director of the Red Wolf Coalition (www.redwolves.com) for 8 years. She lives and works in northeastern North Carolina, the heart of red wolf country, where she devotes her time and energy to leading the Coalition in ensuring the long-term survival of the critically endangered red wolf. She is the full-time caretaker for the ambassador red wolf pair at the Red Wolf Education Center, where she gives a variety of programs about these native predators of the Southeast. Kim was an International Wolf Center (IWC) nanny in 2004, 2008 and 2012. She received the coveted "Who Speaks for Wolf" award from the IWC in 2011, honoring her exceptional contributions to wolf education.

Abstract: The red wolf is one of the world's most endangered species. Reintroduced to the wild in 1987 under the Endangered Species Act, a small but stable population (100-130) now lives in a 5-county recovery region in rural northeastern North Carolina. The restoration area includes private land (65%) and three national wildlife refuges. Founded in 1997, the Red Wolf Coalition (RWC) works in partnership with the U.S. Fish and Wildlife Service Red Wolf Recovery Program. The RWC is the only citizen non-profit whose mission is to advocate for the long-term survival of red wolves. In a rural area where private property rights are highly valued and where hunting is deeply ingrained in the local culture, many people oppose the presence of a major predator. However, without acceptance and tolerance by local citizens, as well as their direct involvement in red wolf conservation, the future of wild red wolves is uncertain. The most important ingredients for encouraging public engagement are (1) identifying the specific needs of the community and (2) a sincere, honest approach by the organization and its staff in addressing those needs. The RWC tag line is "Connecting people, places and red wolves." We have learned that local people must buy into the value of red wolf conservation if recovery goals are to be achieved. This presentation will identify the specific reasons that ongoing public engagement is critically important to red wolf recovery. Secondly, we will address the problems faced by the Red Wolf Coalition in gaining local support. Lastly, we will outline and explain the ways in which the organization is successfully addressing those challenges. We hope other organizations working in endangered species recovery and management will benefit from the Red Wolf Coalition's experiences.



Enemy of the shepherd, wolf in dog's clothing?: Wolf as deity, devil, menace, mistreated

Worringer, Renee

*University of Guelph, Department of History, 1004 MacKinnon Building, Guelph, ON N1G 2W1 Canada
(rworringer@uoguelph.ca)*

Bio: Dr. Renee Worringer is an Associate Professor of Islamic/Middle East History at the University of Guelph in Guelph, Ontario, Canada. She is the author of numerous publications and is the recipient of a Social Sciences and Humanities Research Council of Canada (SSHRC) Connection Grant in 2012 for faculty/student "Middle East Scholars Society" (MESS) seminar series and Great Lakes Ottomanist Workshop (GLOW) colloquia at the University of Guelph. She is also a licensed judge of the American Kennel Club (AKC) and Canadian Kennel Club (CKC) herding competition events on sheep, ducks and cattle. Dr. Worringer competes with her own dogs on all stocks, and she instructs and trains others on these skills for competition and/or for livestock management purposes.

Abstract: The wolf left an indelible imprint on the spiritual and material lives of human societies despite the constantly changing nature of its image across time and place. Unlike many other animals overlooked as voiceless objects, wolves were centrally located as supernatural beings, as nurturers and guides for humankind, as powerful or malevolent predators. My research enriches an understanding of the wolf's role in human history through a cross-cultural perspective on wolf-human relations focusing on ancestral mythologies, the shift from nomadism to settled raising of livestock, the religious influences of paganism, and conversion to monotheistic, Abrahamic faiths. Scholarship tracing human-wolf relations typically only explored Christian thinking about the wolf and its transformation as a result of sedentarization and religious conversion. Lingering attitudes toward wolves among Muslim people have not been investigated, though many still idealize or idolize the wolf. My study of wolf-human interactions introduces the Islamic historical perspective on wolves, sheep, and shepherd dogs. It addresses questions of modernity that arise when deconstructing Christian, Islamic, and pagan attitudes toward nature, the environment, livestock, and domesticated dogs, in an effort to search for common cultural ground between Christian and Muslim societies with respect to present-day ecological concerns. The intertwined lives of wolves and people affected the development of livestock management strategies: the emergence of sheepherding dogs and animal training methods used to capitalize upon canine instinctual behaviors originating in wolf packs illustrates humanity's unbreakable tie to the wolf, modified as a bond between sheepdog and shepherd. Close examination of interactions between wolves and peoples in Europe, Asia, North America, and the Middle East demonstrate the impossibility of human existence without the wolf in some form, whether as a mythologized animal believed capable of great feats of gentleness or cruelty, or a symbol of human domination over the environment or reformed custodianship of it through resurrecting the wolf population after human-induced near extinction. As the wolf was disappearing as a predator, the herding dog appeared on the scene as the "enlightened wolf," a trusted worker whom they could not live without in tending their flocks. Is the Christian world alone in almost completely exterminating the wolf, changing methods of livestock management, and developing dogs to herd and protect their flocks in ways that resemble behavioral patterns and instincts of the wolf when hunting? Do other societies maintain such ties with wolves?



Gray wolves in Wisconsin: from extirpation to game species

Wydeven, Adrian P., Jane E. Wiedenhoef, David MacFarland, Ronald N. Schultz, Sarah R. Boles, Jean Bruner

*Wisconsin Department of Natural Resources, 2501 Golf Course Road, Ashland, WI 54806
(Adrian.wydeven@wisconsin.gov)*

Bio: Adrian Wydeven, obtained a B.S. in wildlife management and biology from the University of Wisconsin-Stevens Point (1976), and an M.S. in wildlife ecology from Iowa State University (1979). He has worked for the Wisconsin DNR since 1982 and had been the state wolf coordinator from June 1990 through February 2013. Since March 2013 he has worked as a Forest Wildlife Specialist for the Wisconsin DNR.

Abstract: Gray wolves were extirpated from the state of Wisconsin in the late 1950s and returned to the state in about 1975-1976. The Wisconsin DNR began monitoring wolves in 1979 with radio telemetry, snow track surveys, and collecting of wolf observations. Wolf numbers grew from a minimum count of 25 in 1980 to 815 in 2012. Wolf classification by the State changed from protected wild animal in 1957, endangered species in 1973, threatened in 1999, protected wild animal in 2004, and game species in 2012. The Federal listing of wolves in Wisconsin was endangered from 1973 to 2003, varied classifications between 2003 through 2012, and delisting after January 2012. During the growth of the wolf population, depredations on livestock increased and became a regular management activity by the 2000s. In 2012 a wolf hunting and trapping season was conducted across the state, with a quota system set at 116, and a total of 117 wolves harvested. The long-term wolf population will likely decline with more intense management, but successful recovery has been achieved and healthy populations will likely persist into the foreseeable future.

Behavioral response of wolves to roads: scale-dependent ambivalence

Zimmermann, Barbara, Petter Wabakken, Lindsey Taylor, Håkan Sand, Olof Liberg

Faculty of Applied Ecology and Agricultural Sciences, Hedmark University College, Campus Evenstad, NO-2480 Kopang, Norway (Barbara.zimmermann@hihm.no)

Bio: Barbara Zimmermann works as a lecturer and scientist at Hedmark University College, Faculty of Applied Ecology and Agricultural Sciences. Together with colleague Petter Wabakken she takes part in the Scandinavian Wolf Research Project Skandulv, a joint Swedish-Norwegian research group that studies the Scandinavian wolf population.

Abstract: After recent recovery in several industrialized countries, large carnivores have to cope with a changed landscape dominated by human infrastructure, with roads being one of several new features. Wolves (*Canis lupus L.*) may use roads for ease of travel, search of prey and territory maintenance. However, roads also increase human-caused mortality and likely cause disturbance. We analyzed the summer movement of 19 GPS-collared resident wolves from 14 wolf territories in Scandinavia, including > 12,000 field-checked GPS-positions and 315 kill sites. We applied resource and step selection functions to describe the behavioral response of wolves to roads at the local step-by-step scale, at the within-home range scale, and at the across-pack scale. At the local scale wolves selected for roads when travelling, with travel speed nearly doubled as compared to off-road travel. However, they kept distance from roads while handling prey and resting. Wolves avoided areas of high forest road densities within their home ranges, this avoidance being stronger for breeding than non-breeding wolves. The functional response of wolves to road use in relation to road density at the across-pack scale was less than proportional to road availability. Wolves have adapted to use roads, but at the same time developed cryptic behavior to avoid potential human presence on roads. This highly plastic behavior may be an important cause of the successful wolf recovery in industrialized countries. However, we emphasize the role roads may play for human-caused mortality, with illegal killing being currently the largest source of mortality in the relatively small Scandinavian wolf population.







Melissa McGraw



2013 INTERNATIONAL WOLF SYMPOSIUM

Wolves and Humans at the Crossroads


Poster Presentations



Poster Presentations List

 **Concordant mitochondrial and microsatellite DNA structuring between Polish lowland and Carpathian Mountain wolves**

Sylwia D. Czarnomska – Mammal Research Institute, Polish Academy of Sciences, Bialowieza, POLAND

 **Impact of recolonizing gray wolves on mule and white-tailed deer in Washington**

Justin Dellinger – School of Environmental and Forest Resources, University of Washington, Seattle, WA, USA

 **Forensic cases in human-wolf conflicts in Finland**

Jenni Harmoinen – Ph.D. Candidate, University of Oulu, Oulu, FINLAND

 **Seasonal diet composition of gray wolves (*Canis lupus*) in northeastern Minnesota**


Yvette Chenaux Ibrahim – Wildlife Biology Technician for Grand Portage Indian Reservation and Graduate Teaching Assistant, University of Minnesota - Duluth, Duluth, MN, USA

 **Public perceptions of wolves and their return to the Great Lakes states**

Roger Nemeth and Hillari Vashaw – Department of Sociology, Hope College, Holland, MI, USA

 **The effects of partial scat collection on gray wolf (*Canis lupus*) scat analysis**


Lucas Olson – Wildlife Ecologist, University of Wisconsin–Madison, Madison, WI, USA

 **Wolves resting in risky environments: diurnal vs. nocturnal resting sites' characteristics and duration in a human-dominated landscape**


Vincente Palacios – Wildlife Research Biologist, University of Valencia, Valencia, SPAIN

 **Reducing human/coyote interactions in Cape Breton Highlands National Park**


Jason Power – Master of Science Candidate, Acadia University, Nova Scotia, CANADA

 **The unique role of non-profit captive breeding facilities in supporting of the Species Survival Plan programs for red and Mexican gray wolves**

Linda Saunders – Director of Conservation, Wolf Haven International, Tenino, WA, USA

 **The silent strategy of conservation: the case of the Mexican wolf (*Canis lupus baileyi*)**


Jorge Servin – IUCN Wolf Specialist Group, Universidad Autonoma Metropolitana Unidad, Xochimilco, Mexico City, MEXICO

 **Use of actimetry to know the activity pattern of the Mexican wolf (*Canis lupus baileyi*)**


Jorge Servin and Jose C. Sanchez-Ferrer – IUCN Wolf Specialist Group, Universidad Autonoma Metropolitana Unidad, Xochimilco, Mexico City, MEXICO; Ph.D. Candidate, Universidad Autonoma Metropolitana, Iztapalapa, Mexico City, MEXICO

 **Morality, empathy and the social dynamic of wolf packs**

Matheus de Mesquita Silveira – Ph.D. Candidate, Vale do Rio dos Sinos University, Porto Aelgre, BRAZIL

 **A double reproductive cycle in female Mexican wolf (*Canis lupus baileyi* – Nelson & Goldman 1949): a case study report**

Maria A. Soto – Biologist, Universidad Autonoma Metropolitana, Iztapalapa, MEXICO

 **Starting to identify relationship dynamics between wolves and other wildlife species in northern Manitoba**

Vicki Trim – Regional Caribou Biologist/Wildlife Technician, Manitoba Conservation and Water Stewardship, Thompson, Manitoba, CANADA

 **Ontogeny of behavior of captive Mexican wolves (*Canis lupus baileyi*)**

Carmen Vazquez – Master's Degree Candidate, Mexican Wolf Keeper, Aragon Zoo, Mexico City, MEXICO



Poster Presentations (alphabetical by presenter)

Concordant mitochondrial and microsatellite DNA structuring between Polish lowland and Carpathian Mountain wolves

Czarnomska, Sylwia D., B. Jedrzejewska, T. Borowik, A.V. Stronen, S. Nowak, R.W. Myslajek, M. Niedzialkowska, H.Okarma, M. Konopinski, M. Pilot, W. Śmietana, W. Jedrzejewski

Mammal Research Institute, Polish Academy of Sciences, 17-230 Białowieża, Poland
(s_czarnomska@ibs.bialowieza.pl)

Bio: Sylwia Czarnomska is a Ph.D. candidate at the Mammal Research Institute, Polish Academy of Sciences (PAS), with focus on landscape and conservation genetics of European species of mammals.

Abstract: Poland represents the western edge of relatively continuous distributions of many wide-ranging species, e.g., lynx (*Lynx lynx*), wolves (*Canis lupus*) and moose (*Alces alces*) and, therefore, is a key area for understanding historic and contemporary patterns of gene flow in central Europe. We examined wolf genetic structure in Poland and in a recently recolonized area in eastern Germany using microsatellite profiles (n = 457 wolves) and mitochondrial DNA sequencing (mtDNA, n = 333) from faecal samples. We found significant genetic structure and high levels of differentiation between wolves in the Carpathian Mountains and the Polish lowlands. Our findings are consistent with previously reported mtDNA subdivision between the northern lowlands and the southern mountains, and add new and concordant findings based on autosomal marker variation. Wolves in western Poland and eastern Germany showed limited differentiation from northeastern Poland. Moreover, mtDNA results indicated a southeastern subpopulation near the border with Ukraine. The observed structure might reflect landscape fragmentation and/or ecological differences resulting in natal habitat-biased dispersal.

Impact of recolonizing gray wolves on mule and white-tailed deer in Washington

Dellinger, Justin, Aarib Wirsing, Eric Krausz, Matt Marsh, Woodrow Myers, Brian Kertson

School of Environmental and Forest Resources, University of Washington, Box 352100 Seattle, WA 98195
(jad1nel2@gmail.com)

Bio: Justin Dellinger is a native of western North Carolina. He received his B.S. from the University of North Carolina – Wilmington, and his M.S. from Auburn University, studying foraging and spatial ecology of red wolves. He served as a wildlife biologist for one year in Arizona studying mountain lions. He is currently a Ph.D. student at the University of Washington in Seattle studying the impacts of naturally recolonizing gray wolves on mule and white-tailed deer in north-central Washington. Justin is most proud of the fact that his two year old son Jude can name almost any animal you show him as well as replicate the sounds they produce or some other associated bit of knowledge.

Abstract: Gray wolves are rapidly recolonizing Washington State. Our study seeks to understand the impacts that the return of a large carnivore can have on mule and white-tailed deer in north-central Washington. The study is examining both consumptive (e.g., fawn and adult survival) and non-consumptive (e.g., shifts in behavior and habitat use) effects of wolves on both deer species using wolf and non-wolf study areas within a multi-use landscape. Long and short-term data are being collected in the form of remote camera grids, GPS collars, and GPS camera collars.



Forensic cases in human-wolf conflicts in Finland

Harmoinen, Jenni

University of Oulu, Oulu, Finland (jenni.harmoinen@oulu.fi)

Bio: Jenni Harmoinen is a Ph.D. student at the University of Oulu, Oulu, Finland. She is studying social structure and relationships in wolves and bears by using genetic methods. Jenni also works with the Finnish Large Carnivore Research Project (<http://www.flcrp.org>).

Abstract: Wolf-dog hybrids - During recent years, there have been a few suspected wolf-dog hybrid cases in Finland. Suspected canids have had unusual coloration for wolves and dog-like body type. Samples from these individuals have been delivered to our research group for genetic analysis. The samples have been genotyped for 17 microsatellite loci and compared to ~400 Finnish, ~50 Russian and 10 Scandinavian wolf samples and 35 dog samples from breeds which morphologically resemble wolves (German Shepherd, East Siberian Laika, West Siberian Laika and Russo-European Laika). Our results confirm that wolf-dog hybridization occurs in Finland, but this is very rare at the moment. Poaching - After a serious population bottleneck in the 20th century, the Finnish wolf population has grown rapidly and expanded to new areas. Even though population size is still only ~130 individuals, this has caused discontent among people, especially hunters whose hunting strategies are based on using dogs. The wolf is listed as an endangered species in Finland, and shooting of wolves is only allowed in special cases, and it requires a license. Still, the population size of wolves doesn't grow as expected based on the number of breeding pairs. Thus, it is suspected that poaching of wolves is a problem in Finland. The police have delivered suspected samples, e.g., pieces of skin from bonfires or blood from snow to our laboratory for genetic analysis. Often in these cases, it has been stated that shot individuals are not pure wolves but dog-wolf hybrids. Our results confirm that those sample originated from wolves and are not hybrids between dogs and wolves.

Seasonal diet composition of gray wolves (*Canis lupus*) in northeastern Minnesota

Ibrahim, Yvette Chenaux, Seth Moore, Ron Moen

624 North 2nd Avenue W, #2, Caspers Hill Road, Duluth, MN 55806 (Ibrah051@d.umn.edu)

Bio: Yvette Ibrahim currently works as a graduate teaching assistant at the University of Minnesota Duluth and as a wildlife biology technician for the Grand Portage Indian Reservation. She is attending graduate school in Integrated Biosciences at the UM-Duluth and has a Bachelor of Science degree in biology from St. Edward's University in Austin, Texas (2008). She worked for two summers as a forestry technician in wilderness and wildlife in the Boundary Waters Canoe Area Wilderness. She then worked for two years as an air quality specialist and wildlife biology technician for Grand Portage where she began working on a wolf diet study.

Abstract: Wolf scat analysis is an efficient method to estimate diet composition. Adult and fawn white-tailed deer are an important food source for wolves in northeastern Minnesota. Moose are an alternate prey species for wolves, but VHF radio-collared adult moose had low predation rates through 2010. The extent of predation on moose calves is unknown. Determining wolf diet composition through scat analysis will increase understanding of how predation could be affecting the moose population. We systematically collected wolf scats along fixed routes in the Grand Portage Indian Reservation in 2011 and 2012. Sample sizes exceeded sixty scats per sampling interval. Scats are currently being collected across the Arrowhead region of northeast Minnesota. Scats were sterilized to prevent zoonotic disease and parasite transmission and then were washed to remove organic material. We identified hair and bone remains to determine prey species. Preliminary macroscopic identification of scats from the Grand Portage area indicates that scat composition was about 30% moose calf, 10% deer, 25% fawn, 15% calf/fawn, and 20% beaver from May to June, 15% fawn, 25% deer, and 15% moose from July to September, and 70% deer and 20% beaver from October to April. Beaver was in wolf diets in late fall and early spring. Scat contents also included bear hair and vegetation. Microscopic identification of several hundred scats will be performed in the summer of 2013. Frequency of occurrence of prey items will be converted to percent biomass consumed.



Public perceptions of wolves and their return to the Great Lakes states

Nemeth, Dr. Roger and **Hillari Vashaw**

Department of Sociology, Hope College, Holland, MI 49423 (nemeth@hope.edu)

Bio: Dr. Roger Nemeth has looked in depth at the lives of wolves, their return to Michigan's Upper Peninsula and at how Michigan residents are responding to the wolves' return and to the state's plans for managing them. Dr. Nemeth is Professor and Chair on the faculty of the Department of Sociology at Hope College in Holland, Michigan. He is also a member of the "Keep Michigan Wolves Protected" advisory council.

Bio: Hillari Vashaw is currently working on her undergraduate degree in communications and French at Hope College, Holland, Michigan. She has been actively involved in teaching elementary students about wolves and the positive environmental role they play.

Abstract: The recent removal of gray wolves from the endangered species list transfers responsibility for their management from the federal government to state agencies. In the Western Great Lakes region, the delisting of gray wolves means that Michigan, Minnesota, and Wisconsin must now implement their own plans to manage wolf populations in their respective jurisdictions. While the growth in wolf populations has been viewed by many living in this region as a great success story, attitudes towards wolves and their future remain uncertain and controversial for those living in areas of states that wolves inhabit. Our study consisted of surveying over one thousand northern Michigan residents about their support and fear of wolves, as well as their approval of methods for state management of the species. Results from our study indicate that, while there continues to be strong support for wolves in Michigan, since 2005 there has been a significant decline for the level of support and an increase in fear of the animal. These findings suggest that the wolf population in northern Michigan may be at or exceeding its maximum "social carrying capacity" for those residents inhabiting the same land as wolves do. Findings also indicate a growing polarity of opinions regarding wolves in recent years. Since Michigan is still developing its wolf management plan, findings from this study have direct policy implications.

The effects of partial scat collection on gray wolf (*Canis lupus*) scat analysis

Olson, Lucas

University of Wisconsin – Madison, WI (lolson129@gmail.com)

Bio: Lucas Olson is a wildlife ecologist from La Crescent, MN and is a graduate of the University of Wisconsin-Madison. He served as a research assistant in the Van Deelen Lab of the Department of Forest and Wildlife Ecology and in the Carnivore Coexistence Lab of the Gaylord Nelson Institute for Environmental Studies. He also served as a research technician for the Cascades Carnivore Project.

Abstract: Scat analysis is a common method for determining the diet of elusive carnivores. However, for many species scat is used to mark territorial boundaries. Some researchers collect only partial scat samples in order to minimize impact associated with scat collection, but partial collection may bias results. We collected grey wolf (*Canis lupus*) scats from Central and Northern Wisconsin to determine the effects of collecting partial scat samples on diet composition, especially for rare species. We divided each scat into quarter subsamples, processed and analyzed each subsample independently, and compared the species compositions and frequencies between subsamples from single scats. We hypothesize that if only half scat samples are collected, rare species may be overlooked, but relative presence and abundance of common species will remain unimpacted.



Wolves resting in risky environments: diurnal vs. nocturnal resting sites' characteristics and duration in a human-dominated landscape

Palacios, Vicente, Paula Roig, Bernat Claramunt, José Vicente López-Bao, Luis Llana, Víctor Sazatornil, Emilio José García

Instituto Cavanilles de Biodiversidad y Biología Evolutiva. Universidad de Valencia Apdo 22085, 46071-Valencia, Spain (v_palacios_s@hotmail.com)

Bio: Vicente Palacios is a wildlife research biologist who began to study wolves in 1998, monitoring Iberian wolf populations. His professional work has focused on the conservation and management of wolves, and he is conducting, in parallel, long term research about acoustic communication in Iberian wolves.

Abstract: The persistence of wolves in human-dominated landscapes is driven by their ability to minimize the risk of encounters with humans. Chances of survival will depend on the adoption of different static and dynamic mechanisms involving both temporal and spatial segregation such as becoming more nocturnal, avoiding areas with high human activities, or selecting dense vegetation areas as refuge. In this scenario, selection of resting sites (resting behavior) will be critical, where resting sites must offer protection to counteract exposure risk. If wolves select resting sites accordingly to perceived exposure risk, we hypothesize temporal and spatial differences in that selection influenced by human activities. We studied characteristics of resting sites from seven Iberian wolves (*Canis lupus signatus*) equipped with GPS-GSM collars in a human-dominated landscape in northwestern Iberia. By analyzing 12 landscape attributes (as surrogates of human activities and exposure risk) associated to 842 resting sites (120 ± 77 per wolf; range: 223), we found that wolves were more sensitive to human activities in daylight hours. Diurnal resting sites were located farther from unpaved roads, in areas with fewer buildings, and at lower elevations than nocturnal resting sites (544 diurnal vs. 298 nocturnal resting sites analyzed). Wolves spent more time in diurnal resting sites, suggesting that wolves were more active during the night. Avoiding human activity may facilitate coexistence, allowing wolves to persist in areas with high human densities and at high levels of landscape transformation.

Reducing human/coyote interactions in Cape Breton Highlands National Park

Power, Jason

Acadia University, Wolfville, Nova Scotia, Canada (095388p@acadiau.ca)

Bio: Jason Power completed his Honours degree in Biology and Environmental Science with Honours in coyote parasitology from Acadia University. Jason also graduated with a Cooperative Education certificate, which he earned by completing three work placements. His placements included positions at the Nova Scotia Department of Natural Resources, Wildlife Division; Nova Scotia Department of Fisheries; Inland Fisheries Division; and the Department of Biology at Acadia University. Jason is currently in his second year of his MSc. degree in Coyote Ecology at Acadia. He has been the recipient of an Encana Native Council Opportunities Fund scholarship for the past two years, and he was awarded a national volunteer award from Ducks Unlimited while at Acadia. Along with his research work, Jason also volunteers with Ducks Unlimited and has started a duck box project in the Annapolis Valley.

Abstract: We will present a preliminary genetic characterization of eastern coyotes from the Atlantic provinces, Canada. This analysis was prompted as a result of uncharacteristically aggressive behaviours noted among coyotes on Cape Breton Island, Nova Scotia, Canada, which included a fatal attack on a human in 2009. The taxonomy and population genetic structure of wild *Canis* ssp. in northeastern North America is complex and controversial. The three putative wild *Canis* taxa present in eastern North America include gray wolves (*Canis lupus*), eastern wolves (*Canis lycaon*) and eastern coyotes (*Canis latrans*). Some authors have argued that while *C. lupus*, *C. lycaon* and *C. latrans* are each derived from distinct



phylogenetic lineages, there has been extensive current and/or historical hybridization among these taxa. Furthermore, they have only been documented in Nova Scotia, which is part of Atlantic Canada, in the past two decades. Eastern coyotes in particular have hybridized extensively with eastern wolves, and several populations in Ontario, Canada and in the northeastern United States have been found to contain both mitochondrial haplotypes and microsatellite alleles that are characteristic of eastern wolves and “typical” western coyotes. We present a phylogenetic analysis of mitochondrial DNA haplotypes from eastern coyotes from Cape Breton Island and mainland Nova Scotia that demonstrates the presence of both *C. lycaon* and *C. latrans* mitotypes. Quantitative analysis of eight nuclear-encoded microsatellite loci is currently underway. In addition to our generic analyses, we have collected data on body size variables (e.g., weight, girth, body length, tail length) and skull dimensions (e.g., width and length) as well as calculating an “aggression index” for trapped coyotes. These morphological and behavioural variables will be compared with the genetic data to test whether there is an association between eastern wolf (*C. lycaon*) genetic characteristics and larger body size and/or higher aggression index.

The unique role of non-profit captive breeding facilities in support of the Species Survival Plan programs for red and Mexican gray wolves

Saunders, Linda

Director of Conservation, Wolf Haven International (www.wolfhaven.org), 3111 Offut Lake Road SE, Tenino, WA 98589

Bio: Linda Saunders received her B.S. in Wildlife Biology from the University of California at Davis, and her M.A. in Biology from California State University at Chico, California. Linda worked for the U.S. Forest Service for 16 years as a wildlife biologist in California, Alaska, Idaho, and Washington, working with a variety of species such as woodland caribou, grizzly bear, gray wolf and northern spotted owls. In 1993, Linda transferred to the U.S. Fish and Wildlife Service where she specialized in gray wolf and grizzly bear issues, serving on the North Cascades Grizzly Bear Technical Committee. She is currently working for Wolf Haven International as Director of Conservation, overseeing restoration work on the mounded prairie on site, as well as providing input on various federal and state proposals for gray wolf management in Washington and throughout the United States.

Abstract: Our poster presentation will show the role of captive breeding facilities in supporting the Species Survival Plan programs for the critically endangered red wolf and the Mexican gray wolf. We will focus on the lessons learned, the challenges of our work, the benefits both to the species and to the organization, and the implications for policy decisions.



The silent strategy of conservation: the case of the Mexican wolf (*Canis lupus baileyi*)

Servin, Jorge

Laboratorio de Ecología y Conservación de Fauna Silvestre, Depto. El Hombre y su Ambiente, Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico City, Mexico (jservin@correo.xoc.uam.mx)

Bio: Jorge Servin is a representative of Mexico on the IUCN Wolf Specialist Group and has been the leader for the Mexican Wolf Conservation Project in Mexico. He is an active member of the Mexican Wolf SSP (Species Survival Program). He is a Professor of Animal Ecology, Biological Conservation and Wildlife Management, at the Universidad Autónoma Metropolitana campus Xochimilco in Mexico. He has been working on Mexican wolf conservation since 1983.

Abstract: The Mexican Wolf Conservation Program reached an important goal in October 2011, when 5 wolves were released in the Western Sierra Madre in Sonora. After 35 days, four members of the pack were poisoned by local people. These actions put on the table of discussion the conservation strategy that the federal government chose to follow, with the advice of the group which was initially commissioned for its monitoring. The strategy carried out was a wide and intense information campaign in the region and at the national level. This process imitated the strategies that were implemented in 1996 when wolves were released in Arizona, USA. Actually, it is necessary to carry out an alternative strategy of conservation and release. I call it, the “silent strategy of conservation for the Mexican wolf.” In order to release wolves, it is necessary to have a mandate by the Mexican environmental authorities and local people as partners, which supports the project on their lands and then reaches the biological objectives. It must not give information about the exact locations for release or, later on, the areas inhabited by the wolves, since this information would give a disadvantage to the survival of released individuals. We will never achieve a majority consensus for these conservation programs of top predators. However, when the federal government incorporates social, economic and environmental benefits that focus on the local people supporting the program, this makes a big difference and incorporates a high level of success probabilities.

Use of actimetry to know the activity pattern of the Mexican wolf (*Canis lupus baileyi*)

Servín, Jorge, and José C. Sánchez-Ferrer, Jairo Muñoz-Delgado, Ricardo López Wilchis

Laboratorio de Ecología y Conservación de Fauna Silvestre, Depto. El Hombre y su Ambiente, Universidad Autónoma Metropolitana Unidad Xochimilco, Mexico (jservin@correo.xoc.uam.mx); Programa de Doctorado en Ciencias Biológicas y de la Salud, Universidad Autónoma Metropolitana Unidad Iztapalapa, Mexico (lobojcsf@hotmail.com)

Bio: Jorge Servin is a representative of Mexico on the IUCN Wolf Specialist Group and has been the leader for the Mexican Wolf Conservation Project in Mexico. He is an active member of the Mexican Wolf SSP (Species Survival Program). He is a Professor of Animal Ecology, Biological Conservation and Wildlife Management, at the Universidad Autónoma Metropolitana campus Xochimilco in Mexico. He has been working on Mexican wolf conservation since 1983.

Bio: José Carlos Sánchez-Ferrer, is a Ph.D. student in Biological Sciences from the Universidad Autónoma Metropolitana Unidad Iztapalapa, Mexico. His main interest is Animal Behavior and studying the activity patterns of the Mexican wolf. He has been involved with Mexican wolf conservation since 2003.

Abstract: The use of actimetry has proved to be a suitable tool to obtain motor activities records daily, monthly and annually for wild mammals. The purpose of this study was to evaluate the motor activity of eight Mexican wolf captives and candidates to be released to the wild in order to know their activity patterns. Each wolf was attached with a collar with a actiwatch (Cambridge Neurotechnology®), which recorded its motor activity between 13 to 240 sample days. Data obtained showed a circadian periodicity with mean duration of 24:01'53"±0:03'43" h, a mean period of activity from 11:45'37"±2:47'35" h, and a mean resting period of 12:14'22"±2:47'35" h. The wolves displayed an average peak activity at



11:40'39"±4:04'29" h, with a mean duration of 3:19'22"±1:28'15" h, which represents the 30.93±12.99% of day activity. The exception was an adult female who participated as helper in rearing the pups. The litter was born the end of April 2012, which showed a nocturnal pattern activity. Meanwhile the rest of wolves displayed a diurnal activity pattern. Since the 69.31±15.57% of its activities was diurnal, followed from 30.69±15.57% of nocturnal activities, and 10.72±1.63%, was crepuscular (sunset and sunrise periods) activity. The index of nocturnality value was $IN = -0.69 \pm 0.47$ (-1 diurnal; +1 nocturnal), which corresponds to 9:24'30" activity during the daylight period and 2:21'08" h during the darklight period.

Morality, empathy and the social dynamic of wolf packs

Silveira, Matheus de Mesquita

Vale do Rio dos Sinos University, José de Alencar Street, 868 / 501 – Menino Deus – Porto Alegre-RS – Brazil – CEP: 91380-000 (mdm.silveira@gmail.com)

Bio: Matheus de Mesquita Silveira has a Graduate and Master's degree in philosophy and is a Ph.D. student at Vale do Rio dos Sinos University, Brazil. He currently integrates the research group Chiron: Ethics, Language and Human Nature. He is also affiliated with the International Wolf Center and is a founding member of the Brazilian Society for Analytic Philosophy. His research concerns the study of the role that empathy plays in the social-bonding dynamics of wolves. Through a naturalistic perspective, it seeks to establish the relationship between empathy, social instincts and emotional attachment and its relationship with the development of morality. The current aspects studied in this research concern the analysis of how empathy affects emotions and establishes an intersubjective aspect that acts as an adjuster of the social relations of the group. The goal of the research is to develop a theory that explains the relationship between morality and emotions without falling into internalism or moral relativism.

Abstract: The central point of this poster presentation is to present a naturalized view of morality. The empirical sciences have correctly applied the empirical method in practical philosophy, and its technological advances allow us to bring new light to the problem of morals. According to ethnology, morality can be characterized as a system of reciprocal demands in which social mammals are already members since birth and in which the symmetry relations between the members of the group play a key role. I am going to defend this position by presenting a possible relation between empathy, the social aptitude of wolves and the existence of a system of mutual demands within the pack in which they live. This work is based in the research on empathy, cognitive sciences and in contemporary studies in ethology, especially those done by Dave Mech on the social behavior of wolves. This research adds empirical support for the philosophical thesis that complex emotions arise in response to a wide range of socially significant events. Thus, I intend to elucidate the question of the emotional demands inherent in morality, as well as its relation with the natural characteristics that allowed wolves to develop a complex social life. In this sense, I intend to show that the elements necessary for the emergence of morality are present in mammals of complex social life, which seems to be a strong argument in favor of a theory that explains morality in natural bases. (Key Words: Wolves. Empathy. Social Behavior. Ethology. Morality)



A double reproductive cycle in female Mexican wolf (*Canis lupus baileyi* – Nelson & Goldman 1949): a case study report

Soto, Maria A., I. Carmen Vazquez, Gerardo Lopez-Islas, Maria de Lourdes Yáñez, Miguel Angel Armella
Universidad Autónoma Metropolitana, Iztapalapa, Mexico (maps@xanum.uam.mx)

Bio: Maria A. Soto is a Biologist at the Universidad Autónoma Metropolitana in Mexico City, Mexico. She holds a Master of Science degree in Psychobiology from the Universidad Nacional Autónoma de México. Her work focuses on hormones and reproduction in mammals, mostly wolves.

Abstract: As in most of the wolf subspecies, sexual behavior in the Mexican wolf is shown in late winter once a year. The reproductive cycle in female wolves includes seasonality and monoestrus, with a long anestrus period. Estrogens and progesterone are responsible for estrus appearance, and presence of both seems to be necessary for the full stimulation of sexual behavior in female wolves. In previous studies, we made quantification of fecal estrogens and progesterone to several couples of Mexican wolves in captivity. In all the cases, peaks on both hormones are correlated with reproductive behavior and shown in winter. Lately, another couple hosted in the Aragon Zoo showed, in an unexpected way, sexual behavior during August in addition to the normal one in February. Then we performed a sexual hormones analysis during two consecutive years in fecal samples. Results show a significant rise of female sexual steroid hormones concentrations in both winter and summer. The female was checked for clinical and physical disorders, but we found no evidence of pathologies. The pedigree was reviewed looking for possible hybridization, but only a pure wolf lineage was found. Environmental factors were also studied providing no evidence that could explain such hormone concentrations. This is the first report of summer sexual behavior on Mexican or other wolves.

Starting to identify relationship dynamics between wolves and other wildlife species in northern Manitoba

Trim, Vicki

*Regional Caribou Biologist, Manitoba Conservation and Water Stewardship, Box 28, 59 Elizabeth Drive,
Thompson, MB, Canada, R8N 1X4 (Vicki.trim@gov.mb.ca)*

Bio: Vicki Trim completed her undergraduate work at University of Manitoba in 1996 and received a Natural Resource Management diploma from the University College of The North, in The Pas, Manitoba in 2000. Vicki worked 6 years as a Wildlife Technician for the Province of Manitoba, Department of Conservation and Water Stewardship in northwest Manitoba, and has worked for the last 6 years as a Caribou Biologist for the northeast region of Manitoba, based in Thompson. For a frame of reference, the northeast region of Manitoba is approximately 400,000 sq. km, comparable to the size of California. Vicki spends the majority of her time developing and conducting monitoring programs for boreal woodland and forest tundra caribou and using results to develop conservation strategies and action plans for Manitoba. She also conducts moose surveys and various polar bear studies, and now wolf studies, working closely with First Nations and local industries.

Abstract: Over the last three years, the province of Manitoba and First Nation communities have partnered together on various wildlife monitoring projects in northern Manitoba within the Kaskatamagan Wildlife Management Area (WMA). In 2010, Conservation and Water Stewardship, in collaboration with the Fox Lake, York Factory and Split Lake Resource Management Boards, initiated an eight-year monitoring program of forest-tundra caribou including GPS collaring and genetic analyses. In 2012, a four-year polar bear study was initiated to locate and document the extent of denning activity south of the Hudson Bay coast into the Kaskatamagan WMA. Wolves are considered to be the main predator



of caribou and moose in northern Manitoba. Local knowledge indicates that wolves may also be pre-dating on polar bear cubs following den emergence in March while making their migration out onto the sea-ice of the Hudson Bay. In January 2013, five GPS Argos collars were deployed on wolves to start and identify relationship dynamics between wolves, polar bears, caribou and moose along the Hudson Bay coast. Over the last four months, locations have been mapped and have identified some preliminary relationships. Moose kills have been identified through clustering of locations and visually confirmed through aerial survey. There is also evidence that wolves travel onto the sea ice in coordination with female polar bears and cubs in March. Locations recorded in May through July may help identify relationships between local wolves and forest-tundra caribou during the calving and post-calving period. Although results are preliminary, there is a great interest by governments and local resource users to expand wolf monitoring in the Kaskatamagan WMA to support local wildlife conservation and land-use planning efforts.

Ontogeny of behavior of captive Mexican wolves (*Canis lupus baileyi*)

Vazquez, Carmen, Miguel A. Armella, María A. Soto, Jorge Servin, María Yáñez

Aragon Zoo, Mexico City, México (carmenlobaragon@yahoo.com.mx)

Bio: Carmen Vazquez is studying for a Master's degree in Biology at the Universidad Autonoma Metropolitana's Iztapalapa campus in Mexico City, Mexico. She has been researching Mexican wolf behavior since 1990. She has been a Mexican wolf keeper at the Aragon Zoo in Mexico City since 1993.

Abstract: Ontogeny of behavior refers to the changes, in a given animal's behavior, during its growing process. Little is known about this part of Mexican wolf (*Canis lupus baileyi*) biology despite the fact that general information about physical upbringing is well known. In this paper we describe the changes in behavior of 44 pups, and the adults in their packs, from eleven litters of Mexican wolves raised at the San Juan de Aragon Zoo in Mexico City between 1989 and 1997 using the zoo's data logs. We describe a total of 66 behavioral categories recorded day by day from the day of birth (day 1) until they reached two years of age (day 720). Since behavior was recorded unevenly, we made a data base of event/day/individual. This base has 28,045 records. We analyzed frequencies of the most significant categories divided into six meaningful groups, also by developmental periods. Main results show that social behavior can be detected as soon as 20 days of age. Few categories appeared and disappeared during the maturity; however most of the categories remained once they were acquired and remained at least until the end of the study period. Play and submissive behaviors were displayed more often than agonistics. Multivariate statistics probed, we can divide the process into logical steps, not only during the first three months but during the juvenile period as well. Agonistic behavior of pups and parents increases in intensity and frequency as the pups grow, and low intensity is always the most frequent.





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