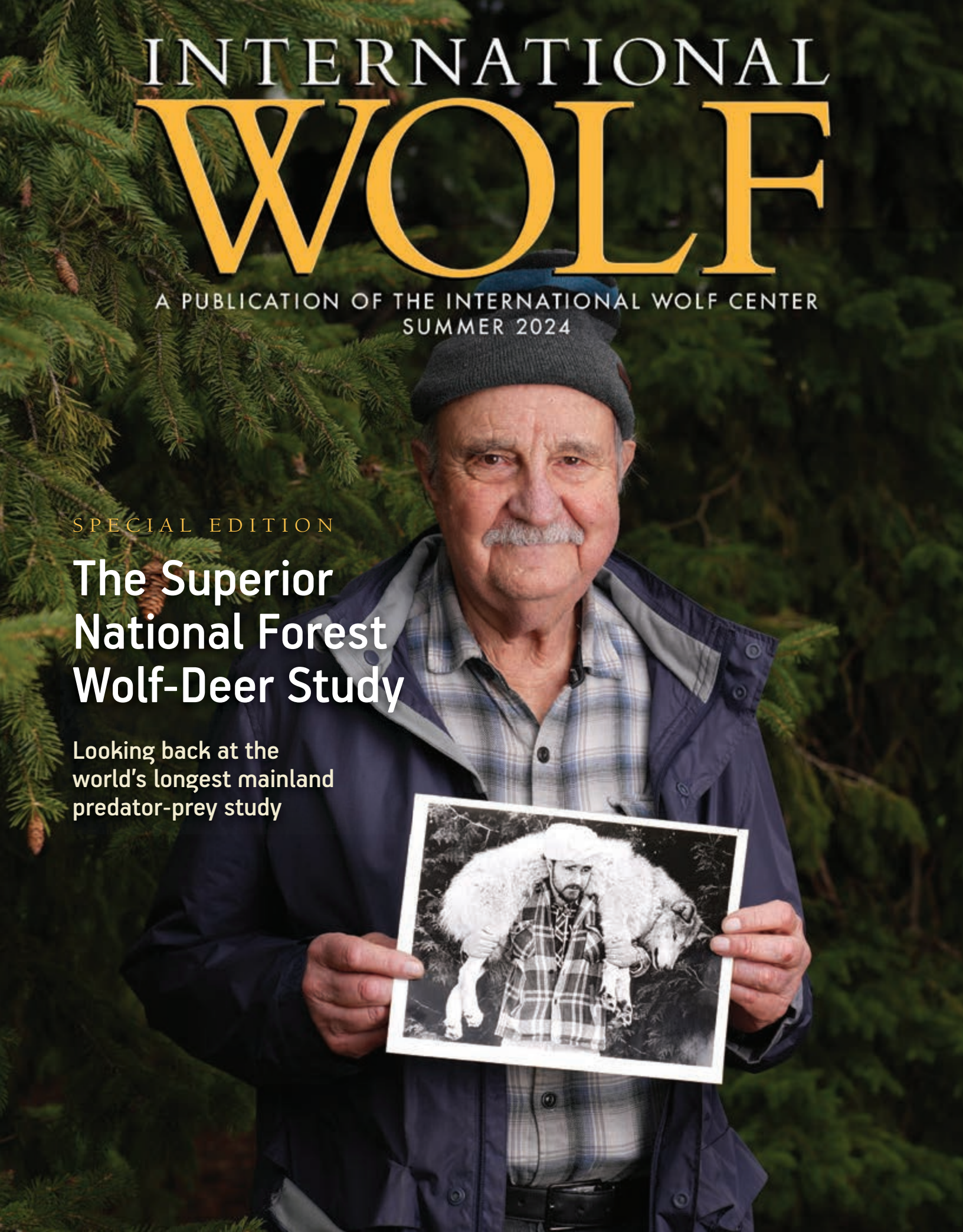
INTERNATIONAL
WOLF
A PUBLICATION OF THE INTERNATIONAL WOLF CENTER
SUMMER 2024



SPECIAL EDITION

The Superior National Forest Wolf-Deer Study

Looking back at the world's longest mainland predator-prey study

Oh What a Difference a Dave Makes!

There is no way to adequately express what Dr. L. David Mech means to the wolf world. However, by narrowing the focus a bit, we can say that without his six decades of wolf research and his vision of teaching the public about wolves, the International Wolf Center would not exist.

Dave not only planted the seed for the creation of the International Wolf Center, but he has continued to contribute and guide the organization into what it is today, some 38 years after its beginning. He has been a strong, supportive, inspiring member of the Board of Directors who gives his time and talents unselfishly to others to further the Center's mission.

Over all these years, his work for the International Wolf Center includes being a valuable member of several board committees where he provides expert advice and scientific oversight for the *International Wolf* magazine, our educational programming, exhibits, intern training and much of the information on our website. He is always available when needed.

Dr. Mech's work has had a profound impact on many young researchers and supporters. His dedication and example have inspired many to choose career paths in wolf research, environmental education, and wildlife rehabilitation. He has mentored many of today's leading wolf biologists from around the world and was part of the great wolf reintroduction into Yellowstone National Park, leaving a lasting legacy.

Dave (and the wolf) is also the reason many people over the years have become board members. Whether he inspired them in their youth or made a life-changing impact during the International Wolf Center-sponsored Arctic and Yellowstone trips, they believed in the organization's mission and wanted to be part of it.

The Board of Directors of the International Wolf Center expresses their deep gratitude and appreciation for all that Dave has done and continues to do for the organization and the wolf. We can't say it enough—What a Difference a Dave Makes!

INTERNATIONAL WOLF

International Wolf Center

VOLUME 34, NO. 2 THE QUARTERLY PUBLICATION OF THE INTERNATIONAL WOLF CENTER **SUMMER 2024**

The USGS Superior National Forest Wolf and Deer Research Project

During his personal time in 1966, Dr. L. David Mech began examining and gathering specimens from wolf-killed deer in a portion of the Superior National Forest. That work ultimately led to a study that lasted 56 years. Here, we take a look back at the study's background, location and results.

The Superior National Forest Wolf Study: from Collecting to Reporting

The work begun by Mech and continued by a new generation of technicians, interns and graduate students helped reveal the lives of wolves in the wild not only to biologists, but to the public as well.

By Debra Mitts-Smith

Research findings enhance knowledge of the dance of life, and death

The study of wolves in and around the Superior National Forest also contributed to the knowledge base of many inter-related subject areas including prey animals, their survival strategies and ways in which winter weather and food availability affect succeeding generations. Here we look at studies that advanced knowledge of these diverse but related topics.

By Tracy O'Connell

The Study's Methodology

The first words written about the study of wolves and deer in the Superior National Forest were brief: "Fresh wolf tracks, at least two sizes of wolves." From those humble beginnings in a notebook to radio collars and more, the study's methodology changed as the years ticked by. Mech looks back on the study's methodology.

By Dr. L. David Mech

On the Cover

Photo Credit: Anthony Souffle, StarTribune

In 1966, Dr. L. David Mech started studying the relationship between wolves and deer in the Superior National Forest. The study continued until the fall of 2022. In this image, Mech poses with a photo of himself from the early days of the project.

INTERNATIONAL
WOLF

Publications Director
Chad Richardson

Graphics Coordinator
Carissa L. Winter

Consulting Editor
Kristine Chapin

Technical Editor
Dr. L. David Mech

Graphic Designer
Tricia Austin

International Wolf (1089-683X) is published quarterly and copyrighted, 2024, by the International Wolf Center, 7100 Northland Circle N, Suite 205, Minneapolis, MN 55428, USA.
email: internationalwolf@wolf.org.

Publications agreement no. 1536338

Membership in the International Wolf Center includes a subscription to *International Wolf* magazine, discounts on programs and merchandise, and free admission based on the membership level you select. See wolf.org for complete details.

Membership levels (in U.S. dollars):

$50	$125	$500
$100	$250	$1000

For memberships outside the United States, please add an additional $15 for postage.

Please mail membership payment to:
International Wolf Center Administrative Office,
Attn: Membership, 7100 Northland Circle N,
Suite 205, Minneapolis, MN 55428, USA.
Contact the membership department with questions:
763-560-7374 ext. 2270 or membership@wolf.org.

International Wolf is a forum for airing perspectives, science-based information and personal experiences about wolves. Articles and materials printed in *International Wolf* do not necessarily reflect the viewpoint of the International Wolf Center or its board of directors.

International Wolf welcomes submissions of personal adventures with wolves and wolf photographs. Prior to submission of other types of manuscripts, address queries to Chad Richardson, publications director.

PHOTOS: Unless otherwise noted, or obvious from the caption or article text, photos are of captive wolves.

International Wolf is printed entirely with soy ink. We encourage you to recycle this magazine.

The Superior National Forest Wolf-Deer Study

An entire issue of *International Wolf* dedicated to 57 years of local research with global impact

In mid-2023, I had the opportunity to attend the "Wolves Across Borders" conference in Stockholm, Sweden. Over four days, I attended dozens of talks and workshops describing the rapid recolonization of wolves across much of their former range in Europe and the unique challenges of managing a species across multiple international boundaries.

One of the most memorable moments of the conference occurred during a plenary presentation by Dr. Josip Kusak and Dr. Çağan Sekercioğlu titled, "Challenges and opportunities of wolf studies in Croatia and Türkiye." Considering that title, you can imagine my surprise when one of the first slides shown was an image of the Kawishiwi lab in Ely, Minnesota, where Dr. Kusak had learned wolf field-study techniques from Dr. L. David Mech and Dr. Michael E. Nelson back in the mid '90s. Josip knew that "Dave" was in the audience, and wanted to make sure that, at the start of his talk, he acknowledged the importance of his time spent in the Superior National Forest to his subsequent research.

At the International Wolf Center, we have always been aware of the import of the Superior National Forest Wolf-Deer study. It took place right down the road from our Visitor Center in Ely and was in many ways responsible for the founding of our organization (see story in this edition). But as the project ended in 2022 after 57 years, we want to acknowledge the monumental, overall impact of this project on the field of wolf biology—from decades of research findings and papers to the hundreds of scientists, managers, technicians and students who worked and learned under project coordinators Dave Mech, Mike Nelson and Shannon Barber-Meyer— many of whom, like Josip Kusak, went on to establish wolf projects of their own.

The board and staff of the International Wolf Center decided it was critical to publish a special issue of *International Wolf* to describe this project in more detail and to celebrate its worldwide influence. The impact of this Northern Minnesota research project on global wolf conservation efforts cannot be overstated, and this issue brings you a few voices of people who helped make it successful, in which you can hear their pride and appreciation for the opportunity, and their respect for the man who taught them so much. ■

Grant Spickelmier
Executive Director
International Wolf Center

Crée Bradley

An Overview:

The USGS Superior National Forest Wolf and Deer Research Project

Dave Mech

The Wolf and Deer Research Project in the Superior National Forest (SNF) of northeastern Minnesota began in 1966 and continued into 2022 under the auspices of several organizations and agencies, most recently the U.S. Geological Survey. Its primary objective has been to determine and follow the annual wolf density in a 2,060 square-km (almost 800 square-mile) part of the east-central SNF and assess the causes of its trajectory over a long period.

Background

This research began in February1966 when Dave Mech, on his personal time, began examining and gathering specimens from wolf-killed deer in the east-central part of the SNF. In 1967, the U.S. Fish and Wildlife Service (USFWS) listed the wolf as an endangered species under the Endangered Species Preservation Act of 1966, and Dave continued this work under the auspices of Macalester College, using students as assistants, flying as an observer on routine Minnesota Department of Natural Resources (DNR) patrol flights and headquartering in a Minnesota DNR cabin in the SNF. Intermittently from early January through March 1967, he not only continued collecting specimens from wolf-killed deer but also aerially followed wolf tracks to observe and count wolves seen during the flights.

Other than on Isle Royale in nearby Lake Superior, the only wolf population in the 48 contiguous states was Minnesota's, and little was known even about wolf natural history. In addition, the advent of radio-tracking was revolutionizing wildlife research. Dave was just completing his research-associate position, testing radio-tracking techniques for the University of Minnesota (UMN). Thus, much was to be gained by a radio-tracking study of Minnesota wolves.

In 1968, Dave became an assistant professor and research associate at Macalester College and continued the informal wolf work he had been doing, assisted by grants from various non-governmental organizations (NGOs). The research received considerable publicity, and Region 3 of the U.S. Fish and Wildlife Service and the North Central Forest Experiment Station (NCFES) of the U.S. Forest Service (USFS) offered radio-tracking collars for the project. The NCFES also provided the services of one of its biologists to assist during 1968-1969, as well as the use of its Kawishiwi Field Lab outside of Ely. (The project headquartered there through 2010.) The project began live-trapping and radio-collaring wolves in that same study area in 1968.

In 1969, Region 3 of the USFWS recruited Mech to become its wolf biologist, and in 1973, the project was transferred to the Endangered Wildlife Research Division of the Patuxent Wildlife Research Center. The NCFES then offered Dave an office in its building on the UMN campus, and the UMN offered an adjunct-professor position with its Department of Fisheries and Wildlife (now the Department of Fisheries, Wildlife and Conservation Biology) and the Department of Ecology and Behavior (now the Department of Ecology, Evolution and Behavior).

Study Area

As mentioned above, the main objective of the research was to determine the long-term trajectory of the wolf population in part of the SNF and the causes of any major changes. The study area was a 2,610 km2 area east of Ely, Minnesota, later reduced to a 2,060 km2 area (Fig. 1). It contained a region where wolves preyed primarily on white-tailed deer and another where they preyed primarily on moose and beavers. Another important characteristic of this study area is that it included not just wolf range accessible to humans but also the Boundary Waters Canoe Area Wilderness, which was much less accessible, particularly to wolf hunters and trappers.

SNF Field Work

When the project became a full-time endeavor, Mech recruited volunteer wildlife technicians and graduate students to assist with it. Eventually wildlife technicians were hired, and in the late 1970s, a full-time wildlife research biologist, Michael E. Nelson, was added. He, Mech, graduate students and volunteer technicians conducted the main field work through about the late 1980s when Mech had begun working on other wolf projects in Denali National Park, Ellesmere Island and Yellowstone. Nelson then assumed most of the SNF field work. He retired in 2011 and was replaced by Shannon Barber-Meyer, who continued the SNF field work.

When Congress transferred the Division of Wildlife Research from the USFWS to the National Biological Survey (later the National Biological Service), the Wolf and Deer Project transferred with it, and then to the U.S. Geological Survey. Concurrently, administration of the project moved from Patuxent to the Midcontinent Ecological Science Center, and then to Northern Prairie Wildlife Research Center.

Funding for the research during the earlier years included major grants from NGOs as well as base funding from the respective Department of

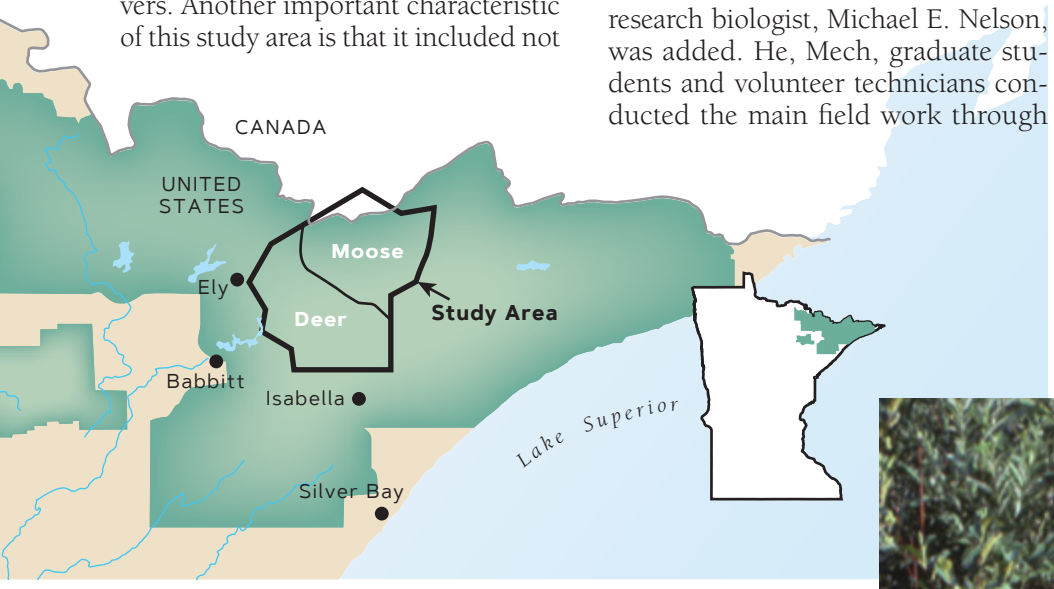


Figure 1. Wolf and deer study area in the Superior National Forest (green) of Northeastern Minnesota, 1966 to 2022. Areas where moose and deer form the main year-around wolf prey are labeled.

Shannon Barber Meyer and Dave Mech aerially radio tracked wolves during the project.

Mike Nelson (left), wildlife technicians John Scott and Eric Gese (extreme right) prepare to radio track deer and wolves.

the Interior (DOI) agencies, with the USFS contributing the maintenance and utilities of Kawishiwi Field Lab of the NCFES into the 1990s. However, when the NCFES later eliminated its wildlife-research program, it terminated its support of Kawishiwi Field Lab, while allowing DOI researchers to remain headquartered there. In 2011, however, the NCFES (now the Northern Research Station) decided to decommission the Kawishiwi Lab buildings, so DOI researchers moved to a new U.S. Forest Service facility in Ely.

The Wolf and Deer Project's primary study technique involved live-trapping, radio-collaring and aerially radio-tracking wolves and deer, and recording their numbers, locations, survival and mortality causes. Most of the tracking was conducted weekly via aircraft as conditions allowed, and during winter included observing and counting radioed wolves and their packmates, as well as aerially searching for non-radioed wolves and/or tracks in parts of the study area where no radioed wolves lived. The objective was to obtain a complete count of wolves in the study area annually. Since 2019, attempts have been made to obtain this count with non-invasive methods such as scat DNA collection, trail cams, citizen reports and snow tracking.

Dave Mech

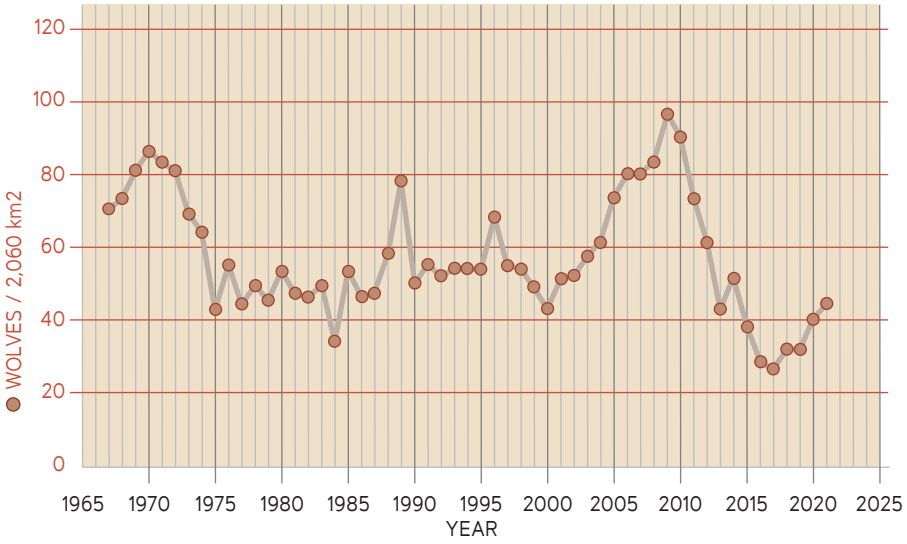


Fig. 2. Wolf density trajectory in the east-central Superior National Forest study area (Mech 2022).

Results

The project live-trapped 884 wolves during a total of 1,254 captures and recaptures and radio-tagged 778 of them. Also, 801 deer were caught during 1,068 captures and recaptures and most were radio-collared. Wolf counts were made each year from winter 1966-1967 through winter 2021-2022 (Fig. 2). Approximately 250 peer-reviewed books, monographs and articles were published about this research.

Although the basic objective of this research was to obtain the first long-term record of a mainland wolf-population trajectory worldwide, the technique used also allowed learning much about many other aspects of wolf ecology and behavior. Thus, hundreds of peer-reviewed scientific articles resulted, covering wolf natural history, movements, population changes, spatial organization, scent-marking, howling, dispersal, survival, mortality, diseases, nutritional condition, and relations with deer, moose and black bears. Others were published on deer movements, migrations, mortality, nutritional condition and natural history, as well as on Canada lynxes and martens, all in the same study area.

Every year for many years, 16 volunteer wildlife technicians gained experience with the project, and many of those, plus numerous Ph.D. and Masters' students, eventually taught at universities, or became researchers or administrators with state or federal agencies. Many contributed significantly to wolf conservation, including the reintroduction of wolves to Yellowstone National Park and red wolves to Alligator River National Wildlife Refuge. One, Greg Smith, became director of Patuxent Wildlife Research Center.

The U.S. Geological Survey is the nation's largest water, earth and biological science and civilian mapping agency. It collects, monitors, analyzes and provides scientific understanding of natural resource conditions, issues and problems. ■

Mech, L. D. 2022. Long-Term Wolf Study in the Superior National Forest Ends. *International Wolf* 32 (3): 12-15.

Cree Bradley

The Superior National Forest Wolf Study: from Collecting to Reporting

By DEBRA MITTS-SMITH

In 2022, the Superior National Forest (SNF) wolf/deer study—the longest running of its kind—came to an end. Its groundbreaking results produced much of our current knowledge of the gray wolf's life, death and role in the ecosystem.

In 1966, when Dr. L. David Mech began studying wolves in Minnesota's SNF, habitat loss, hunting, trapping and bounties, and eradication efforts by the federal government had taken their toll. Aside from wolves on Isle Royale and a few remaining in Wisconsin and the Upper Peninsula of Michigan, the roughly 700 wolves in northeastern Minnesota were the only viable population in the 48 contiguous states.

The wolves in Minnesota's SNF were important because their population had historically existed. Over most of the study period, the wolves had not been hunted or trapped. The population spanned both wilderness and adjacent non-wilderness areas. Further, unlike the wolves isolated on Isle Royale, the SNF wolves were a mainland population much more representative of most wolves worldwide, with room to disperse and expand across Minnesota, Wisconsin, Michigan and Canada.

Prior to the first years of the study, wolves were not protected; year-round hunting and trapping were permitted. Minnesota had begun its move toward protection in 1965 by removing its last bounty on wolves. Although this did not prohibit hunting and trapping of wolves, it did remove the economic incentive. In 1966 the U.S. enacted the Endangered Species Preservation Act; in 1967, wolves were added to that list. This act did not afford protections to the species listed, but it allowed government agencies to promote recovery efforts. Protections for most of Minnesota's wolves came on October 26, 1970, when the head of the Superior National Forest, Craig Rupp, issued an order that prohibited hunting, trapping or other taking of timber wolves in the SNF. In 1974, the gray wolf received full protection under the federal Endangered Species Act.

The SNF wolf-study site was in the east-central portion of the SNF and covered 795 square miles, from just east of Ely to Adams Lake, Minnesota. It included non-wilderness area (national forest land with private residences) and wilderness areas of the Boundary Waters Canoe Area Wilderness (BWCAW). There were no towns, farms or livestock producers within the study area. Motorized vehicles were prohibited in the BWCAW, making it less accessible to people—especially hunters and trappers. The wolf's main prey were white-tailed deer, moose and beaver.

Mech's initial focus was the distribution and territorial behavior of wolves and wolf packs in the SNF. However, in 1968, with the introduction and use of radio-collaring to identify, track and count individual wolves and wolf packs, the objective became a long-term

study of the wolf population—a study that tracked and assessed population changes, survival rates and causes of death. As Mech has stated, "Basically, we were trying to learn all we could about wolves and their natural history and predation, but the long-term objective was to follow the population trend for as long as possible and determine what factors affected its trajectory."

A day in the life

In the early years of the study, funding was limited. Mech relied on volunteers like Roger Powell. During the summer of 1971, Powell, a recent graduate from Carlton College, accepted an unpaid internship on the wolf project. That summer the study focused on how changes in the number of deer affected the wolf population.

Powell spoke about the project this way: "Jeff Renneberg, another intern, and I began the day by checking the modified steel traps. Teeth welded to each bar were offset to reduce injury to the wolf while still holding the paw. Compared to what was available at the time, this was safer and less prone to cause injury. A chain on the trap connected to a large hook, so the trapped wolf would drag the chain, which would get caught on brush, logs or other debris. When a wolf was caught, we would let Dave know, and he would drive out to the site. We used a jab-stick to tranquilize the wolf; then we collected blood, took weight and measurements, and recorded the location. We also radio-collared and tagged it so we could track it."

Powell spent a part of each day driving or flying across the SNF to locate and track previously radio-collared wolves before returning to the Kawishiwi Field Lab, where he bunked.

Occasionally, wolves could upend the daily routine. "During the spring of 1971, Bud Heinselman, Chuck Wick and other Forest Service biologists were collecting data on forest recovery after the Little Sioux fire, and they reported seeing wolves. From their description, Dave guessed the wolves had been near a rendezvous site. So he sent Jeff and me to hike around the area for a day. After a while, we got separated. I found this huge, shoulder-high rock, climbed on top of it, sat down and drew my knees up as I listened, watched and waited. After a while, a wolf approached—about two meters away—and stood there, just looking at me. It slowly walked counterclockwise around the rock. When it got downwind of me, it jumped two meters into the air and ran."

Then Powell added parenthetically, "I am certain that it didn't jump that high—but it sure did seem like it."

Dr. Mech came to view the area.

"Early in the morning, we were walking east and came upon an open outcrop. A wolf was lying on top of the rock, sleeping. We crept around the rock edge, sat quietly on a ledge of rock that faced away from the open outcrop. To see to the top of the outcrop, we had to look backward over our shoulders. We were facing north, and as we sat there, a wolf pup came up. It cocked its head and approached us. It got within a meter or two, curious about us. Then it got on top of the rock and lay down.

"Later, an adult wolf came to the site and regurgitated to three or four pups. I'm not sure how long we were there—it could have been five minutes or five hours—time slowed down."

Results

Over the life of the study, 884 wolves were live-trapped, of which 778 were radio-tagged. Winter wolf counts were conducted from 1966–1967 to 2021–2022. The data reveals not only changes in population size and density, but also survival rates and causes of death, including disease and human-caused mortality. Later, Mech reported declines in wolf numbers between the winters of 1968–69 and 1973–74 before numbers began increasing. The wolf decline in 1982 followed a decline in the deer population. A 2021 journal article by Drs. S. Barber-Meyer, T. J. Wheeldon and David Mech reported that survival rates of adult wolves in

Dave Mech radio-collars his first wolf, November 1968. Bob Ream assists.

Don Breneman

wilderness areas were higher than those in the non-wilderness areas.

Legacy

The research conducted over those 55 years has led to hundreds of peer-reviewed articles and publications, helping to inform students, researchers and wildlife managers about wolves. The technicians, students and researchers working on the project gained practical experience in handling and studying wolves and other wildlife. And as Powell said of his time on the project, "It changed my life, giving me opportunities that I never would have had."

But the data on wolves led not only to academic publications; it also formed a foundation for educating the public.

In the early 1980s, Nancy Gibson, a wildlife expert for the TV series P.M Magazine, met Dave Mech while gathering background for an episode on the SNF wolf study, accompanying him on a flight to look for wolves. "We watched a pack of wolves chase a deer over a ledge, and I was hooked." She became involved, assisting in the field and teaching people about wolves in classrooms and clubs, corporate training sessions and conventions, as she and other researchers shared factual information with the public.

Part of this work involved obtaining state money for building and funding the International Wolf Center. "At the time," Gibson admits, "animosity toward the wolf ran high. Part of my job was to talk to legislators. Standing up for a species like the wolf could be uncomfortable."

One way to get state legislators on their side was to bring them north to where the wolves were—the Superior National Forest. "They all wanted to hear wolves howl, so Dave and I howled. Unfortunately, the replies came from sled dogs—but the legislators refused to believe that what they heard weren't wolves."

Gibson says "Although myths and misinformation about wolves persist, attitudes toward the wolf are shifting; today, they are more positive and more realistic. *Little Red Riding Hood* is no longer mentioned." She credits this change in attitudes to Mech, his research and his ability to share his data, adding that "The SNF study was a hotbed of research and interest. It slowly picked away at the myths about wolves."

The work begun by Dr. L. David Mech in the SNF, and continued by new a generation of technicians, interns and graduate students helped reveal the lives of wolves in the wild not only to biologists, but to the public as well—transforming our understanding of the wolf and garnering support for its continued existence. ■

Don Breneman

Trapper Robert Himes stabilizes Wolf 1051 while Dave prepares to radio collar it. Bob Ream and Darrold Walls in background.

Cree Bradley

Predator and Prey:

Research findings enhance knowledge of the dance of life, and death

By TRACY O'CONNELL

Radio-collared wolf 6685 was killed when its skull was pierced by a deer hoof.

The study of wolves that took place over the course of 50 years in and around the Superior National Forest also contributed to the knowledge base of many inter-related subject areas including prey animals, their survival strategies and ways in which winter weather and food availability affect succeeding generations. Here is a look at several studies that advanced knowledge of these diverse but related topics.

Buffer zones provide safe havens

In a 1977 paper L. David Mech proffered a theory about an evolutionary strategy that addresses how predator-prey systems survive, in most cases, for prolonged periods of time. One well-known strategy, he notes, is the propensity of predators to attack young, old, or debilitated game, leaving the strong stock of breeding age to provide future generations of prey.

Another, he suggests, is that prey animals inhabiting an area that constitutes a buffer zone between wolf packs are more likely to survive and reproduce for extended numbers of years, than those who make their homes in the center of a pack's territory. Wolf pack territories in the study area, Mech notes, are typically 125 to 310 square kilometers (48 to 120 square miles) each, and they are surrounded by a 2 km (1.2 mile) strip – the buffer zone – which accounts for between 25% and 40% of a given area.

Wolves tend to not hunt in these areas unless driven by extreme hunger, because they could be found and attacked by members of another pack, creating danger and perhaps death. Mech notes that wolves in the buffer zone scent mark twice as often as in their central territory – an indication of their anxiety in that region.

Deer of course are not aware of the existence of buffer zones and do not target these areas as safe havens, but that is what they prove to be to prey animals who turn up there, allowing a place where deer can reproduce with comparative safety so that a reservoir is built up of prey animals that will then disperse to other territories as they mature.

After initially positing this theory, Mech notes, he became aware of writings of human tribal territories where, similarly, hunting in the borderlands was considered dangerous for fear of running into members of enemy tribes. These areas proved a safe place for prey animals to regenerate, on the fringe of human hunting territory.

Three-decade dearth of deer

The pattern of deer inhabiting specific winter territory (known as a "deer yard") was studied in a section of the Superior National Forest where a confluence of wolf predation, years of severe winters and a lack of browse due to a maturing forest appeared to have combined so that one such deer yarding area was no longer populated.

Over a 30-year period, from the mid-1970s to 2004, Mech and colleague Michael Nelson found no sign of deer during the typical period (February and March) in which a deer yard is occupied, despite efforts at radio tracking and searching for deer sign. White-tailed deer had inhabited the area 40 years prior, though their numbers had dropped during the decade preceding the study, despite rising numbers of deer occupying adjacent areas. Wolves continued to inhabit this area and preyed

This radio-collared deer was studied during the project.

Photos: Dave Mech

Mike Nelson, left, and a technician put a radio collar on a deer during the project.

on moose, which provided a sufficient food source for their numbers.

Because deer follow patterns taught by their mothers, most will not move into new territory unfamiliar to them. Therefore, those individuals most likely to take the initiative are orphans, who were not taught a familiar path to follow, and dispersers. In these instances, deer would be moving alone through deep snow and would be vulnerable to predation.

"The rarity of such a localized prey decimation and the opportunity to study its aftermath for three more decades presented a valuable chance to examine the role of various factors involved in preventing deer recolonization of local areas," the resulting paper states. It had been unknown what habitat, population, behavioral and predator-prey dynamics must occur before wintering deer will recolonize areas occupied by wolves.

"Our findings underscore the localized and multiple-decade effects of severe population decline in deer experiencing severe winters and wolf predation in mature forests near the northern edge of their range," the authors note. Given the knowledge of forest dynamics and their understanding of wolf-deer interactions, "the evidence also manifests the intergenerational influence of learned migration behavior on the spatial dynamics of northern white-tailed deer."

Effects of maternal nutrition on deer

Mech, Nelson and Ronald McRoberts studied the impact of diet in the vulnerability of deer in succeeding generations to wolf predation. Data confirmed the first-generation nutritional effects on body mass and survival, but more significantly, also documented the "grandmother" effect on second-generation deer which occurred in fawns born to two-year-old females. The effect appears to diminish as the first-generation offspring matured.

The results were important, the study concludes, for predator-prey relations, stating that without maternal nutritional condition it cannot be assumed by observation that remains of prey found at kill sites are considered healthy. Additionally,

these intergenerational effects may help explain lags among trends in weather and vegetation on one hand and the condition of prey and predators on the other.

Previous years' snow found to affect deer and moose populations

Much was learned of deer and moose abilities to cope with the effects of severe winter conditions in the animals' succeeding years. Both species gain weight throughout the balance of each year and lose it in winter, with that season's severity affecting their mobility and therefore their nutritional intake. Deer in this case were studied in the Superior National Forest and moose, on Isle Royale.

It was found that winter malnutrition affected the ability of adults to recover in the warm seasons, as well as the fecundity of females in both species. The ratios of adult females to new births, the rates of twin births in moose, and changes in ungulate populations were among the correlations uncovered as they related to prior winter conditions.

While snow accumulation was found to be positively correlated with each of these conditions, the strongest relationships were found between each condition and the accumulation of snow over the three previous winters, accounting for 36 to 51% of variability. A significant relationship was found between the winter vulnerability of moose calves and the sum of snow accumulation in the current and up to seven previous winters, explaining about 49% of the variability of results.

As a result of these findings, researchers concurred that the influence of winter on deer and moose maternal nutrition can have a cumulative effect for several years and can strongly determine fecundity as well as survival of offspring. While wolf predation is the main cause of death in moose calves and fawns, wolf density appeared to be secondary to winter severity in affecting ungulate populations.

Winters spanning the 1965/66 through 1975/76 were studied, during which time it was found snow accumulation "substantially exceeded both deer and moose stability thresholds" and the populations hit lows in about 1977. From then until 1983-84, snow accumulations were lower than stability thresholds and populations rebounded. While prior studies suggested that access to food the rest of the year offset harsh winters, this research posits that the full nutritional recovery theory be reexamined.

Snow depth found to affect wolf predation on deer

While snow depth played a role in the success of ungulate reproduction in successive years, it was also a predictor of the vulnerability of deer to wolf predation. A study spanning the winters of 1975 to 1985 examined 203 yearling and adult deer in an area where grey wolf predation was known to range from zero to 0.29%. Snow depth per month was found to account for 51% of the variation, with greatest predation in places with the deepest snow.

While four of the six winters with the deepest snow accumulation also recorded the lowest average temperatures, no relationship was found between temperature and deer mortality. However, reduced forage and the effects of gestation on mature female deer in cold temperatures of late winter all contributed to a decline in their physical condition.

Table 1. Gray wolf predation rates (WPR)[a] of radio-collared white-tailed deer, snow index (SI),[b] and monthly mean minimum daily temperatures (T) from January through April in northeastern Minnesota, 1975-85.

Year	WPR	95% CI	SI	T (C)
1975	0.22	0.00-0.44	36	-14.3
1976	0.22	0.00-0.43	34	-12.7
1977	0.00		14	-12.5
1978	0.29	0.05-0.53	33	-15.8
1979	0.20	0.03-0.38	38	-16.4
1980	0.05	0.00-0.16	25	-14.3
1981	0.06	0.00-0.18	18	-11.5
1982	0.13	0.00-0.27	32	-16.5
1983	0.14	0.01-0.26	21	-8.6
1984	0.06	0.00-0.15	32	-12.3
1985	0.09	0.00-0.21	14	-13.5

[a] Based on 27 deaths of 203 radio-collared adult (≥2 years old) and yearling (1-year old) white-tailed deer monitored for 23,441 deer days.

[b] Sum of weekly snow depths (ft), Jan-Apr.

The paper concludes, "Results have important implications for wolf ecology and population dynamics because they indicate to a considerable degree that wolf food supply in winter is determined by external factors. Because wolves breed in winter and produce pups in spring, litter size and pup survival could be affected by winter weather."

Recap of findings on wolf-moose interactions

A 2018 paper by Mech, Barber-Meyer, and Fieberg reviewed the relationship between wolves and moose in northeastern Minnesota over several decades with the goal of updating, extending and refining prior analysis. Findings confirmed that during the prior half century Minnesota moose populations fluctuated greatly with major declines in 1990-93, in 1997-2001 and in 2012-2016.

Moose and wolf numbers tended to be inversely correlated – declines in one population typically tracked with increases in the other. While wolves were the main cause of moose mortality, bears killed four of 25 radio-collared calves. Deer and beavers were also wolf prey, contributing to high wolf numbers without a direct link to moose mortality. Many other factors affected moose numbers: Deer-carried brain worm spread to moose and killed or weakened them to be vulnerable to predation. Other impacts included malnutrition, parasites and diseases and possibly impacts related to climate change.

Because the study area was reflective of larger Minnesota moose range, the findings are believed to have greater implications.

A half century of work later

Much has been learned over the years not only about wolf and ungulate behaviors and interactions but also the impacts of weather, food availability, and maternal health and condition across several generations of both predators and prey. ■

Tracy O'Connell is professor emeritus at the University of Wisconsin-River Falls in marketing communications and serves on the Center's magazine committee.

Cree Bradley

The Superior National Forest Wolf Study's Methodology

By L. DAVID MECH

Northern Prairie Wildlife Research Center
U.S. Geological Survey, Jamestown, North Dakota 58401 USA

When I planted my first snowshoe down on a Minnesota lake, I had no idea how many million more such steps would follow or where they would lead. "Fresh wolf tracks, at least two sizes of wolves," read my notes that day, 19 February 1966. A well-chewed deer skull that I labeled "MN Dead Deer 1" might have offered some clues. That was on Lake One in the Superior National Forest (SNF), some 20 miles east of Ely and gateway to what would become the Boundary Waters Canoe Area Wilderness (BWCAW).

That trip and that specimen turned out to mark the beginning of research that lasted until August 2022 (*International Wolf*, Fall 2022). Its main objective was to assess the annual wolf-density trend in a 2,060-km2 (795 mi2) area throughout the study and determine factors that affected the population trajectory.

Although the techniques used on this project began simply, an increasing amount of new technology was adopted as it became available. Furthermore, the research required the development and refinement of several new techniques that soon were adapted by other researchers and became standard in many other regions.

The basic methods used on the SNF project involved live-trapping wolves and deer, and then anesthetizing, blood sampling, radio-collaring and aerially radio-tracking them. Ontario biologists had already applied this approach, in its most elementary form, on a few wolves for 2 days to 4 months starting in 1964. They primarily tracked their subjects from the ground in summer. With the benefit of their experience, we refined this process and began using the approach on a wholesale basis.

My assistants, graduate students and I experimented with several trap modifications to minimize wolf-capture injuries. Also, instead of restraining wolves manually with a forked stick, we drugged them and recorded several types of data. We blood-sampled the wolves for nutritional condition and disease exposure, estimated their ages and radio-tracked them almost exclusively by air—usually weekly throughout the year, and some individuals for several years.

After we published these techniques in 1971, they were widely adopted and remain a standard approach with continued refinements and adaptations for most wolf research, as well as that on other large carnivores. I was even invited to teach these techniques to biologists in Manitoba, Alaska, Italy, Kenya, Tanzania and India for studies on such creatures as leopards, lions and tigers, as well as wolves. Biologists from various other countries visited our project to learn the techniques and apply them to their own work.

As part of any long-term study, it is common to team up with researchers

Dave Mech

Wildlife technicians Amit Saxena and Mary Maule examine a deer before radio-collaring it.

Photos: Dave Mech

Radio-collared wolves and deer were aerially tracked as part of the project.

from allied fields to expand on the types of information a study can yield. From the beginning of our wolf-capture work, we teamed with Dr. Ulysses S. Seal, a medical scientist with the U. S. Veterans Administration Hospital and an authority on mammal blood and physiology. This partnership allowed us to obtain much new information about wolves and deer via blood samples.

Eventually, we started studying the details of wolf scent-marking, which no one had done before. Master's student Russell Rothman and I learned that urine marks were used to establish wolf pair bonds and "advertise" territories of pairs and packs. Raised-leg urinations (RLUs) by mature males and flexed-leg urinations (FLUs) by females, when made as double marks, indicated pair bonding. Blood in the female urine signaled a pre-breeding or breeding condition.

As we focused on this urine in the snow, I wondered whether chemically analyzing it might indicate an animal's nutritional condition. Dr. Seal was an invaluable resource for us then, and this yellow-snow project turned into a PhD dissertation for Glenn DelGiudice. Glenn showed that "yellow snow" from both wolves and deer could index nutritional conditions. Workers elsewhere then followed up by similarly analyzing ungulate fecal pellets.

Another collaboration, this time with a University of California geneticist studying canid DNA, also yielded much more information, both for our research and eventually for many other projects. With DNA specimens from our wolves and those from other studies, Dr. Robert Wayne instituted the use of mitochondrial DNA and later genetic fingerprinting to determine relatedness among wolves. Those approaches then became standard in such studies.

Concurrently with the scent-marking studies, Ph.D. student Fred Harrington joined our team and researched wolf howling. Although others had studied the howls, we focused on the functions of howling and the conditions under which wolves tend to howl. Harrington made good use of earlier findings that wolves would reply to human howls. He then figured out ways to use human howling to survey areas for wolves and to count them—an approach now widely used elsewhere.

Meanwhile, because the main prey of our wolves was the white-tailed deer, we began studying deer more closely. Not only did we continue to examine as many wolf-killed deer as we could, but we also began live-trapping, anesthetizing, blood sampling, radio-collaring and radio-tracking deer. The methods we used were pretty standard. However, our partnership with Dr. Seal allowed us to develop ways to use the deer's blood and urine to assess the animal's nutritional condition and habitat suitability.

This emphasis on blood and urine studies of both the wolves and deer that we regularly captured for radio-tracking made us wish for better methods of recapturing the individuals we originally caught, sampled and collared. Sampling them several times over long periods would teach us so much more about them. Even just weighing them multiple times over the seasons and years would be informative.

Still, recapturing our study animals several times was just not possible with existing techniques. Even if the original captures failed to teach the creatures to shy away from traps, it still would be hard to target those same individuals for recapturing. On top of that, wolves learned quickly to avoid traps. It took some 100–300 trap nights to capture each wolf just the first time. (A single trap out for 10 nights = 10 trap nights).

Thus, we were forced to figure out a new way to recapture our study animals. It occurred to me that there might be some way to use the collar already on an animal to recapture that critter. The

technology used to fly a model airplane came to mind, and I wondered if a similar system could be used somehow to fire a drug dart mounted on the collar into an animal. Again, a collaborator would help, so I instantly thought of a friend I had recently worked with at the University of Minnesota—Bill Cochran.

Cochran was one of the earliest inventors of wildlife radio-tracking, after having helped the government develop similar systems for tracking satellites. Because of that experience, Bill knew of a little device that would be key to any type of system needed to fire a dart remotely. That device was a "squib"— a miniature flashbulb: it uses an electrical current to make a flash. A radio signal could fire this squib, and an adjacent dash of gunpowder could fire a dart. Bravo, Bill!

All that was left was to design a tiny receiver as part of the radio collar and a dart that could ride around on the collar above an animal's neck to be fired when a signal was received. Bill took care of the receiver. It took a graduate student of mine, along with collaborator Lee Simmons from the Henry Doorly Zoo in Nebraska, Dr. Seal and me to come up with a dart-and-drug

Wildlife technicians Eric Gese (right) and John Scott weigh a wolf in the field.

Photos: Dave Mech

Below: A wolf darted remotely by a capture collar (note darts on collar) is beginning to feel the effects of the sedatives.

combination that worked. We used that "capture collar" to serially recapture several wolves and deer over periods as long as 16 months, with one wolf examined 17 times.

Our capture collar (Patent 4,652,261) received much acclaim, and a local Fortune 500 company even worked with it for a few years. That collar turned out to be the very first of a wide assortment of collars now used on pets (with darts replaced by shockers and other devices). However, it was an accessory to our collar that eventually proved most useful. We felt we needed the ability to release the collar from the animal at will, so my student, Rick Chapman, devised a remote-controlled mechanism to drop the collar off.

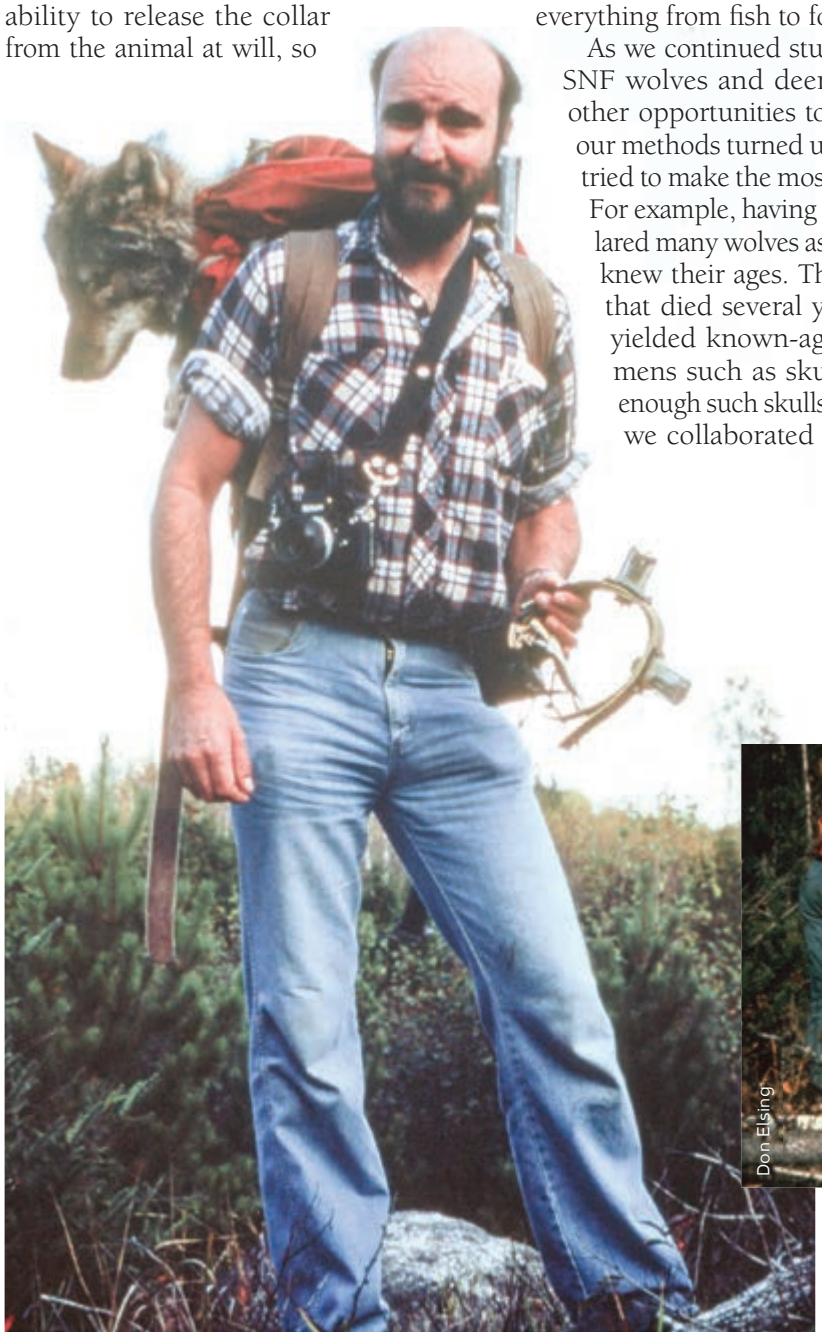
That all happened just as the possibility of a Global Positioning System (GPS) collar occurred to everyone for collecting location data. However, during those early years, a researcher needed to retrieve the collar to access the data. Rick's drop-off mechanism allowed them to do that, so it facilitated those first GPS collars. Capture-collar use then fell by the wayside because GPS collars filled a much broader niche and its use flourished all over the world for everything from fish to fowl.

As we continued studying the SNF wolves and deer, various other opportunities to improve our methods turned up, and we tried to make the most of them. For example, having radio-collared many wolves as pups, we knew their ages. Thus, those that died several years later yielded known-aged specimens such as skulls. With enough such skulls available, we collaborated with colleagues to learn how to estimate wolf ages based on the amount of tooth wear, or by counting rings on sectioned teeth. Now, wolf workers anywhere can estimate the ages of their study animals accordingly.

Similarly, we examined enough breeding female wolves with known breeding histories to produce data that has allowed other wolf researchers to determine the breeding histories of the wolves they study. They can basically tell whether a female has not yet bred, has bred recently or had bred in the past but not currently.

After the first 10 years or so, I leaned heavily on graduate student Mike Nelson, whose main interest was deer, to assist with both the wolf and the deer work. He obtained his masters and Ph.D. degrees based on our research and then became my full-time assistant. When he retired, Shannon Barber-Meyer took his place. Shannon then tested out various non-invasive methods such as snow tracking, trail cameras, wolf-scat DNA, citizen-science reports and DNA in wolf-tracked snow to further assess wolf-population changes.

All of the various methods described above served our SNF wolf-and-deer population study well over its 50-plus year duration. Although the investigation has reached its end, it is heartening to know that, as part of its legacy, studies in many other places will benefit from the methods this research refined and developed. ■

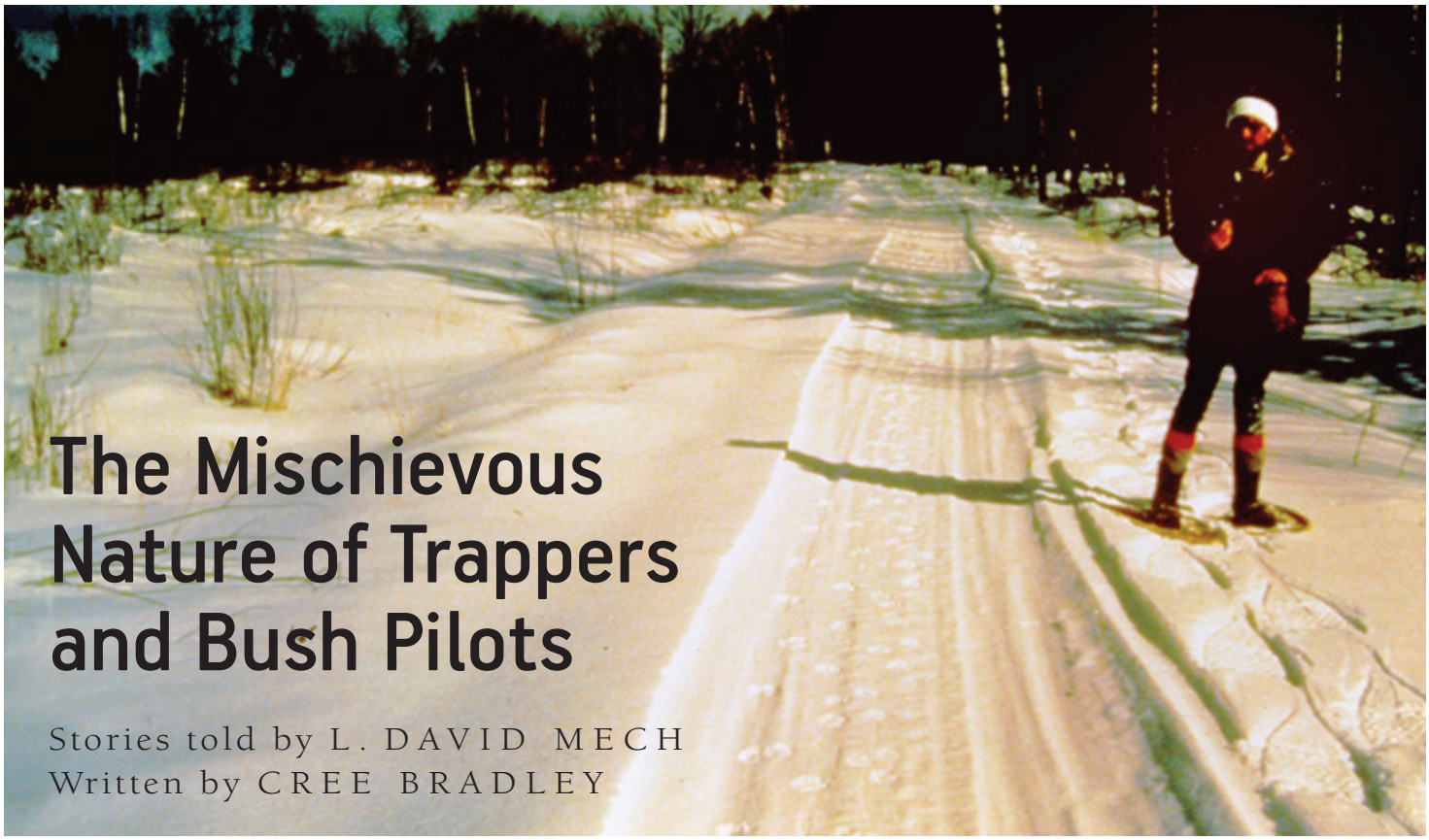


Steve Arthur

Don Elsing

Above: Dave Mech uses a jab stick to inject a sedative into a wolf.

Dave Mech with a capture collar with 2 darts carries a drugged wolf to a safe spot to re-collar it.



The Mischievous Nature of Trappers and Bush Pilots

Stories told by L. DAVID MECH
Written by CREE BRADLEY

In a study as far-reaching in methodology, techniques and survey area, and as enduring as the Superior National Forest (SNF) Wolf-Deer Study, scientific rigor and safety were top priorities. With new and changing technologies, the handling of wildlife, bush flying and work in the rugged terrain of the SNF, meticulous attention to detail and consistent professionalism were hallmark characteristics of project leader Dr. L. David Mech and all the associates involved.

Despite exactitude of professionalism, there was a lighter, funnier and even mischievous element provided by the project trappers and pilots. In what seems almost contrary to his more serious side, Dave has a long history of pulling pranks on unsuspecting associates—and he enjoys a great laugh in re-telling stories of events that "got his goat," as well.

It is impossible to overlook the scientific significance and impact of Dave's work. But often the characters he worked with along the way created some of the most memorable stories. We hope you'll enjoy these examples:

Himes: "Walks Like a Male"

When Dave first started to live-trap wolves for radio collaring, he hired the state's top wolf trapper, Bob Himes, to help. Bob had extensive experience trapping wolves, claiming to have caught more than 2,000 wolves, though he didn't distinguish between brush wolves (coyotes) and timberwolves. He had also worked with Dave and another University of Minnesota colleague, live trapping foxes for radio collaring, so he had experience collaring canids, too. Dave knew Bob would be a great hire, and through the years, they became good personal friends.

Bob shared a lot of stories about his experiences, as well as thoughts and information about wolves—often presented as facts. But Bob's information sometimes conflicted with what Dave knew from his research. The two would banter frequently about things they each knew—or thought they knew.

One claim Bob made was that he could tell the gender difference between male and female wolves by the appearance of their tracks in the snow. By that time, Dave had been studying wolves for a while, and could not then (nor can he now) distinguish wolf gender from tracks. Therefore, he had a hard time believing that Bob had this skill.

One late fall day, with snow covering the SNF grade just west of Isabella Lake where they were checking traps, there came an opportunity to test the theory. As Bob and Dave walked the grade toward the traps, there was a fresh wolf track heading in the same direction, and they knew it was possible that a wolf might be caught in one of their traps.

Dave asked Bob, "Is this a female or a male?" Bob confidently replied, "Male."

Dave made a mental note, hoping the wolf would be in the trap to con-

firm the information. They continued to follow the track—and sure enough, there was the wolf! Bob and Dave followed through with the usual tasks, first sedating the wolf and then collaring it. They then collected and recorded physical and other data, including its gender.

The wolf was female, not male as Bob had predicted. This was Dave's chance to clear the air.

"Bob, I thought this was a male," he said—to which Bob slyly replied, "Okay, it was a female. But it walked just like a male!" With a huge laugh, Dave realized that in the end, no matter how you cut it, Bob was going to be right, either way.

Lou Ohmann and the Lynx

The SNF Wolf-Deer Study was headquartered at Kawishiwi Lab, or K-Lab, where other research biologists also headquartered. They included a forest ecologist named Lou Ohmann. Lou was interested in Dave's work, especially when one of Dave's traps on nearby Spruce Road live-captured an elusive Canadian lynx—an animal that, to date, hadn't been researched much. Dave was interested in collecting data from the lynx, but given the accidental catch, they were not prepared to do this work in the field. Instead, they sedated the lynx, brought it back to K-Lab, took blood samples, weight and other measurements, and then drove it back to the place it had been captured to release it.

Other K-Lab biologists, including Lou, became interested in the lynx and decided to accompany Dave and Lou to watch the release. The group hopped into a sedan, with Lou in the front passenger seat and Dave sitting in the back seat directly behind Lou, holding the groggy lynx in his lap.

Wildlife don't always appear to be drugged when they technically are, and Dave, who had years of experience anesthetizing various wildlife, knew the difference between an animal safely drugged and one that is "coming to." The lynx was suitably "out," even though its eyes were wide-open, and its head was moving as if alert.

This appearance of alertness was unsettling to an antsy Lou, with a large wild cat directly behind him in an enclosed vehicle. As they made their way down the Spruce Road, Lou kept turning around to check on the status of the lynx, asking Dave how the lynx was doing. Dave calmy and repeatedly responded, "It's fine." But true to Dave's mischievous nature, he'd occasionally insert a reply like, "He is looking at the back of your neck though!" Lou knew Dave was teasing him, but it didn't quite squelch his increasing nervousness.

As they got close to the release destination, the lynx still suitably sedated,

Adobe Stock / Stan

Dave decided—much to the delight of the other biologists—that a little prank on anxious Lou wouldn't do much harm. When Lou turned around again, asking how the lynx was doing, Dave solemnly lied, "Well, he's starting to come to, but we're almost there. I've got a good hold of him. I can handle him, no problem."

Dave waited 30 seconds, making sure the lynx was still suitably drugged, took both his hands off the lynx settled safely in his lap, slowly and quietly reaching up behind Lou. With a sudden jolt, he grabbed Lou's shoulders, simultaneously releasing his best snarl.

As Dave put it, between fits of tear-inducing belly laughter (because his own words re-telling the story are the funniest), he stated, "Holy Mackerel, Lou almost went through the windshield! I am darn lucky nothing else happened to him!" Lou took the prank in stride, especially after he and the lynx were both safely outside of the vehicle. And true to Dave's mischievous nature, the cruel prank served as a long-running joke on poor Lou.

Pilot Pranks

Perhaps the most mischievous associates on the SNF Wolf-Deer Study were the pilots, whose expertise and skill in flying single-engine aircraft over heavily forested and wet landscapes like the SNF gave them permission to "play" with their unsuspecting passengers.

One favorite—a trick first played on Dave and repeated on new graduate and Ph.D. students, and always to Dave's enjoyment—was to give the false impression that the aircraft was going to "conk out" mid-air.

The planes had double fuel tanks. When one tank would get too low on fuel, the pilot simply had to reach down and flip a switch that sits between them and the front-seat passenger to switch fuel use to the second tank. Switching fuel tanks was necessary on most flights, but the action usually came at the emotional expense of the passenger.

As the fuel from the first tank got low, the pilot monitored the gauge for perfect prank timing, while also making sure that the plane was high enough in the air to leave plenty of room to maneuver if something went wrong. As the tank ran out, the plane would start to cough and buck, stuttering as if the engine might die. New passengers usually feared the worst, thinking the plane was going down then and there.

Just before the engine might actually stop, the pilot would look over at the passenger with a perfectly timed, big, crafty smile. At that point, they'd reach down and flip the fuel switch. As the fuel from the second tank started to flow, the plane corrected with no damage done—at least no damage to the plane, the pilot, or to Dave. The unsuspecting students generally took a while to recover.

In another instance, the pilot prank was pulled (literally) on Dave!

The pilot was a U.S. Fish and Wildlife employee, John Winship, who was landing on a runway near Virginia, Minnesota. Single-engine planes have all sorts of dials and knobs in the cockpit dashboard, and John had set Dave up to pull a particular knob, saying "Yank it hard!" at his count on three, to help slow down the plane.

John approached the runway at a good clip. After landing, John counted, "1-2-3-PULL!" and Dave gave a good yank on the knob. Instead of the plane slowing down, however, the knob pulled right out of the dashboard along with a long line of cable!

Dave was horrified, thinking for sure he had seriously screwed up. But of course, as the plane came to a safe stop, John looked over with another of those big pilot smiles, indicating that the joke was on Dave.

Another incident involved U.S. Forest Service pilot Steve Gheen, whom Dave affectionally calls a "crack pilot" for performing his flight operations with such skill and safety.

Steve had been a Marine fighter pilot in World War II and the Korean War. Post war, after being a crop sprayer, which requires expertise flying in low, tight spaces, he went to work for the U.S. Forest Service (USFS) as a water-bomber pilot from 1962 to 1983, also

helping Dave track wolves in the SNF. As Steve grew in experience and skill, it got easier and more enjoyable to float around high in the sky, spotting fires—but his ability to fly safely in low, tight spaces was unparalleled. Of the three USFS pilots available at that time, Steve was the one who was able to fly in and out of the smallest lakes to pick up water or deliver people because he had excellent judgment and knew his limits.

And this man, considered the Forest Service's best pilot, liked to joke around, too!

One of the Ph.D. students Dave worked with in the SNF was Roger Peters, who was studying wolf scent-marking. Roger needed to check on a wolf-killed deer somewhere near the Lake One-Two-Three Chain in the Boundary Waters. Steve was his pilot—and at that time, planes were allowed to land on the lakes.

After checking on the kill, as they readied themselves to fly out of the lake, Steve decided to play a prank on Roger. Roger was sitting in the passenger seat, right next to Steve, watching the landscape directly ahead of him as they were taking off. Steve was flying low, keeping below the tree line, knowing full-well what was about to happen in his take-off path. Down at what appeared to be the end of the lake, the waterway made a big, 90-degree bend to the left. At that point, Steve would crank the plane to the left, cruise the narrow channel still below the trees, where he would eventually pull up out of the trees and into the sky. Roger, of course, didn't know about this 90-degree turn. And Steve knew that Roger didn't know.

The opportunity was ripe to give Roger a good scare.

As the plane got closer and closer to what appeared to be the end of the lake, still below the trees, Roger wondered about Steve's famous piloting skills. As they continued, growing closer yet and still below the treetops, Roger began to panic and wonder what Steve planned to do. Just as Roger decided his life was over because they were about to careen into the trees at the end of the lake, Steve cranked the plane 90 degrees into the opening to his left, where it safely gained speed down the channel and smoothly took off into the air.

As all the mischievous pilots do, Steve looked over at the ashen-faced Roger and gave him a big, sly smile, indicating that yes, he had known the whole time exactly what he was doing.

When Roger returned to K-Lab—unnerved but unharmed—he had quite a story to tell Dave, who was amused, but not surprised, having not only experienced the "pleasure" of a good pilot's sense of humor, but having heard the stories many times, told by big-eyed, breathless students who would become as accustomed to the humorous elements of a serious, long-term study as he had. ■

Memories Of Wolves From The Superior National Forest Wolf-Deer Study

Stories told by L. DAVID MECH
Written by CREE BRADLEY

Over fifty years of wolf data were collected through Minnesota's Superior National Forest (SNF) Wolf-Deer Study. This achievement built a wealth of understanding about wolf-prey relationships, population dynamics and scent-marking as it developed and refined methodology adapted and used by researchers around the world.

Nearly equal in measure to this scientific legacy, for Dr. L. David Mech - or Dave - who initiated the study, are the enduring memories garnered from 1966-2022 through his experiences with the wolves themselves. Some wolves taught Dave valuable lessons about how to trap, how to improve trapping, and whether ever to trap again. Other wolves possessed a curiosity or some behavior that was intriguing or entertaining to behold. And yet another, Wolf 2407, captivated Dave's imagination and earned his gratitude for all that her life contributed to the study.

Just as the data were gathered, so too, were the stories - endearing memories of specific wolves, as told by Dave himself:

Dave Catches His First Wolf

Near the start of the SNF study in 1968, Dave hired trapper Bob Himes to provide expertise in catching wolves to be radio-collared. The first wolf Bob and Dave caught, using Bob's trapping leadership, was Wolf 1051, captured along the Powwow Lake Road. They then caught Wolf 1053, Wolf 1055, and more. But it was soon after Wolf 1051 was caught that Dave, having trapped mink, bears and other wildlife, decided to try his own hand at wolf trapping near the Ogishke Muncie Lakes in the Boundary Waters Canoe Area Wilderness (BWCAW).

It was January then - a good time to catch wolves, but not a good time to trap them, due to the risk of a trapped foot freezing. This was a learned lesson, not something realized early in this first trapping season. Soon thereafter, Dave limited winter trapping.

Bob had been setting traps along roadsides, but to catch his first wolf, Dave decided to innovate, based on what he knew of wolf behavior and the fact that he was trapping in roadless lake country. He took a trap with him on a radio-tracking plane, thinking that if they found a trail of fresh wolf tracks on a lake, Dave would have the pilot put him down to set a trap along the trail. Sometimes wolves re-use their own tracks, and Dave hoped he'd see some repeat use in the area, enabling him to capture a wolf.

After finding a line of tracks, Dave set up a trap along the track-trail, marking it with a little spruce tree. He put the tree through the chain of the trap and stuck it into the snow so he could easily see the tree, and thus the trap, from the air. In addition to being a marker for the trap placement, Dave was also using the tree as a potential lure for the wolves. To wolves, walking on the lake nearby, but not along the same track-trail, the tree itself might draw the curious creatures to check it out, which would bring them near the trap.

Dave and the pilot flew day after day, looking at the spruce tree. If it was present, the trap would be intact, and there was no wolf captured. If the tree was gone, they would know that a wolf had been captured and had dragged the trap someplace nearby, with the tree in tow. But for days, the tree stood in its original place.

Then, a few days later, it turned out that Dave's intuition had worked! He captured and located his first wolf - part of a big pack that had crossed the lake. After that early success, Dave decided to trust his own skills and instincts and began trapping wolves and becoming less reliant on professional trappers. He still used trappers such as Himes

Dave releasing a newly collared, 5-month-old wolf pup.

to run two different trap lines, allowing him to increase wolf captures and more quickly initiate the study.

This first wolf Dave trapped was one of hundreds captured over more than 50 years. Yet this first wolf-catch was one of the most thrilling experiences for Dave. As a life-long fur trapper, capturing his very first wolf was a memory not soon, if ever, to fade.

Wolf 1051 Heads Far West

As mentioned above, Wolf 1051 was the first wolf that Bob Himes and Dave caught and radio tagged. That was in November 1968 on a road north of Isabella Lake at a time when the road was not gated, and one could drive farther into the BWCAW than today.

A large Hollywood crew from MGM was visiting the area to film a documentary on wolves, so the fact that Bob and Dave had captured and tagged their first wolf was a big deal. The project had truly commenced now that they had their first wolf to study, and the Hollywood crew was excited about it, too.

Tracking Wolf 1051, they quickly learned that this wolf spent a lot of time wandering all over that widespread area north of Isabella Lake and in the adjacent BWCAW. But toward the spring of 1969, Wolf 1051 did what many wolves do - it dispersed from the area and moved west.

Dave was aerially radio tracking the wolf about once a week. One day, he picked up its signal many miles west, by Highway 53 somewhere between Cotton and Canyon. When Dave found the wolf, he watched it come out of the woods, head down an embankment toward the highway, and interestingly, stand there looking up and down the road before he crossed. When there were no cars coming, it ambled across the road, repeating the watchful behavior in the median of the 4-lane divided highway before making its final crossing and ambling into the woods where it chased a deer and disappeared.

Dave never did see the deer kill on the west side of Highway 53, though he believes it's likely that Wolf 1051 did get the deer. Nor did he ever see the wolf again. Ultimately, he lost the radio signal further southwest, about 60 miles away near Big Sandy Lake. But just watching Wolf 1051, the project's first-ever captured and collared wolf, travel so far out of the study area - a good 50 to 60 miles southwest of the BWCAW - was thrilling. It was a bit sad, as well, to watch it amble across the highway and beyond, departing the area for good.

Collaring a Conscious Wolf

That first fall and winter of radio tracking was still early in the learning process: when to trap, when not to trap, what kind of sets to make and how to handle the wolves they caught.

Wolf 1059 was about the fifth one caught along the Spruce Road south of Ely, and Dave decided to try handling this wolf without injecting drugs. He had previously used drugs to anesthetize the wolves for handling. It had worked very well and would remain his dominant handling system going forward. But with Wolf 1059, since there was yet a lot to learn about handling, Dave decided to try a drugless approach that he had learned from a biologist from Ontario, who had caught a few wolves to collar without using drugs. Instead, he pinned its neck to the ground with a forked stick, put a muzzle and a blindfold on it, and tied it up so that it could be handled safely.

Dave had a professor from Macalester College and at least four students working with him at the time. Dave told the professor how they were going to handle this wolf and asked him to find or cut a branch to make a forked stick. Soon after, Dave heard a heavy "chop-chop-chop," and thought, "What the heck is he cutting?" Dave had thought that a hunting knife would do the trick.

As it turns out, even though the professor had seen the wolf and knew its size, he must have had an inflated view of what was needed to handle a non-drugged wolf. The professor had chopped down an aspen tree a few inches thick, when all Dave needed was a stick an inch-or-so wide. The professor delivered that beast of a forked pole, and Dave found it impossible to use, for the fork was so big it would have straddled the entire wolf - not pinned the neck.

Finally, Dave showed the crew what kind of stick was needed, and a student brought over a much smaller one. They pinned the wolf by the neck, blindfolded and muzzled it, tied up its feet, and it all worked remarkably well. Dave was surprised to see that the wolf went into a trance-like, calm state. They were able

to put the ear tags in, collar it and measure it before turning it loose.

Or at least they tried to turn it loose. They untied its feet and took the blindfold off. Then they took the muzzle off. The wolf was free to leave. But instead of running or even walking off, the wolf just lay there. And it lay there. And it continued to lie there.

Dave had everybody back away while he gently prodded it with a stick, but the wolf wouldn't move. It appeared to be breathing just fine; it was blinking and looking around, but it wouldn't move. All the crew could do was wait, as they weren't about to leave it without knowing it was able to resume its natural wolf life. After 90 minutes had passed, Wolf 1059 finally got up and ambled off, struggling through the snowpack, but otherwise seeming fine. As Dave remarked, "It was the darndest thing."

This was the only time Dave opted to handle wolves without the use of drugs. Though the experience generally went well, and the wolf seemed okay in the end, it was hard to fully understand what was behind the trance-like state and delayed departure. All things considered, Dave thought it was probably less stressful on the wolf for it to be unconscious while they conducted what can be intrusive procedures - especially since a year or so later, he began to collect blood samples, which may have been hard to do with a conscious wolf.

A Wolf on His Lap

Aerially radio tracking wolves about a day a week, Dave once found a wolf in the same place for two flights in a row, adding up to just over a week. He suspected something was wrong, for wolves usually move around much more than that.

Dave and his crew decided to check on that wolf, hiking into the site northeast of the Tomahawk Trail. Sure enough, the wolf had been caught in someone's fox trap. Traps must be checked daily, but this wolf had been left in the trap far too long. The animal was in poor shape and needed to be rescued if it were to live.

Dave and his crew took the wolf back to their headquarters at Kawishiwi Lab, where they put it in a large cage and gave it food they purchased from the Ely grocery store - fat and bones, dog food and meat - anything that would get its weight back to normal.

After about a week, the wolf seemed to be in pretty good shape. Its weight was up, and its health had returned. It was time to release the wolf, and Dave figured if he released it near where it had been caught, the wolf would recognize the place and resume its life more easily.

It was winter, and conditions had degraded. The decision was made to fly the wolf back to the catch site in a very small Super Cub aircraft - just a two-seater, pilot in front and one person in the back.

Dave lightly anesthetized the wolf; he didn't want to leave a deeply sedated wolf out in winter conditions. He tied its mouth and feet to handle it more safely, and held it on his lap as a passenger in flight. Dave, the pilot, and the wolf flew out to the Isabella Lake area.

As they flew, Dave could tell the wolf was doing okay. It was alert, eyes open and blinking. It began to move around slightly, but that didn't concern Dave. The wolf was stable, and he preferred some movement over sedating the wolf more deeply.

Eventually, while still alert, the wolf propped its head against the window, and to Dave, it appeared as if the wolf was looking out over the water and woods of the SNF and the BWCAW directly over Quadga Lake, and taking it all in, just as a human might do. Despite how scientifically objective and non-anthropomorphizing he usually is, Dave couldn't help but ponder in that moment, "What is this wolf thinking? Is he looking down onto Quadga Lake and thinking, 'Oh, there's Quadga Lake! Yah, that's a pretty nice lake down there!'"

The pilot, the wolf, and Dave eventually landed. Dave untied the wolf and dropped it off in the woods. He waited for the wolf to fully awaken from its shallow sedation and watched it walk off, healthy and back in its territory, where it remained with what was probably a unique, once-in-a-lifetime memory for a wolf - an aerial view of Quadga Lake and the rest of its territory. Asked how he felt about the experience, Dave stated, "It was super!"

Trapped Wolf Swims River

When Dave and volunteer helper Dr. Bob Brander started to live trap wolves along the Kawishiwi River, they were still naïve about wolf trapping and made the mistake of setting traps along a deer trail that ran along the bank, parallel to the river.

Dave Mech

One day they discovered a trap was missing. These types of traps were not staked to a tree or other solid object. They had instead an 8-foot chain with a metal drag on the end of it. The idea was that when a wolf was caught, it would run off, and eventually the drag would get caught up in the brush or on a log, stopping the wolf in place, where it could be tracked down by the marks the drag left in the plant undergrowth and the ground.

With the trap missing, Dave and Bob were pretty sure they had a wolf and started to follow the drag marks—which went right down the bank and into the river. Feelings of hope and dread crept into them when they knew the wolf had gone into the river. They hoped the wolf had crossed the Kawishiwi and made it safely to the other side. But dread reminded them it was possible the wolf had drowned.

They got back into their canoe and crossed the river, delighted to find that the drag mark had come out of the river on the other side. It was there, on the far side of the Kawishiwi River, that they found their wolf, alive and well, and did what they had set out to do—collar and collect data on the wolf, and release it back into the wild.

Dave learned a very valuable lesson from that experience. You never trap near open water of any sort, because the wolf might run into the water and drown. At the time, he had an enduring thought: "Oh my gosh, why were we so dumb?!" Fortunately, this wolf swam 50 to 60 meters across the Kawishiwi River with 5 to 10 pounds of chain and drag attached, and Dave was very grateful that it made it.

Famous Wolf 2407

Wolf 2407 was a female wolf, at least one-and-a-half years old when caught for the first time on October 10, 1971. She had a den in the Harris and Heart Lakes area of the SNF, just north of theTomahawk Trail, and she occupied an area of at least 30 square miles with her Harris Lake Pack packmates over the years.

There were several small roads and grades that dotted her territory, and those allowed Dave and his crew to set traps. By chance, they ended up catching her a second time, which is fairly unusual. It's always good to get a recapture on a wolf, because the collars in those early days lasted only about one year. A second capture allows a collar change and a longer history to be gathered on the same wolf, which is extremely valuable.

Wolf 2407 was recaptured a third time, and then a fourth, and was recollared each time. By this point, Dave realized how truly significant this wolf was because of the many years of data gathered. This one animal, with four years of data, and counting, was technically more valuable than any of the wolves with only one or two years of data gathered.

Dave began trying to recapture her again and again, which became harder and harder as she became savvier to the traps. He felt fortunate when he captured her for the eighth time, but that didn't happen without significant innovation and considerable trap nights expended.

For example, Dave attempted to rig up some special trap sets designed to outwit Wolf 2407. One such set utilized a water puddle next to the road - nothing large enough to risk drowning her, but enough to hide a trap. He placed the trap in the puddle and laid a piece of sod on the pan of the trap, so it made a steppingstone of sorts through the puddle. Beyond that, he would bait or add a scent lure to attract her. Brilliant! Or so he thought. But this rigged trap failed to catch 2407. In fact, she would pull the trap out of the water, leaving it wolf-less along the road in the puddle's wake. (One can't help but question whether mockery was at play, or if that's just the nature of wolves.)

By the eighth and final capture, it was very difficult to outwit Wolf 2407. She was extremely trap shy, which is why it took so long to recapture her that final time. Dave spent a total of 8,000 trap nights trying to catch her - 5,000 one summer without luck and another 3,000 the next summer, finally with success. (A trap night is one trap out for one night, so 10 trap nights may be 10 traps out for one night, or one night out for 10 traps).

Dave caught Wolf 2407 for the final time on August 28, 1982 by making a creative set he had never made before. He dug a hole next to the road, only 3 to 4 inches wide, but quite deep. In the hole, he inserted the end of a deer leg, so that only the end of the pointed hoof was sticking out above the hole. Wolf 2407 took an interest in the hoof, which was just behind the trap - and that was the trap that captured 2407 for the final time.

After that eighth capture, Dave and his crew never learned the fate of Wolf 2407. After about four months, they lost her signal, which meant she may have dispersed or that her transmitter failed. Eventually, of course, she would have died or been killed.

As noted in Dave's essay, *"Minnesota Wolf 2407: A Research Pioneer,"* in the book *"Wild Wolves We Have Known,"* Wolf 2407 was located more than 1,300 times during her life and was observed with her packmates nearly 500 times. She was a pioneer for wolf research, contributing considerable information about movements, territoriality, mate tenure, longevity, reproduction and many other aspects of wolf ecology and behavior. She provided important experience for many of the young wildlife techs who worked for Dave and continued their careers in wolf research and conservation.

Finally, Wolf 2407 was an inspiration to Dave himself. Though her final whereabouts, her pack structure and the last days of her life were lost to Dave, her enduring and endearing legacy remains firmly rooted in his memories as one of the most special wolves he had the pleasure to interact with and learn from. ■

Cree Bradley is a member of the International Wolf Center board of directors, and, with her husband Jason, owner-operator of the nearby *Chelsea Morning Farm and Never Summer Sugarbush*. She experiences many wildlife encounters through her off-farm work in Minnesota public lands and the Superior National Forest.

My 11-Year Stint at the Stern of the Project

By Shannon Barber-Meyer

Implementing the field research for the U.S. Geological Survey's Minnesota Wolf and Deer Project in the Superior National Forest for more than 10 years (2011-2022) helped prepare me to be the Research Manager at the Pacific Whale Foundation, where I currently supervise and conduct field research on wild whales and dolphins in Hawaii.

When I first replaced retiring Dr. Michael Nelson, Dave Mech's main associate for the project, my initiation was relatively smooth, given I had been a graduate student there for two summers —and because Mike graciously answered my many questions.

One of my earliest tasks was to relocate our field headquarters from the beloved Kawishiwi Lab (K-Lab) to a U.S. Forest Service (USFS) office on the edge of Ely. I laugh recalling how volunteer Hans Martin, now Dr. Martin, and I cautiously entered a dark, dank, bait-curing root cellar near K-Lab, armed with something like a broomstick. I can still see Hans' scrunched-up face, surrounded by flies, as he transferred beaver "juice" into small jars. It was also a welcome surprise when containers thought to house explosives for the deer-net gun turned out to hold wolf scat. Getting to the containers to check the contents included my crashing through the floorboards. It was time for our "big move" into town.

One of my favorite memories is the new level of cooperation with our long-term USFS partners that the move afforded us. I had detected two wolf radio-collars on mortality mode deep in the Boundary Waters Canoe Area Wilderness (BWCAW) during a winter flight. Because of motor restrictions there, our best hope of accessing them was via dogsled. I previously wrote about this incredible journey, led by USFS mushers, to recover one of the collars (see Spring 2013 *International Wolf* magazine).

I will never forget the silence of the winter wilderness night and the glorious view from my sleeping bag, gazing up at shimmering silver pin-pricks of light piercing the inky sky. More notably, this adventure illustrates the lengths we went to for a single data point—driven largely by Dave's singular focus. His drive to learn all we could about wolves never wavered.. His enthusiasm for "all things wolf" drove the project to achieve more than we could have imagined..

Dave never gave up; when he hit an obstacle, he sometimes paused a line of research, but he never forgot his question. Later, we would pounce on a new opportunity to answer the nagging query that had earlier evaded him. He could be remarkably patient, but always relentless in his pursuit. It was a great privilege to learn from him, work with him and become friends.

I carry many of his lessons forward with me today. ■

Shannon Barber-Meyer is the research manager at the Pacific Whale Foundation, where she supervises and conducts field research on wild whales and dolphins in Hawaii.

Dave Mech, K-Lab and my Summer Internship on the Superior National Forest Wolf Study

By Diane Boyd

The Kawishiwi Lab (also known as the K-Lab) was used as the study's field office.

Dave Mech

In the summer of 1977, I volunteered for Dave Mech's Superior National Forest Wolf and Deer Research Project. I was a sophomore undergraduate student at the University of Minnesota in the Wildlife Biology Program, and I was ecstatic to be offered this June-to-September internship.

After my U of M classes finished up, I arrived at Kawishiwi Lab (K-Lab) and stayed in a little log cabin down the hill from a big lodge. I worked with Dave and his wolf technician, Jeff Renneberg, to trap, radio-collar and track wolves via telemetry on the ground and from a plane. I surveyed and necropsied snowshoe hares for Dave's snowshoe hare-lynx cycle study, living and working with several enthusiastic researchers at K-Lab, including Mike Nelson (deer), Lynn Rogers (bears), Dave Bruggers (ravens) and several others.

Dave Mech brought his kids up one weekend and we feasted together; Dave even received a special gift, embedded in the purple berries of a fresh, wild blueberry pie that I baked.

My professional career began at K-Lab as I learned how to catch the smartest animal in the woods, how to run wolf traplines, to howl for wolf pups to confirm reproduction, and to hike mossy spruce forests looking for snowshoe hare trails—always loving the thrill of discovery that whetted my appetite for research.

That Kawishiwi summer 45 years ago was instrumental in launching me on my path as a wildlife biologist specializing in wolves. I subsequently conducted my MS and Ph.D. research on wolves in northwestern Montana, working there off-and-on for the next 40 years. None of this would have happened without Dave Mech and my Kawishiwi summer, and I am eternally grateful. Thank you, Dave. ■

Diane K. Boyd retired from Montana Fish, Wildlife and Parks. Since retiring she has been consulting, lecturing, writing scientific work and completing her memoir, "No Wolves Here," which will be published in September 2024.

Ciucci Carried SNF Project and Dave Mech Expertise to Rome

By Paolo Ciucci, Orvinio, Italy, 2023

I first volunteered in Dave Mech's project in the Superior National Forest (SNF) in mid-September 1985 and spent three months there learning how to live-trap and radio-collar wolves for research. At that time, I was working as a young student in a research project on wolves in the central Apennines in Italy, but frustration was rising, as we weren't having any success in live-trapping wolves.

Ellie Schoenfeld, who came from Duluth to volunteer in our project in Italy, knew that Dave could use helpers in his wolf-deer project and suggested that I to write him. I still have the typewritten response from Dave (no e-mails at that time!) who, in his essential style, welcomed me to Kawishiwi, warning me to be ready for the harsh field-work conditions.

Dave needed someone to accompany a senior trapper in the Boundary Waters Canoe Area Wilderness (BWCAW) to radio-collar wolves in the portion of the SNF where moose were the main prey. I could dream of northing more exciting at that time—an experience that surely shaped and directed the rest of my life as I continued to do research on wolves and other large carnivores in Italy. I am currently a professor of Wildlife Ecology at the University of Rome.

In 1985, I spent half of my first three months in Dave's project live-trapping and radio collaring wolves in the BWCAW. We canoed, portaged, camped and set traps along traplines running up to the border with Ontario.

Tom Meier was the senior trapper, a superb teacher and a great companion. I was observing, asking a million questions, taking notes on every detail, and I absorbed as much as I could from the experienced biologist. We caught wolves that probably had never seen a human being before. When we returned to Kawishiwi, I had the opportunity to apply what I learned, as Dave allowed me to set traps along with other experienced trappers in the Isabella area.

When I finally had to leave for Italy, there were still active traplines with my traps, many of which were successful. I still treasure Tom's and Dave's letters congratulating me for my trapping success—and that was one of the most significant 'graduations' in my life. Since then, throughout all these years, Dave has been a true mentor and an inspiring friend. ■

Author Paolo Ciucci attended the University of Minnesota 1988–1990. He currently works at the Department of Biology and Biotechnology, Sapienza University of Rome, Italy. His main research interests comprise wildlife ecology and management, with a focus on ecology and conservation of large carnivores.

A Surprising Start to a Long, Meaningful Career

By Vicente Palacios Sanchez, ARCA, People and Nature, SL, Spain

I began working as a wolf biologist in 1998, combining wolf surveys ordered by Spain's regional governments with my job as a highway toll collector. It was then that I heard about Dr. Dave Mech for the first time; I bought some of his books and read them at the tollbooth on night shifts. It seemed that everything I wanted to know about wolves had been written by Dave long before.

In 2001 I left the highway department and continued working as a wolf biologist for different companies and universities, and began my Ph.D. studies on wolf acoustic communication at the University of Valencia.

Six years later, I wanted to take a break, so I contacted Dave in hopes of going to Minnesota as a field technician for the summer. My first surprise was that he answered immediately; the second was that he accepted me! I felt very lucky.

The first time I saw Dave was at the Kawishiwi Field Lab. I woke up at 7 a.m., and there he was—waiting in the kitchen, ready for us to go into the field to visit location clusters of wolves we had fitted with GPS collars. There was the boss—Dave Mech himself—and me, still in my pajamas. Not the best start.

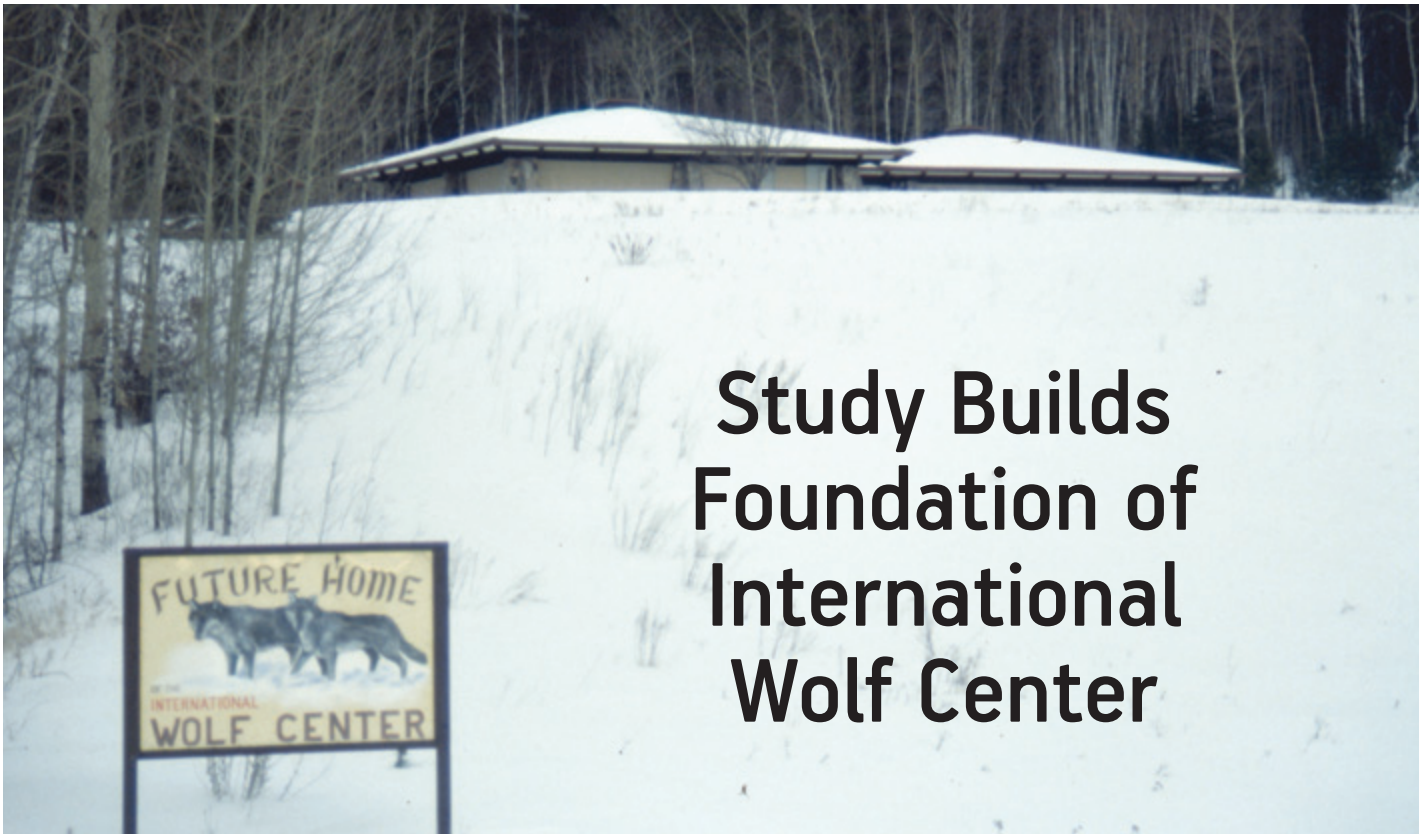
That day in the field was unforgettable. We were three field technicians (Dan Thomson, Mike Clark and me) and Dave. The terrain was swampy, and Dave and I fell into the water near a beaver dam. Mike helped us out of the water, and we continued our fieldwork. Mike was always in the right place at the good time.

Years later, at the 2013 Wolf Conference in Duluth, Dave told several colleagues that I had saved him from the water. He thought I was the hero! At that moment I didn't know how to react, so I didn't say anything—but the truth remains it's a good thing for both of us that Mike had been there that day.

It's been 25 years since I started reading Dave´s books and articles in that tollbooth. At that time, I could never have imagined that I would end up having such a long friendship with Dave and that I would eventually publish a couple of scientific articles with him. In addition, knowing Dave allowed me to become acquainted with other wonderful people like Laurie Mech, Mike Nelson and Shannon Barber-Meyer. And I am still working with wolves.

Thanks, Dave, from this grateful biologist. ■

Vincente Sanchez is a wildlife consultant in Olviedo, Spain



Study Builds Foundation of International Wolf Center

By CHAD RICHARDSON

It was 1966 when Dr. L. David Mech first began tracking wolves on frozen lakes in northern Minnesota. By 1968, he was collaring wolves and radio-tracking them. At the time, radio collars were big news, so Mech and his project began to attract a lot of media attention.

As the public became more aware of the project, interest started to grow.

Mech remembers organizations like the Minnesota Zoological Society becoming interested in the project. Soon, others followed suit.

"They'd ask if they could come out and track wolves and go out howling with us," Mech said. "We tried to accommodate them. At the time, it was rare for the public to be interested in things like that. Then, their buddies wanted to come, too. We were getting kind of overwhelmed with the public who wanted to be part of the project. It occurred to me that it'd be a good idea to do this on a broader scale, in a formal fashion."

By 1970, Superior National Forest leadership asked Mech to work up a wolf-management plan for the forest. In that plan, Mech shared a suggestion: There should be science-based education outreach about wolves. Nothing came of his idea, though.

Mech had just been hired by the U.S. Fish and Wildlife Service to expand the project in the forest, and that came with funding and the kinds of support he'd only dreamed of.

"Before you knew it, we had grad students and volunteers, and the project really grew," he said.

The public continued to be involved, going on howling trips into the forest with Mech and his colleagues, but the opportunity to open any kind of formal education center remained a long shot.

That all changed in the early 1980s, though, when the Science Museum of Minnesota got a grant to make a beautiful exhibit about wolves and humans. Mech was called in to help guide the exhibit, and it opened to rave reviews in St. Paul. The exhibit was then moved to museums in Washington D.C., Montreal, Alaska, Hawaii, Yellowstone National Park and many other locations.

Eventually, the exhibit came back to St. Paul, and Science Museum representatives asked Mech what he wanted to do with it.

"That's when I realized we could build a wolf center," Mech said. "We had this big display that was so popular and seen by so many people. We thought that'd be a good basis for a wolf center."

Mech re-engaged with the committee that had helped design the exhibit, recruited some new volunteers, and the Committee for an International Wolf Center was officially incorporated in 1985.

By 1989, a temporary facility was established in Ely, Minnesota. Then, in 1993, more than 30 years ago, the interpretive center's permanent location opened its doors to visitors. More than 1.2 million folks have streamed into the Center since.

The International Wolf Center now

Mech said he could never have envisioned the Center becoming what it is today. Some 15 full-time employees work hard to educate as many people as possible about wolves. More than 10,000 students every year get lessons in their classrooms about wolves. More than 40,000 people visit the interpretive center in Ely. Two million page views are served up every year on the organization's website, wolf.org, and *International Wolf* magazine, started in 1990, is still printed quarterly.

"This is way beyond my original vision," Mech said. "We had a pretty darn good wolf center when it started in 1993. We were off to a really good start. Success begets success, and we started to grow. That means our board also grew. We found people who could help get more money and people who started the magazine and the website and all of that. It just grew and grew and grew."

Dave Mech gives a talk about the International Wolf Center

Helping hands

Mech would be the first person to tell you that while the Center was his idea, it came to fruition only through the help of innumerable volunteers.

One key individual in those early days was Nancy Gibson, who lobbied the Minnesota Legislature to obtain a $1.2 million appropriation that got the Center built. She also raised an additional $600,000 in funding from private sources.

"It was apparent in those early years that we needed accurate wolf tales for our times," Gibson said. "Dave Mech and I made a consequential decision to use some wolf pups to attract the public's attention. We bonded his scientific knowledge and my wildlife publicity skills to sway policymakers and funders to build the Center. It is hard to capture that emotional moment when the ribbons were cut, and the public funneled into the Center. The Center remains one of my biggest accomplishments and a personal, 30-year legacy of work."

Looking back over those past 30 years, Gibson has a strong sense of pride.

"There are so many things to be proud of when it involves the International Wolf Center," she said. "But near the top is the word 'International.' The Center left the comfortable boundaries of Ely and has hosted International Wolf Symposia beginning in 1990 and continuing today. I traveled to many international conferences, and it was apparent that our Center was the impetus for new wolf education facilities and non-profits. Whereas many other institutions attempted some healthy competition, we are still the top breeders of science-based education. And of course, I am wildly prejudiced." ■

Crowds gather at the grand opening of the International Wolf Center in 1993.

Chad Richardson is the publications director at the International Wolf Center.

Come See Us This Summer!

Daily Program Schedule

May 24 – October 20

(included with admission)

For events before or after these dates, visit wolf.org. Programs are held in the auditorium

9:15 a.m.	Ambassadors to the Wild
10:15 a.m.	Wolves and Wetlands
11:15 a.m.	Gray Wolf 101
12:00 p.m.	Enrichment
1:15 p.m.	Ambassadors to the Wild
2:15 p.m.	Wolves and Wetlands
3:15 p.m.	Gray Wolf 101
4:00 p.m.	Enrichment

Kelly Godfrey

Specialty Programs

(small additional fee for after hours programs)

Behind the Scenes: Members Only

Get ready for our exclusive, up-close experience, Behind the Scenes program! Dive into the secretive world of ambassador wolves every Tuesday and Thursday at 4 p.m. May 29 to August 8. This is your golden ticket to uncover the mysteries of these majestic creatures and the dedicated team behind their care. Don't miss out—secure your spot now at wolf.org!

What's for Dinner?

Ever wondered what dinner time looks like for a wolf? Join us every Saturday at 7 p.m. for the legendary "What's for Dinner?" event. Witness the Exhibit Pack weekly feeding. It's a unique opportunity to observe the feeding rituals of wolves, from dining to caching. An experience you'll not want to miss!

Howling Safari

For those who seek adventure under the moonlight, our Howling Safari awaits. This is your chance to delve into the world of wolf vocalizations before stepping into the wilderness to call out to a local wolf pack. Imagine the thrill if you get a response! Available on Saturday nights at 8 p.m. in August, September and October. Remember, pre-registration at wolf.org is required.

New Exhibit!

Join us for a glimpse into the fascinating world of wolves, as we unveil the significant findings from the Voyageurs Wolf Project. This exhibit not only highlights the struggles and adaptations of wolves during the summer months but also showcases the intricate balance of ecosystems in Northern Minnesota.

Starvation, adaptation, and survival:

INSIGHTS FROM THE VOYAGEURS WOLF PROJECT

Open Daily from 9 a.m. to 5 p.m.

New Exhibit on Display through October 20

International Wolf Center
7100 Northland Circle N, Ste. 205, Minneapolis, MN 55428

Dr. L. David Mech Fellowship

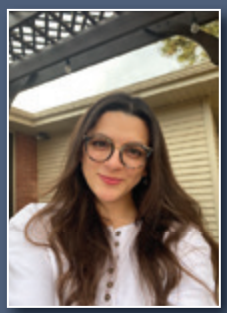
Since our founding in 1985 by Dr. L. David Mech and others, the International Wolf Center has sought to provide the latest scientific information about wolves to our visitors and program participants. We believe that continued investment in scientific discovery about wolves and other wildlife will lead to an increased understanding of how to build a future where wolves and humans can coexist and thrive. We also understand that many barriers exist for students and early career researchers and hope these fellowships can facilitate access to people pursuing a wildlife biology career.

As an investment in the future of wolf research and science-based wolf education, the Center awards fellowships each year for undergraduate students or recent graduates interested in pursuing careers in natural sciences with an interest in wildlife.

FELLOWSHIP GOALS

- Reduce barriers to allow undergraduate students and recent graduates to directly engage in research and field work.
- Encourage students from diverse backgrounds to explore natural sciences/wildlife biology as a profession.
- Provide bridge support for early career researchers prior to graduate school.

To ensure the future of this program, please contribute by indicating "Mech Fellowship" on your donation. To learn more, visit **wolf.org/programs/mech-fellowship**



Isabella Villanueva
2024 Recipient

John Silva
2024 Recipient

Kyle Martin
2024 Recipient

Lucas Paschal
2023 Recipient

Cameron Ho
2022 Recipient

Lily Heinzel
2022 Recipient