The University of Idaho Taylor Ranch Wilderness Field Station

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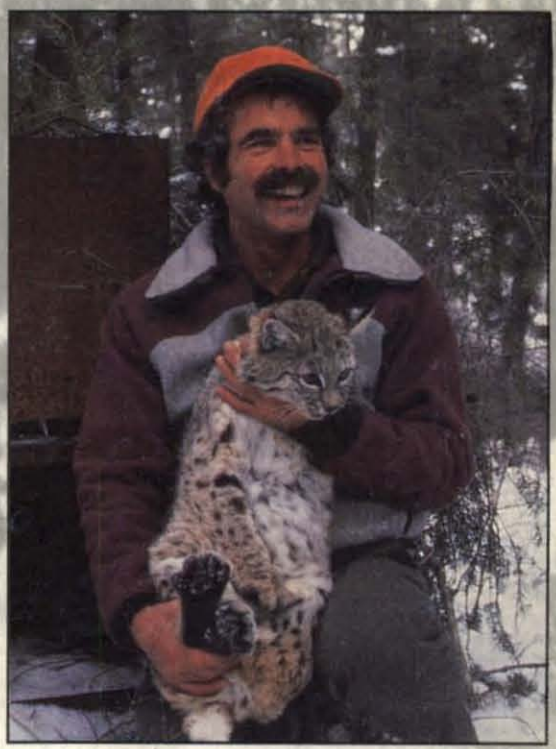

)AHO FOREST, WILDLIFE AND RANGE EXPERIMENT STATION

COLLEGE OF FORESTRY, WILDLIFE AND RANGE SCIENCES

University of Idaho

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This publication is issued as Contribution No. 657 of the Idaho Forest, Wildlife and Range Experiment Station, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow 83843.

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Miscellaneous Publication Number 15
of the
Idaho Forest, Wildlife and Range Experiment Station
College of Forestry, Wildlife and Range Sciences
University of Idaho
Moscow, Idaho 83843

January 1993

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A pack horse carrying field supplies is led over the bridge across Big Creek to the University of Idaho Taylor Ranch Field Station in the Frank Church-River of No Return Wilderness. ***John Hendee photo.***

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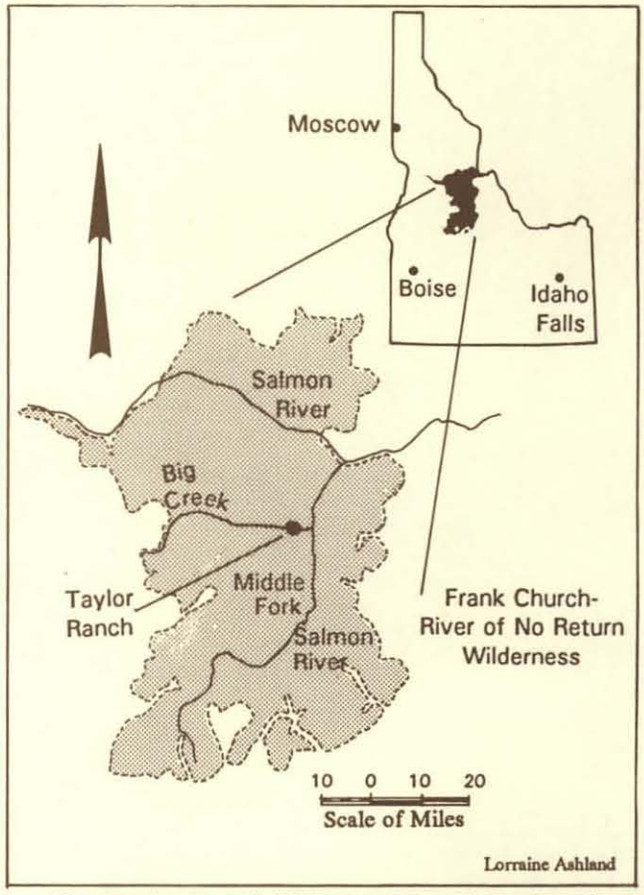
Introduction

Wilderness areas contain the most natural, most protected places in our nation and thus provide unique opportunities to study and teach about natural systems and human responses to primitive conditions. Section 2(c) of the Wilderness Act acknowledges scientific and educational values broadly in defining wilderness as ". . . undeveloped federal land. . . that. . . (4) may also contain ecological, geological, or other features of scientific, educational, scenic or historical value." [P.L. 88-577 Sec. 2(c)]

The scientific values of wilderness areas were a recurring theme in the campaign to establish the National Wilderness Preservation System and were espoused by early leaders of the wilderness movement such as John Muir and Aldo Leopold. The central idea, which is even more important today, is that study of protected natural systems can reveal valuable knowledge that will be applicable everywhere, and by monitoring wilderness conditions we can learn about natural change and the extent to which human-caused changes are occurring elsewhere (Leopold 1941). But the lack of dedicated wilderness research budgets, the remoteness of wilderness, and management regulations and policies limiting access and the means by which data may be gathered, have restricted the amount of research that has been conducted in wilderness. This is ironic, given that growing concerns about global change, endangered wildlife, critical habitat, and biodiversity make wilderness research toward understanding natural systems a higher priority than ever before.

Idaho, with more total classified wilderness and roadless land than any of the lower 48 states, has tremendous wilderness research and education opportunities. In 1969, the University of Idaho, at the urging of Dr. Maurice Hornocker, a young wildlife scientist who recognized the potential value of a wilderness inholding for research and education, purchased the 65-acre Taylor Ranch in the middle of the Idaho Primitive Area. The evolution of that inholding from homestead to its current status as the Taylor Ranch Wilderness Field Station of the University of Idaho Wilderness Research Center administered by the College of Forestry, Wildlife and Range Sciences illustrates the value of a wilderness field station in facilitating wilderness research and education. It also raises questions about the development and use of a wilderness inholding, even for science and education, and the need to respect the naturalness and solitude of the surrounding wilderness.

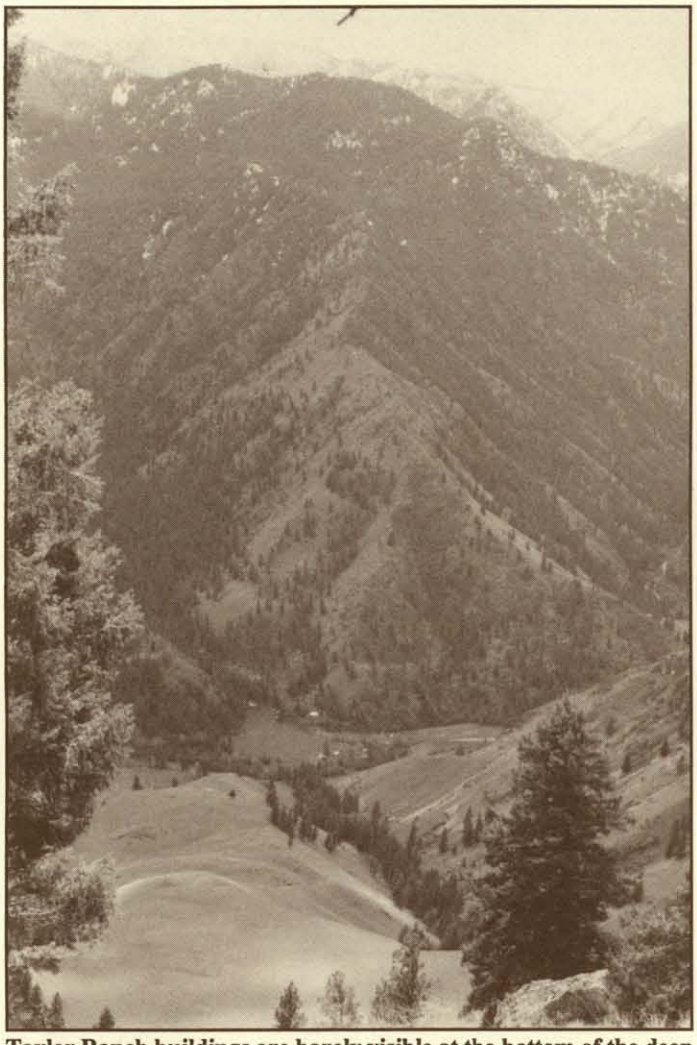
Idaho's Taylor Ranch Wilderness Field Station



The Taylor Ranch Wilderness Field Station, in the heart of Idaho's Frank Church-River of No Return Wilderness,[1] is a unique research and teaching facility.

[1]More detail about the Frank Church-River of No Return Wilderness is available from the Salmon National Forest headquarters, Salmon, Idaho, and from the wilderness newsletter *Frankly Speaking*.

Situated on Big Creek, seven miles upstream from its confluence with the Middle Fork of the Salmon River, the ranch is located in a canyon bottom at 3,835 feet elevation, and is accessible by a 34-mile trail from the settlement of Big Creek, itself at the end of 87 miles of dirt road across the rugged South Fork of the Salmon River. Access by bush plane is permitted using the private air strip, a "grandfathered" use that predates the Wilderness Act ban on mechanized access.



Taylor Ranch buildings are barely visible at the bottom of the deep Big Creek drainage.

History Prior to Wilderness Classification

The Taylor Ranch site where Pioneer Creek, Rush Creek and Cliff Creek join Big Creek has been occupied by human beings for thousands of years. Archeological evidence indicates that aboriginal peoples resided nearby while hunting bighorn sheep and fishing in Big Creek. Nearby are the remains of Indian house pits and three miles downstream, towards the confluence with the Middle Fork of the Salmon River, are impressive petroglyphs.

Ancient petroglyphs tell of early Big Creek inhabitants.

The first recorded white person to visit the vicinity was Dave Lewis, a Civil War veteran and packer and scout for the military during the Sheep Eater Indian campaign in central Idaho territory. Lewis traveled the length of Big Creek for the military in 1878, and a year later was packing ammunition for a mounted company of military when they were ambushed by Sheep Eater Indians three miles upstream from Taylor Ranch.[2] The rock-lined ambush pit used by the "Sheep Eaters"

[2]James Akenson, co-resident manager of Taylor Ranch from 1982-1990, presents more detailed history based on oral histories of early Big Creek residents in *A Century of Taylor Ranch History*, a 40-page draft manuscript on file; University of Idaho, College of Forestry, Wildlife and Range Sciences, Moscow, Idaho 83843.

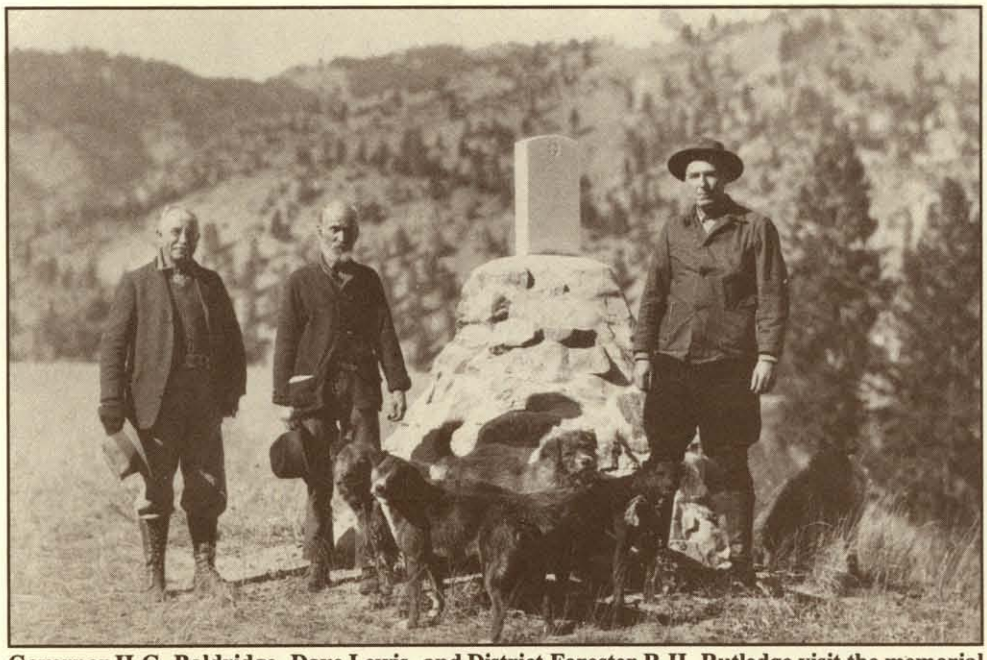
"Uncle Dave" Lewis mends a snowshoe while one his lion dogs demands attention.

during this battle is still visible. One soldier died as a result of this battle and is buried at "Soldier's Bar," two and one-half miles down-stream from the ranch. Dave Lewis probably made note of the attractive site near Pioneer Creek during his travels in the Big Creek Drainage, because 40 years later he would return to the site and play a major role in the region.

The first white residents at the Taylor Ranch site were Elix and Billy Bull, who staked a placer claim on Pioneer Creek and built a sod-roofed cabin in the fall of 1900. They abandoned their claim in 1902, heading for better prospects at Thunder Mountain. For the next eight years the cabin was unoccupied except for occasional hunters, miners and trappers, but in 1910 John and Mary Conyer moved into the cabin from the old Caswell homestead six miles upstream. The Conyers ran cattle, built fences and a corral for their livestock, established a pasture hayfield and constructed a new cabin. In 1918 the Conyers moved back to Cabin Creek to continue their cattle operation and Dave Lewis moved onto the site.

In 1918 Dave Lewis was in his early 70s. In addition to drawing a military pension, he made a living hunting cougars for bounty, guiding big-game hunters, trapping and possibly a little prospecting. Probably the first big-game outfitter in the region, Dave had received national publicity for his cougar hunting prowess. "Cougar" Dave, or "Uncle" Dave as he was known, kept a dozen or more horses to support his hunting. He would meet his clients at Warren, the nearest railroad head 100 trail miles from the homestead at Pioneer Creek. At 70, Dave Lewis was still a tough frontiersman. Shortly after establishing residence at the Pioneer Creek homestead, some horse thieves thought they could take advantage of an old man and headed up Pioneer Creek with his entire string of horses, leaving Dave to pursue on foot. They were surprised when he met them at the top of the pass, peeling one of the thieves out of his saddle with his .44-40 carbine, later complaining he would have nailed them both if he had had his big gun.

As a well-known big-game guide, Dave Lewis introduced many prominent people to the wild central Idaho region, including Idaho Governor H. C. Baldridge. While nearly 90 years old, Dave hosted a delegation of people who were evaluating whether the central Idaho tract should remain in a natural state for the benefit of outdoor enthusiasts and the wildlife inhabiting the area. Governor Baldridge expressed his first impressions of the Big Creek country while addressing the governor's committee on the proposed Idaho Primitive Area in December of 1930. Referring to his party's trip to the Dave Lewis ranch, Governor Baldridge stated, "It was the wildest country I've ever seen . . . Few, if any areas in the United States, offer the opportunities of this section for hunting and fishing. The area comprises something over a million acres with perhaps 25 farms in the whole territory."[3] The reference by



Governor H.C. Baldridge, Dave Lewis, and District Forester R.H. Rutledge visit the memorial at Soldier's Bar, circa 1927.

Governor Baldridge to the 25 farms underscores the fact that the area is wilder today than in that earlier era when many homesteads were located throughout the Salmon River country, many of them in the Big Creek Drainage where homesteaders subsisted or raised cattle to feed the men in the Thunder Mountain mines.

In 1933 Jess Taylor made a pack trip into Big Creek. While hunting in the vicinity, he became acquainted with Dave Lewis and also noted the potential of the homestead as a guest ranch. In the fall of 1934 Jess purchased the ranch for $1,200, paying $500 earnest money. The deed transfer was detained because Dave Lewis' legal administrator, Walter Estep, when returning from the ranch after witnessing the sale, was killed two and one-half miles upstream of the ranch by Frank Lobauer, at what is now known as Lobauer Basin.

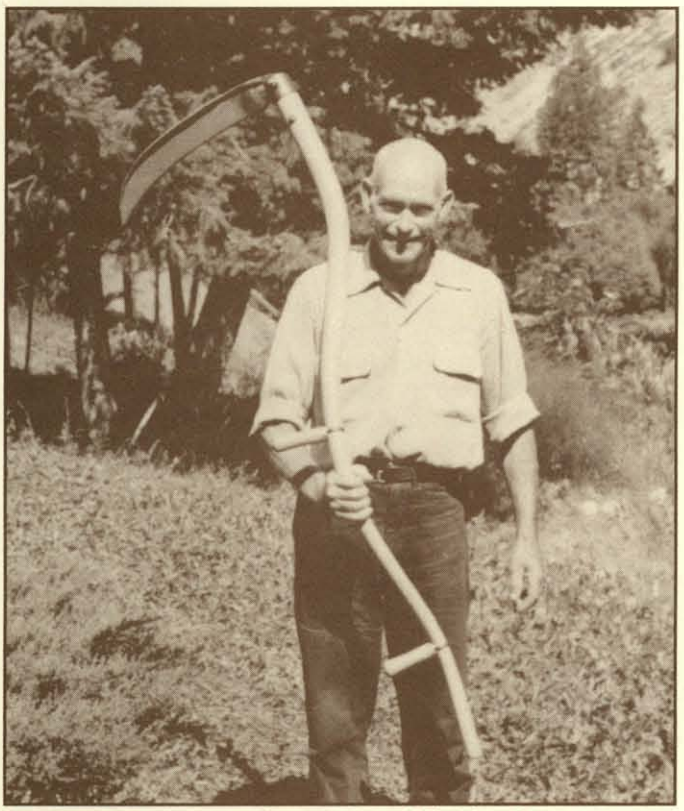
In 1935 Uncle Dave Lewis died at the ripe age of 93, after catching pneumonia from a drenching spring storm on the 34-mile ride from the ranch to Big Creek. Today, the 9,300-foot Dave Lewis Peak at the head of Pioneer Creek and a tributary stream of Rush Creek both bear his name.

Although legally owning the homestead, Jess Taylor moved to Boise in the fall of 1935 to begin a contracting business, and for years he hired a variety of caretakers to look after Taylor Ranch. In 1948, Jess and his new bride, Dorothy, returned to pursue his dream of making the homestead into a guest ranch. In 1948 access into Taylor Ranch entailed a flight to Soldier's Bar and a 2½-mile hike upstream to Pioneer Creek. But the Taylors meant business; they even flew a 500-pound Monarch stove to Soldier's Bar and packed it on a horse to the ranch. A slip-scraper had been packed by mule from Big Creek in 1935 and with it Jess and Dorothy converted a timbered, brushy flat into an airstrip during 1948. The first plane landed in 1949. Several buildings were constructed during the next few years. One client, writing about the Taylors stated: "I watched them turn that land into a home in the wild. The cabins they built speak well of Jess' skills as a man and rugged individual. The only thing he couldn't change were the rattlesnakes!"[4]

As early as 1931, a telephone line ran down Big Creek to mines on Crooked Creek, and in the early 1950s Taylor Ranch had a phone. The old oak-crank phone, and Dorothy's operator's license, are still hanging in their original place in the Taylor cabin back room. Some phone insulators are still visible along the Big Creek trail, but the advent of radio communication and the hassle of continual phone line repair ended the back-country phone network in the early 1960s.

The mid-'50s to early '60s were prime years for the Taylors' outfitting business. Jess kept mowing machines on both sides of Big Creek to make hay for the livestock. Each March, Jess and Dorothy arrived at Taylor Ranch from Boise to prepare for the steelhead season. The fall salmon season and big game hunting were concluded prior to their departure for the winter. One fall Jess caught a 35-pound salmon in the big hole about a mile downstream. During the 1930s and early '40s, mail was brought by dog sled down Big Creek as far as Cabin Creek, but dog sleds were replaced by air service in the 1950s. For awhile the Taylors hiked the seven miles weekly to Cabin Creek for mail, until Jess

[3]James Akenson, *A Century of Taylor Ranch History*, p. 5.
[4]James Akenson, *A Century of Taylor Ranch History*, p. 10.



Jess Taylor takes care of weeds the old-fashioned way.

. . . While Dorothy Taylor hikes a nearby trail.

successfully lobbied for mail service by plane to Taylor Ranch in the late 1950s.

During the '50s and '60s, Jess supplemented his income doing contract trail work for the Forest Service and he worked the Rush Point and Cliff Creek trails into their present-day layout. Also during this era, the old suspension bridge at the mouth of Cliff Creek was replaced by a steel span bridge, with bridge segments flown to Taylor Ranch. Steel span bridges were also installed downstream across lower Big Creek and across the Middle Fork of the Salmon River at the confluence with Big Creek. Most packers were happy to see the old swinging bridges replaced, and so were their mules!

Transition: Guest Ranch to Research Station

Wilderness research at Taylor Ranch began in 1964 when Maurice Hornocker, then a graduate student at the University of British Columbia, made arrangements to use Taylor Ranch as winter headquarters for the first major study ever done on mountain lions (Hornocker 1967). Between 1964 and 1967, Maurice and his local professional houndsman, Wilber Wiles, captured numerous of the big cats drawn to the Big Creek basin by the wintering big game herds. They even kept captive mountain lions in a pen constructed adjacent to the main pasture. Hornocker and his research drew national attention and were the subject of a National Geographic film documentary in 1973. But the most important result of Hornocker's research was to change the status of mountain lions in Idaho from that of bounty animal to big game species.

In the mid-1960s the Taylors listed the ranch for sale and put their outfitting business on lease. It was then that Maurice Hornocker convinced both the University of Idaho and Jess Taylor of the potential value of the 65-acre Taylor Ranch as a wilderness research field station. Consequently, the ranch was purchased by the university in 1969 for $100,000. It was anticipated that if the university invested several years of operating funds, the field station would become self-sufficient, funded by research grants. That vision has not been realized.

From 1970 to 1982, the ranch was operated by

1960s: Maurice Hornocker and a tranquilized subject of his groundbreaking cougar study.

various outfitters under arrangements with the university to provide support for research. During this period, a cook house was built, a pack shed and storage shed were added, and then finally a bunkhouse adjacent to the cook house.

Periodically, more research projects were developed by faculty to take advantage of the new wilderness field station. During the '70s, Dr. Maurice Hornocker supervised two graduate students in major studies staged from Taylor Ranch. John Seidensticker studied mountain lion home ranges in the first radio-telemetry study of cougars (Seidensticker 1973), and Jim Claar looked at big game winter range conditions and utilization (Claar 1973). In the summers of 1975 and 1976, Dr. Mike Falter and his graduate student Ed Buettner studied aquatic biology of highland streams near the ranch (Buettner 1987). In 1978 John Hartung, a graduate student of Dr. Jim Fazio, documented the historical resources along the length of Big Creek and its major tributaries (Hartung 1978).

From 1975 to 1980, ten undergraduate student research projects were conducted under faculty guidance. Students were selected based on their submitted proposals and topics ranged from surveys of raptors and rattlesnakes to the ecology of grouse and small mammals. All but one of the projects focused on wildlife. Eleven reports resulted from the ten studies, with two undergraduates subsequently publishing articles based on their experiences at Taylor Ranch in professional journals (Elliot 1977; Thurow 1978).

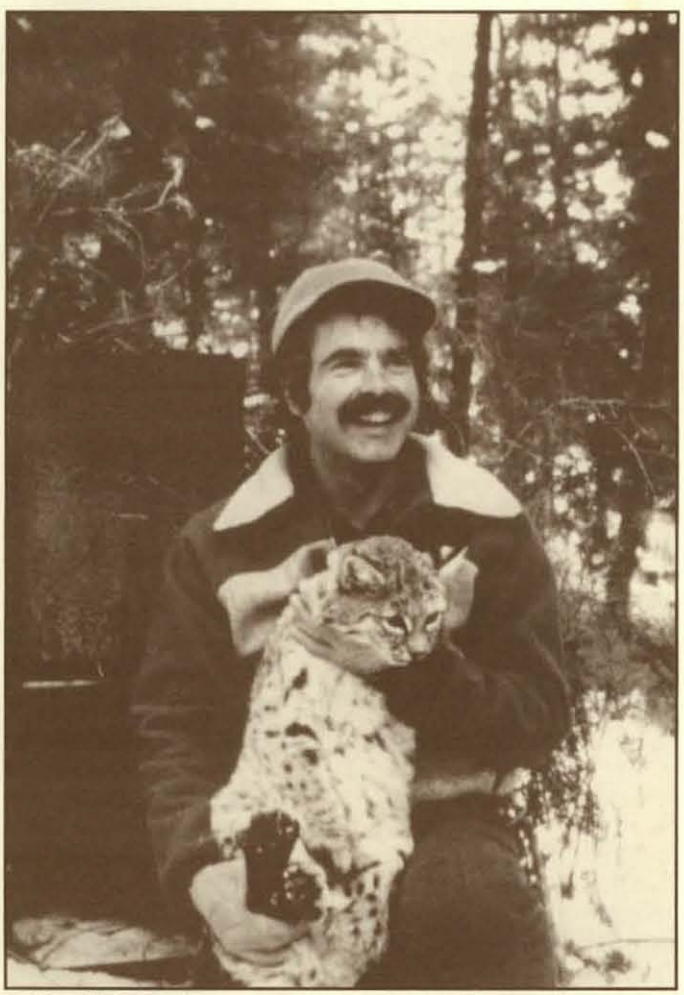
1980-1990: Wilderness Classification and Increased Research

The Central Idaho Wilderness Act of 1980 (P.L. 96-312) established the River of No Return Wilderness of 2.2 million acres surrounding Taylor Ranch and the Big Creek drainage. Aircraft landings at existing air fields would continue as uses predating the Wilderness Act. With the added protection of wilderness classification, and a growing research program, the university made additional commitments. In 1982 Jim and Holly Akenson were hired as year-around Taylor Ranch co-managers and the outfitter's lease was terminated. A management plan was written, including a policy of only research and business-related landings for the airfield (University of Idaho 1988). Mules and a string of horses were acquired and a national weather service recording station was established at the ranch.[5]

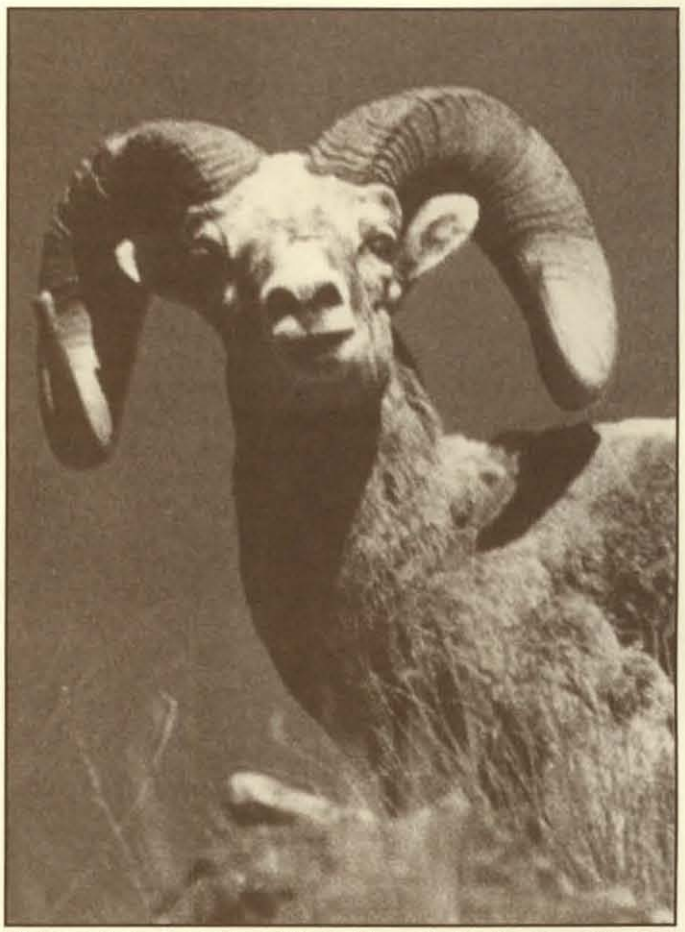
[5]During this era, Dr. Ed Krumpe assumed leadership of the university's Wilderness Research Center, including the field station, and initiated additional wilderness activity. He convened a national wilderness management conference, attracting 400-plus managers from all four federal wilderness managing agencies, including a field trip for some to Taylor Ranch. The conference led to the first national wilderness management working plan, prepared from input by conference working groups and uniting all agencies in commitment to wilderness management priorities for the first time (Bloedel et al. n.d.; Frome 1985; Krumpe 1990).

With year-round support at the ranch, and the growing interest by faculty, research in the adjacent wilderness increased. In the early 1980s Greg Hayward and Pat Hayward, under the direction of Dr. Oz Garton, carried out studies of habitat partitioning and use and population biology of forest owls. This major research effort led to the discovery of a new breeding species and expanded knowledge of the boreal owl, which is now a key indicator species for high elevation spruce-fir forests.[6]

Also during the early '80s, Gary Koehler, under direction of Dr. Maurice Hornocker, investigated the ecology of bobcats (Koehler 1987; 1989). During the three years of this study, Koehler and his crew covered immense distances, capturing and tracking the radio-instrumented bobcats, a distance estimated as equivalent to traveling to San Francisco from Taylor Ranch and back. During the same era, Sue Tank investigated habitat relationships of wintering passerines under Dr. Winifred Kessler (Tank 1983; Tank and Sidle 1986).



1980s: Gary Koehler conducts a bobcat study based at Taylor Ranch.



Bighorn sheep were the subject of two studies headquartered at Taylor Ranch.

In 1983 Dr. Frank Leonhardy began a major archeological investigation of the settlement and subsistence patterns of Sheep Eater Indians, including excavation of a cluster of house pit sites half a mile downstream from the ranch (Leonhardy 1985). One of Leonhardy's graduate students, Fred Thomas, completed a master's project on the utilization of mountain sheep as a food source and hunting strategies

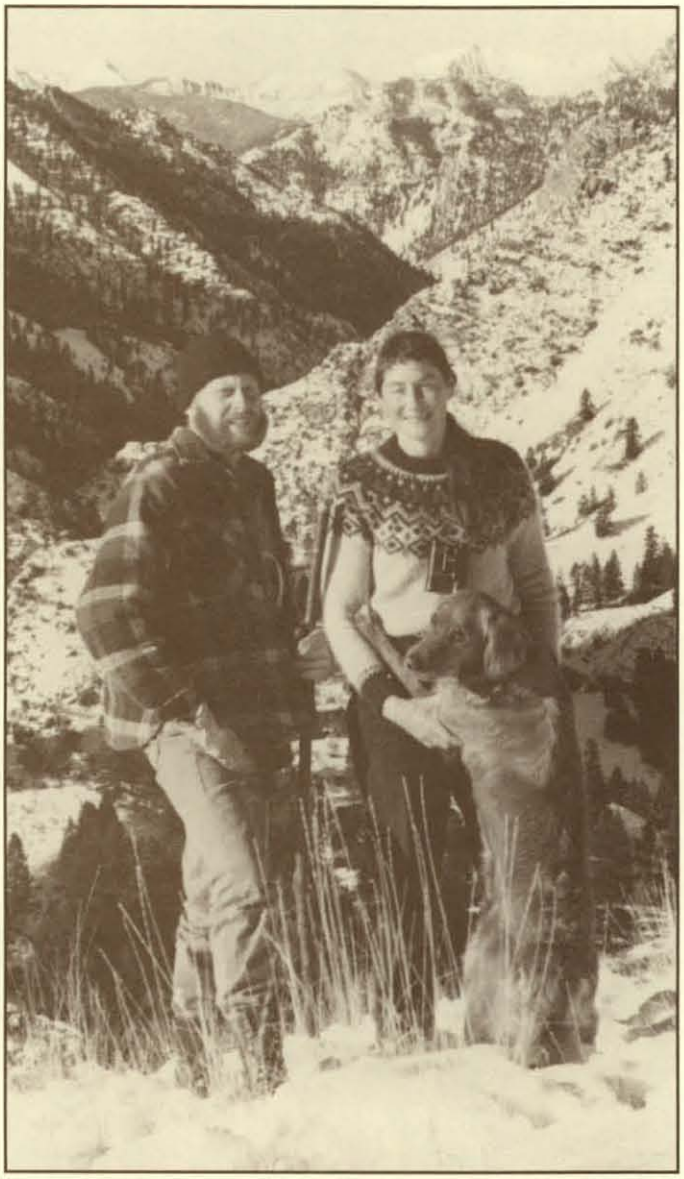
[6]The wilderness studies of owls by the Haywards and Garton are reported in many scientific publications: Hayward 1983, 1989; Hayward and Garton 1983, 1984, 1988; Garton, Hayward and Hayward 1989; Hayward, Hayward and Garton 1987, 1991; Hayward et al. 1987.

used by the local Sheep Eater Indians (Thomas 1988). Gary Koehler completed field work on the bobcat study in 1984 and then moved into a re-evaluation of the mountain lion population study for Dr. Maurice Hornocker. During the winters of '85 and '86, a team of biologists and houndsmen, led by Howard Quigley from Hornocker's Wildlife Research Institute, captured 21 mountain lions (Quigley, Koehler and Hornocker 1987). Two bighorn sheep studies were implemented under Dr. Ernie Ables by graduate students Jim Bennett and Holly Akenson, whose master's thesis will report on behavior and relationships of bighorn sheep, mule deer and elk on Big Creek winter range.

In 1986 a student internship program was initiated that provided summer learning opportunities for undergraduate students who assisted on research projects and did ranch work. Since then, student interns have helped perform ranch maintenance and collect data on noxious weed surveys and range condition transects, small mammal sampling and campsite inventories, while learning wilderness skills and appreciation. With help from the interns, a major study of monitoring wilderness conditions and experiences was carried out, partly near Taylor Ranch but in other wilderness areas too, by Linda Merigliano under supervision of Dr. Ed Krumpe (Merigliano 1987; 1989; Krumpe 1985; Merigliano and Krumpe 1986).

To expand support for the growing research program, a pole barn was constructed to store hay for the mules and string of horses, and the old cabin built by the Conyers in 1911 was converted into a field laboratory. By this time the Taylor Ranch Field Station was attracting national attention. A documentary of research activities at the field station and the isolated lives of resident managers Jim and Holly Akenson was aired on many public broadcasting stations around the country, and the magazine *Idaho, the University* featured stories on Taylor Ranch (Savage 1986; Pritchett 1986; Akenson and Akenson 1986; Moors 1989). During late winter of 1987, ABC filmed Dr. Maurice Hornocker and his staff catching a mountain lion near the ranch. Subsequently, this research was featured on *Good Morning America*.

By the late '80s, summers at the ranch became very busy with research projects and the intern program. Dr. Jim Peek established vegetation plots and transects and remeasured several old exclosures for a continuing range utilization study which will provide an important record of plant and animal response to removal of grazing several decades ago (Peek 1988). Drs. Steve Bunting and Penny Morgan evaluated the spread of spotted knapweed; Dr. Wayne Minshall and



Jim and Holly Akenson, Taylor Ranch co-managers, 1982-1990, with Golda.

graduate students from Idaho State University surveyed aquatic invertebrates on Big Creek and assessed the responses of streams to major wildfires in 1988; and an automated meteorological and atmospheric monitoring station was established in cooperation with the Idaho National Engineering Laboratory. Responding to alarm over unexplained bighorn sheep die-offs in the northern Rockies, a major bighorn sheep study was initiated in 1988, in cooperation with Idaho Fish and Game, to study wilderness herds in Big Creek where there is no contact with livestock and little disturbance

by people.

By the summer of 1990, the physical capacity of the ranch was often saturated, despite strict observance of the policy that airfield use was allowed only for university business, research or education. About 30 wilderness resource projects had been completed or were in progress and summers were busy with a three-week field course, the student intern program, ranch maintenance and research projects to be assisted. In 1990 Dr. Jeff Yeo hosted two sections of 12 students each from San Francisco State University's Wildland Studies Program, with several students turned away because of wilderness and housing limitations. Some international visitors interested in wilderness research were hosted, including delegations from South Africa and the Soviet Union.

The costs of operating Taylor Ranch have been a continuing concern. Limited funding for wilderness research demanded scientists with creative approaches and a strong desire to work in wilderness. Most research was "recruited" by urging faculty with funding to use the vast wilderness laboratory that was accessible from the ranch. Initial budgets for operation and maintenance of the Taylor Ranch field station averaged $10,000 per year, climbing to about $29,000 by 1986, and falling under recent cuts to about $25,000 in 1991, and less in 1992. These monies must cover all expenses, including airplane charter, propane, mail, food and supplies which must all be flown in, building maintenance and repair, and livestock expenses. Support for student interns and research costs not covered by outside grants and contracts must come from other budgets.[7]

Getting Ready for the Future: 1990 and Beyond

During the summer of 1990, with resident co-managers Jim and Holly Akenson planning to leave for other career opportunities, some major changes were initiated to reduce costs and further strengthen wilderness research and education programs. The position of field station resident manager, a job shared by Jim and Holly the past eight years, was upgraded to that of scientist/manager and Dr. Jeff Yeo, a wildlife biologist, was hired for the position. Horses and mules at the ranch were reduced from nine to four, to be kept at the ranch during summers only, thereby reducing the need for putting up so much hay. Education will play a bigger role, including University of Idaho sponsorship of the "Field Research in Wilderness Ecology" course taught the previous year by Dr. Yeo. The intern program will continue, but focus even more on initiating long-term field studies and providing research assistance.

What a bush pilot sees dropping into Taylor Ranch.

A major change during 1990 was the addition of a building moved from the former Lanham Guest Ranch seven miles upstream at Cabin Creek. The Lanham Guest Ranch was purchased by the Forest Service in 1974 as part of their effort to buy up wilderness inholdings. Their original plan was to destroy the cabins on-site to restore wilderness naturalness and

[7]**During 1991, two endowments to support student wilderness research and education were established by private donations and pledges.**

solitude. But strong sentiments by Big Creek residents and others opposing destruction of the attractive buildings had prevented action the past fifteen years, during which the cabins stood locked and empty. In the summer of 1986, UI Forestry Dean John Hendee and his family camped in the cottonwoods in front of the buildings and lamented that one of the nicer buildings wasn't located at the Taylor Ranch field station, where it could be used to support research and education. After further investigation of the feasibility of moving one of the nicer buildings, a 61-foot by 24-foot log structure, to Taylor Ranch, the move was proposed to the Forest Service. Payette National Forest Supervisor Vito "Sonny" LaSalle liked the idea and initiated the extensive environmental analysis that would be required to move the building and naturalize the Cabin Creek site.

The initial idea was to dismantle the cabins log by log and float them a mile down Cabin Creek to Big Creek, and then six miles downstream to Taylor Ranch. Unfortunately, the logs were connected by steel pins and thus entire wall sections had to be kept intact. The Forest Service and the university approached the Idaho National Guard to see if they could move the cabin as a community service and training exercise. After General Manning of the National Guard visited the site with Governor Cecil Andrus, the project was approved (Movius 1991). During a three-week period in July 1990, the cabin was disassembled, transported by forklift and mule wagon to the Cabin Creek airstrip, and then air-lifted to the meadow at Taylor Ranch where it was reconstructed. The goal was to complete the project with minimum use of mechanized equipment, although some use of a reciprocating saw was needed to cut spikes, and a forklift was used to transport a few sections of wall about 1,000 feet to the airstrip because they were found to be too heavy or awkward for transport by mule wagon.

Everyone connected with the airlift was concerned about the temporary impact on wilderness solitude and wildlife. Between June 20 and July 11 there were 58 helicopter or fixed-wing landings associated with the project. The idea behind the project was that the long-term benefits to wilderness from the research that

And here's where a bush pilot lands (and takes off) at Taylor Ranch.

The Lanham cabin was disassembled, transported to the Cabin Creek airstrip, and airlifted by Idaho National Guard helicopter to Taylor Ranch, where it was reconstructed.

would be enhanced by the expanded facilities at Taylor Ranch would outweigh the temporary impacts. When a bull moose trotted from the old Lanham Ranch site at Cabin Creek just as a Forest Service and university team approached for a final inspection, it seemed like a good omen. Today the Cabin Creek site is restored to its pre-1940 condition, and the new Wilderness Education and Research Laboratory provides classroom, laboratory, kitchen and sleeping quarters for four at the end of the meadow at Taylor Ranch.

Future Plans for Wilderness Research and Education

The Taylor Ranch Wilderness Field Station sits in the middle of the largest wilderness complex in the lower 48 states. Big Creek and three side streams cross the property and only occasional hikers pass the ranch on the Big Creek Trail, although outfitter spike camps in the surrounding high country are full of hunters during deer and elk season. Adjacent big game herds spend all their seasonal cycles in the wilderness, affected only by the fall hunt, predators and other natural influences. Future research at Taylor Ranch will continue to take advantage of these natural conditions, with a focus on environmental monitoring and assessment. The weather station, water quality monitoring, and, in the future, air quality monitoring station will provide more information on environmental influences. Such information will support studies of response to natural events and will provide a point of reference for continuing studies of vegetation, fire, wildlife populations and behavior. Long-term monitoring, baseline studies and comparative studies with managed situations are anticipated. The field station will be a staging area as much as possible for research and education conducted in the surrounding wilderness, and not concentrated just at the ranch.

Because we want to respect the spirit of wilderness, we struggle with questions such as: is it proper to use a chainsaw on the property to cut a

winter's firewood supply? What about propane refrigerators for food and to preserve scientific samples? Is solar electricity appropriate for the specimen preparation laboratory? Is solar electricity preferable to a hydroelectric power source from one of the streams? What about microwave transmission of data or even the battery-operated air quality and weather monitoring stations?

These are the issues we struggled with in the university "Wilderness Research Center" plan (University of Idaho 1988). Even on a private wilderness inholding, we need to strike a balance between the spirit of the wilderness and the use of modern scientific techniques to discover her secrets. But where do we draw the line and provide research support that will attract good scientists and allow them to do competitive work at an affordable cost? The answers are not easy. But we will draw the line to favor studies that depend on wilderness conditions that are not available in managed environments (Hendee, Schoenfeld and Peek 1981). Guidelines for research in the surrounding wilderness are outlined in the Frank Church-River of No Return Wilderness Management Plan (USDA 1985). These guidelines encourage research, but restrict permanently established or instrumented sites, even for long-term monitoring.

Funding Wilderness Research at Taylor Ranch and Elsewhere

We are proud of the impressive list of studies that have been staged out of Taylor Ranch.[8] But it's not yet a research program, although Hornocker and colleagues made major contributions to knowledge about cougars and bobcats, as did Garton and the Haywards on owls. It's more a collection of studies, opportunistically implemented by faculty who were interested and had funding. A research program requires base funding for continuing studies, and there is a great need for such funding to support wilderness research programs at Taylor Ranch and elsewhere.

We have a diverse National Wilderness Preservation System: more than 95 million acres in 500 units of the most natural remaining areas in our country, managed by four federal agencies and located in every region and 44 states. The nation needs a national wilderness research program directly applicable to all these agencies and all wilderness (Hendee 1989). Research could be directed toward environmental monitoring and assessment or visitor management studies to harvest the scientific values of our Wilderness System and to support its management. We need a wilderness research funding system so that facilities like the Taylor Ranch Wilderness Field Station, and the scientists who would go there to study, can achieve their potential for discovering the scientific secrets that wilderness holds.

Conclusion

The history of Taylor Ranch mirrors the evolution of society's view of wilderness. In the early part of this century, Dave Lewis homesteaded the site that is now Taylor Ranch. He supported himself in part by killing mountain lions for bounties. In the middle part of this century, Maurice Hornocker developed the first major study of mountain lions, which put an end to the federally subsidized bounties paid for killing mountain lions in Idaho. Now in the last part of this century, we are starting to focus on more than just single species, to focus on whole communities and landscapes, a focus on the wilderness resource. This is the next wilderness frontier--research and monitoring to discover more about natural systems and how to protect them, and what they have to tell us about what we're doing to the rest of the world.■

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[8]For a synopsis of research supported by the Taylor Ranch Wilderness Field Station, see Appendix I.

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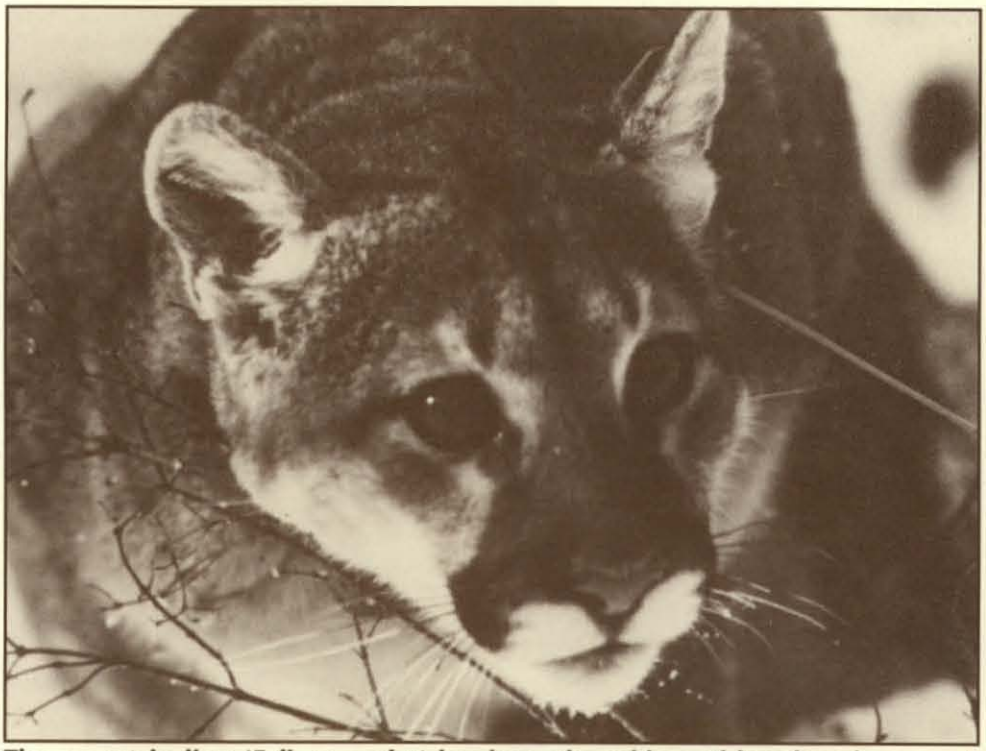
■APPENDIX I: Synopsis of Research from the Taylor Ranch Wilderness Field Station, 1964-1991

By Jeffrey J. Yeo

RESEARCH TOPICS

■*Mountain Lion*



The mountain lion (*Felis concolor*) has been the subject of benchmark research conducted out of Taylor Ranch.

In the early 1960's, we knew little about mountain lions except for information from zoos on their physiology and reproduction, and anecdotal accounts of mountain lions in the wild. Populations of mountain lions which once had been found throughout North America were largely confined to the mountains of the western states as a result of habitat loss and bounty hunting supported by state and federal agencies. In 1964, Maurice Hornocker initiated the first research to describe the population dynamics of mountain lions in the wild and to describe their effect on ungulate prey. Hornocker picked the area surrounding Taylor Ranch because in its remoteness was one of the last remaining places in North America which sustained a healthy lion population relatively undisturbed by man. His research on the mountain lion population surrounding Taylor Ranch, continued by graduate students and research associates, spanned 20 years and is still the study to which all subsequent mountain lion researchers refer.

Significant Findings:

- The mountain lion population remained stable over the first 10 years of research; the population showed a slight increase after 20 years.

- Resident adult males and females, juveniles, and transient lions comprised the population.

- Mature males and females avoided all other lions throughout the year except during breeding and between females and their kittens; termed "mutual avoidance behavior."

- The land tenure system of non-overlapping male territories, overlapping territories of females and males, and the sometimes overlapping territories of females, combined with mutual avoidance behavior, effectively limited numbers of mountain lions below numbers that could be sustained by the available prey.

- Mule deer and elk numbers in the study area initially increased during the first 5 years of study, stabilized during the next 5 years, and were still greater after the next 10 years.

- Lions killed a disproportionate number of young and older deer and elk, half of which were suffering from nutritional deficiencies.

- Mountain lion predation was considered inconsequential in determining total numbers of mule deer and elk in the study area.

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■*Bobcat*

The first study of unexploited bobcat (*Lynx rufus*) populations was conducted at Taylor Ranch.

Similar to mountain lions, bobcats have been exploited throughout their historic range. No studies of unexploited bobcat populations had been done prior to Gary Koehler's research. Wilderness provided the opportunity to study the basic ecology and natural factors regulating an unharvested population of bobcat. In addition, simultaneous studies of mountain lions and coyotes provided a unique opportunity to assess the interactions of these three predators relatively undisturbed by man.

Significant Findings:

- Bobcat population remained stable at 20-25 individuals during 1982-1985; population density was low (1 bobcat/23 km^2 (5900 acres)) compared to populations studied elsewhere.

- Average home range size for males in summer was 88 km^2 (22,500 acres); in winter male home ranges reduced to 18 km^2 (4600 acres).

- Female home ranges were smaller, with summer home ranges averaging 31 km^2 (7900 acres); 104 km^2 (26, 600) in winter.

- Little overlap among home ranges of adults of same sex.

- Bobcats selected lower elevations (average = 1,366 m) and xeric forested habitats (Douglas-fir/mtn. mahogany) in winter and higher elevations (average = 1,853 m) and xeric forested habitats (Douglas-fir/mtn. mahogany and Douglas-fir/wheatgrass) in summer.

- Voles comprised 40-65% of bobcat annual diets; cottontail rabbits and ground squirrels were significant diet items in summer (36% and 32%, respectively), and mule deer and bighorn sheep constituted 27% and 16% of bobcat winter diets.

- Ungulates in bobcat diets resulted both from predation and scavenging, although only 14% of 117 ungulate remains observed had been either killed or scavenged by bobcats.

- Low bobcat population density in this area was attributed to limited prey in winter and severe winters.

- Fifty percent of known bobcat mortality resulted from mountain lion kills.

- During summer, bobcats, mountain lions, and coyotes used different habitats: coyotes used open grasslands near valley bottoms, both cats used forested habitats at higher elevations; cats separated spatially: mountain lions used higher elevations selected by elk and deer, bobcats used timbered grassland areas where ground squirrels and voles were plentiful.

- During winter, all three predators used lower elevations below the deep snows.

• Mountain lions were dominant, killing bobcats and coyotes when defending elk and deer carcasses.

Publications and Reports:

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■*Ungulates*

Over the past century, the big game winter ranges of the Middle Fork of the Salmon River and Big Creek have been considered the most depleted in Idaho as a result of past livestock grazing and high-density mule deer populations. In conjunction with the ongoing mountain lion research, Maurice Hornocker and his graduate student Jim Claar conducted a study of big game range condition, ungulate food habits, and forage plant response to big game browsing in Big Creek. Other research has focused on bighorn sheep. Two graduate student projects, with one soon to be completed, as well as one undergraduate intern, have studied bighorns. Recent high early summer bighorn lamb mortality in Big Creek prompted additional research. One project has been completed and additional research concerning forage-based bighorn winter range carrying capacity is ongoing.

Significant Findings:

- Browse use of key species (mountain mahogany and bitterbrush) generally exceeded 60%.
- Bitterbrush use followed topographic gradient with highest use near ridgetops (>70%) and least use adjacent to stream bottoms (<25%).
- Mountain mahogany was used >70% everywhere it occurred.
- Annual mortality of bitterbrush and mahogany was 1/100 and 2.7/100, respectively.
- Winter diets of mule deer and elk, based on rumen samples, consisted mostly of browse (mountain mahogany, bitterbrush, Oregon grape, and Douglas-fir) for deer and grasses for elk. During crusted snow conditions, elk and deer diets were similar, with both consuming browse.
- Browse species provided the highest crude protein source in winter (10% DM), although in spring grasses had higher crude protein content (27% DM).
- Mule deer rumens consistently had higher crude protein contents than did elk.
- Claar concluded that despite the long-term appearance of poor range condition in Big Creek, browse species and mule deer and elk populations were adapted to these levels of use and that the ecosystem was in good condition.
- Intermediate snail hosts present on bighorn sheep winter ranges; none showed evidence of lungworm larval infestation.
- Ninety-three percent of freshly collected bighorn sheep fecal pellets contained lungworm larvae; however larval output was low (average = 23 larvae/g dry feces).
- Tracking of 12 radio-collared ewes located 4 drainages used for lambing and 3 separate summer ranges. All lambing areas were on steep, south-facing cliffs.

This radio-collared bighorn (*Ovis canadensis*) ewe participated in a study headquartered at Taylor Ranch.

• Since winter 1986-87, lamb:ewe ratios have declined dramatically in the Big Creek drainage. Although lamb production was initially high in spring (79-85 lambs: 100 ewes), within 4-6 weeks of birth, lamb:ewe ratios fell to 7 lambs:100 ewes.

•*Pasturella haemolytica* was the most frequently cultured bacteria of 10 dead lambs and ewes collected.

•High densities of bighorn sheep, coupled with continued drought conditions and increasing elk populations in Big Creek, may be promoting observed high early summer lamb mortality from disease.

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■*Other Mammals*

Small mammals are abundant and their populations are relatively easy to monitor. They can provide an index to structure, function, and change within communities and so can be important components of a wilderness monitoring program. To date, most small mammal research supported by the field station has focused on Columbian ground squirrels. Beaver, marmots, pocket gophers, and deer mice have also received attention. As part of a community monitoring program, small mammals as well as birds, amphibians, and reptiles will be monitored beginning in 1992.

The ecology of the Columbian ground squirrel (*Spermophilus columbianus*) was the subject of one Taylor Ranch-headquartered study.

Significant Findings:

■Beaver

• In headwaters of Big Creek and in Chamberlain Basin, beaver were widespread; these areas are characterized by gentler terrain and good availability of alder and willow.

• Permanent beaver colonies are scarce in lower Big Creek drainage; suggested that steep drainage, lack of preferred forage, and high water velocity in lower Big Creek provided poor habitat for beaver.

■Yellow-bellied marmots

• Only 5 marmot colonies discovered in Big Creek drainage between Big Creek Ranger Station and Middle Fork of Salmon River.

• Suggested that suitable sites for marmots limited in drainage primarily due to lack of good forage close to good denning sites; some colonies that were reported in past are extinct now, probably due to extermination by man.

■Columbian ground squirrels

• In Big Creek drainage, Columbian ground squirrels found in 2 habitats: mountain meadows (e.g., Cold Meadows) and sagebrush-bunchgrass communities on southerly aspects at lower elevations (e.g., Rush Point).

• Average seasonal home range for Columbian ground squirrels (based on mark-recapture) in Cold Meadows was 1532 m^2 (.38 acres); density was 13 adult squirrels/ha (2.47 acres).

• In Cold Meadows, adult female Columbian ground squirrels were significantly more active in June than adult males (probably a result of territorial defense by males which effectively reduced male densities); during July and August, activity was similar between sexes.

• Columbian ground squirrels had generalist diets with no preference shown for any one species; 3 forbs (yarrow, daisy, and clover) and 1 grass (alpine timothy) comprised the bulk of the diet at Cold Meadows; 2 forbs (balsamroot and lupine) and 1 grass (bluebunch wheatgrass) comprised the bulk of the diet at Rush Point.

• Litter sizes of Columbian ground squirrels are similar between Cold Meadows and Rush Point (~3.5), although squirrel biomass was slightly lower at Rush Point than at Cold Meadows (~1100 kg/ha vs 1850 kg/ha, respectively).

• Ninety-eight Columbian ground squirrels were captured at 3 sites of different vegetational moisture (3 different elevations) and different composition (Pioneer Creek, Rush Point, Cold Meadows). Weights of squirrels entering estivation were similar, but the timing of estivation and population densities were different among the 3 sites: population density was highest in the most mesic site, lowest in the most xeric site; squirrels entered estivation earliest in the most xeric site, latest in the most mesic site.

• Dates of estivation: at about 1700 m elevation, squirrels entered estivation between 22 July and 5 August; at 1900 m elevation, squirrels entered estivation prior to 14 August; at 2000 m elevation, squirrels entered estivation about 25 August.

■Pocket gophers

• Study area for pocket gophers included drainages in vicinity of Taylor Ranch and meadow sites in vicinity of Cold Meadows.

• Pocket gopher activity greatest in habitats dominated by forbs and graminoids; gopher populations were not present in dense lodgepole pine forest or in shallow rocky soils of higher mountain ridges.

• Pocket gophers existed in good populations throughout area.

■Deer mice

• Deer mice experienced a 33% weight loss between summer and winter at the same elevation.

• Deer mice found to breed during winter; average litter size was 2.5.

• First clear delineation of the range of *Peromyscus maniculatus serratus* in central Idaho.

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■*Birds*

The great horned owl (*Bubo virginianus*) is one of seven owl species studied in the Taylor Ranch area.

■Owls

Few studies have examined complete owl communities. Previous research concerning niche partitioning among owls has focused primarily on food resources. Greg Hayward and Edward O. (Oz) Garton examined niche partitioning based on three major resources: space, food, and activity period. Niches of individual species and how resources are partitioned among potentially competing species are fundamental aspects of community structure and function and are central to theories of evolution. Wilderness allowed study of owl behavior against a naturally functioning background similar to that in which the owls evolved, i.e., with little human disturbance to confound interpretation of findings.

Significant Findings:

- Seven forest owl species encountered: pygmy, saw-whet, boreal, great-horned, and screech owls were abundant; flammulated and long-eared owls were rare.

- Pygmy owls were food and habitat generalists that foraged during the day and preyed more on birds than other owls; flammulated owls specialized on forest moths; saw-whet, boreal, screech, and great-horned owls preferred mammalian prey but differed in size of prey and habitat selection.

- Boreal owls were confined to higher elevations; saw-whet and great-horned owls were most abundant at lower elevations.

- Largest and smallest owl species differed most from all others in food selection; intermediate-sized owls differed most in habitat selection.

- First nesting record of boreal owls in Idaho; nesting occurred in old forest stands (spruce-fir) with complex physical stucture.

- Highest prey densities for boreal owls were in spruce-fir forests; redback voles were most common prey item in boreal owl diet.

- Annual adult boreal owl mortality was 46%; boreal owl population in Chamberlain Basin may not be self-sustaining but dependent on immigration from other populations isolated in high-elevation forests.

- U.S. Forest Service included boreal owls as indicators of older spruce-fir forests in northern Rocky Mountains.

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■Other Birds of Prey

Birds of prey reside at the top of the food chain. Disturbances that affect species further down the food chain likely will impact birds of prey, therefore, they can be important indicators of the function of the community. Only 1 student summer project focused on raptors was completed. Another survey of raptors was completed by a research intern in summer 1991; report completed soon. We will continue monitoring raptor presence, and plan to expand our information base to include nest site fidelity and nesting success.

Significant Findings:

- Twelve raptor species observed (including 5 owl species).
- Kestrels most common (68% of observed nesting pairs); sharp-shinned hawks next most common (20% of observed nesting pairs).
- Kestrels inhabited grassland at estimated densities of 11.1 pairs/26 km^2 (6600 acres).
- Sharp-shinned hawks inhabited open woodland and riparian habitat at densities in the study area of 4.2 nesting pairs/26 km^2 (6600 acres).
- Drought conditions prevailed during 1977; small mammals populations apparently were depressed, which may have reduced nesting by other raptors observed in previous years and caused raptors to migrate from the area early.

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Thurow, T.L. and S.R. Peterson. 1978. A preliminary survey of raptorial birds in the Idaho Primitive Area. Idaho For., Wildl. and Range Expt. Sta. Note No. 31. 5pp.

■Upland Game Birds

Only 1 study of upland game birds has been completed to date. Blue grouse, ruffed grouse, chukar partridge, spruce grouse are present in FCRNR (don't know about quail). We plan to begin intensive study of ruffed grouse and blue grouse near Taylor Ranch in summer 1992. Our purpose is to test hypotheses concerning maternal habitat selection and brood survival, and long-term survival with subsequent habitat selection. Upland game bird populations in FCRNR are essentially unexploited.

Significant Findings:

- All blue grouse male territories observed (n = 21) were in Douglas-fir/ninebark habitat; males were already hooting on 31 May 1975.

- Peak of hatching was in 3rd week of June (indicating the majority of mating occurred in mid-May).

- Average weights of brood hens in early July was 736 g.

- Broods selected grass/forb habitat in early summer; many broods selected irrigated meadows at field station during late summer; grasshopper abundance higher in irrigated meadows than in adjacent wilderness meadows.

- Blue grouse chick survival through the summer was estimated at 22-25%; approximately 91% of observed adult hens produced broods.

Publications and Reports:

Steuter, A.A. 1975. Some aspects of blue grouse, *Dendragapus obscurus*, summer ecology in the Idaho Primitive Area. Unpubl., Wilderness Res. Cent., Univ. Idaho, Moscow. 24pp.

Steuter, A.A. 1976. Modeling of some aspects of a blue grouse population. Unpubl., Wilderness Res. Cent., Univ. Idaho, Moscow. 11pp.

■Passerine Birds

Passerine birds (as well as other birds) are important ecological indicators of ecosystem function and structure. Recent concern about population declines of neotropical migratory birds highlights the importance of birds for monitoring the effects of man's activities on a regional and global scale. In particular, wilderness bird populations can provide a critical baseline not only for comparison with managed landscapes but also for studying the long-term effects of global climate change. Coincident with other studies, researchers supported by the University of Idaho's Wilderness Field Station have compiled records of the seasonal occurrence of bird species in the FCRNR wilderness. The easternmost sighting in Idaho of band-tailed pigeons was reported from the field station in 1977. Although band-tailed pigeons primarily inhabit the Pacific coast and southwestern North America, they have been observed many times during the summer at the field station over the intervening years. To date, only one study which focused on passerines has been completed. However, we have begun long-term monitoring of bird as well as other vertebrate faunal communities within the wilderness.

Significant Findings:

- One hundred twenty-two bird species originally identified as seasonally inhabiting Big Creek and Chamberlain Basin; seasonal residency status has been determinined for most and many additional species have been added in recent years.

- Easternmost sighting of band-tailed pigeon in Idaho reported at Taylor Ranch; band-tailed pigeons have been sighted at the field station several times in subsequent years.

- Patterns of bird species occurrence in winter were highly variable between years (only 2 years of study).

- Winter residents used habitats opportunistically in search of food rather than associating with structural features of the vegetation.

- Wintering birds made greater use of forested habitats than of open habitats.

- Most species distributed their use over two or more habitats in winter.

Publications and Reports:

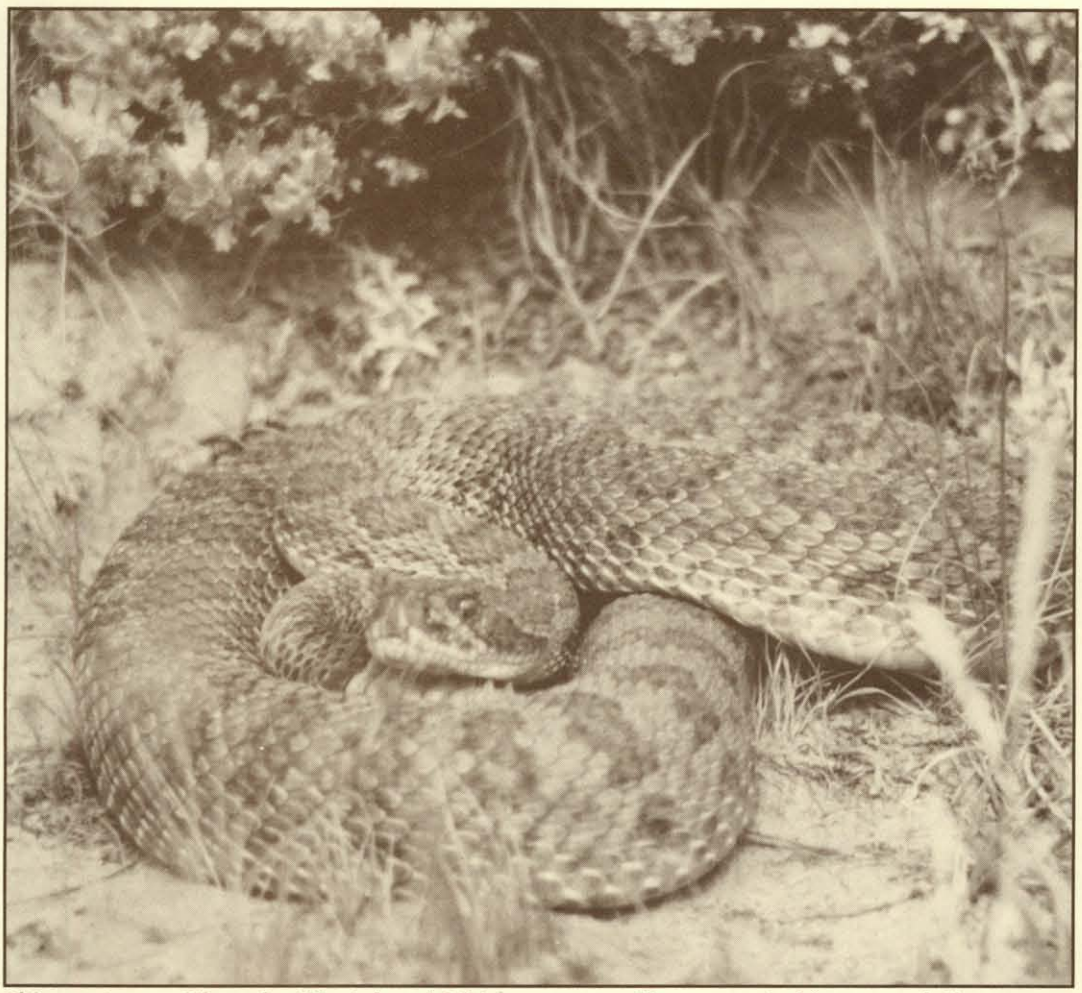
Elliott, C.L. 1977. Easternmost record of the band-tailed pigeon in Idaho. Western Birds 8:107.

Seidensticker, J.C. and R.E. Welch (compilers). 1972. The birds of Big Creek and Chamberlain Basin. Idaho Primitive Area. Unpubl. USDA For. Serv., Payette Natl. For., McCall, Id. 3pp.

Tank, S.L. 1983. A winter passerine ecology study in the River of No Return Wilderness, central Idaho. M.S. Thesis, Univ. Idaho, Moscow. 70pp.

Tank, S.L. and W.B. Sidle. 1986. Habitat relationships of wintering passerines in the River of No Return Wilderness area of central Idaho. Northwest Sci. 60(4):238-242.

■*Reptiles and Amphibians*



This western rattlesnake (*Crotalus viridis*) was among those counted in a population survey conducted at Taylor Ranch by an undergraduate research intern.

Amphibians are sensitive to pollution, acid precipitation, and climate change. Thus they are important indicators of ecosystem health. Populations of amphibians are declining worldwide. To date, no research on amphibians has been supported by the field station, although beginning in 1992 we plan to initiate monitoring of some amphibian populations in cooperation with Chuck Peterson, Idaho State University Curator of Herpetology. One undergraduate research internship surveyed rattlesnake populations along Big Creek and a portion of the Middle Fork.

Significant Findings:

- Three subspecies of rattlesnake are found in Idaho; of 23 specimens collected along Big Creek and a 15- mile portion of the Middle Fork Salmon River, all were same subspecies (*Crotalus viridis viridis*).

- Few rattlesnakes found, or reported by long-time residents of area, upstream of Crooked Creek, a tributary of Big Creek; rattlesnakes most common along lower Big Creek and on Middle Fork below mouth of Big Creek.

- Rattlesnakes found most commonly in talus slopes around rocks 1-2 feet in diameter, not in small rocks or around large boulders; base of steep (20°-45°) talus slopes provides piles of rocks with deep interior spaces, which may be optimal for escape cover, thermal cover, and prey.

- Rattlesnakes moved into shade when surface temperatures > 80° F; as summer progressed, rattlesnakes became more nocturnal and moved closer to water.

- Rattlesnake populations reported by long-time users of area as declining along Middle Fork, possibly as a result of increased number of recreationists with resultant killing of snakes encountered.

Publications and Reports:

Bender, J. 1980. A preliminary survey of the rattlesnake (*Crotalus viridis*) in the Idaho Primitive Area. Unpubl. Wilderness Res. Cent., Univ. Idaho, Moscow. 13pp.

■*Stream Ecology and Fisheries*

Wilderness stream monitoring provides important baseline data for monitoring regional and global pollution.

Streams are major pathways for air and water-borne pollutants. Therefore, they can serve as indicators of drainage-wide disturbance such as fires and erosion. Few streams in the West have escaped the effects of livestock grazing, logging, and road building. Streams of the FCRNR wilderness provide important baselines for monitoring regional and global pollution as well as ecological information on stream function and structure under naturally occurring disturbances. FCRNR wilderness contains important native trout fisheries and historically were major chinook salmon and steelhead spawning and rearing streams. Knowledge of the status and trends of populations in these streams is important because wilderness comprises much of Idaho's anadromous production area.

Fisheries research in the area spans three decades. The field station supported limnological research beginning in the mid 1970's. Annual monitoring of chinook salmon and steelhead densities by the Idaho Department of Fish and Game and supported by the field station began in the mid 1980's and continues to the present time. The study of native fish populations in wilderness streams provides insight into the question of how much habitat degradation and other factors may have contributed to declines in non-wilderness areas.

Research on the effects of wildfire on stream communities and their habitats, conducted by Wayne Minshall of Idaho State University's Stream Ecology Center and supported by the field station, began in 1988 and continues today.

Significant Findings:

- Nine subalpine and montane forest streams in the Big Creek drainage and along the Middle Fork of the Salmon River were sampled in 1975 and 1976.
- Turbidity and total suspended solids at high flows were low and dropped as flows decreased.
- Oxygen remained near saturation with little variation in concentrations.
- Alkalinity levels were low; nutrients were often near or below detection levels; inorganic ion concentrations (Ca, Mg, Na, K) were moderate to low.

- Algal and benthic invertebrate numbers and biomass values were low.

- Limnological parameters indicate the infertile and pristine nature of streams in the FCRNR.

- Densities of wild chinook salmon juveniles ranged from 85% - 95% below rated carrying capacity from 1985 to 1990.

- Densities of wild steelhead juveniles averaged 88% below rated carrying capacity during 1985-1990.

- Juvenile densities were limited by numbers of spawners and generally were similar in wilderness and non-wilderness drainages. Significantly lower densities occurred in the severely degraded Bear Valley Creek drainage (outside wilderness near Stanley) than in comparable, undisturbed drainages during the period.

- 1988 Golden Fire changed the food resource base and altered species composition; all species were impacted similarly.

- Both aquatic insect abundance and biomass was reduced the year following the fire; 2 years later no effect on aquatic insects was evident.

- Wildfire impacts differed among streams.

- A great deal of stream recovery may be completed in less than 50 years for some streams and more than 100 years for other streams, although upland communities can take even longer to recover.

Publications and Reports:

Buettner, E.W. 1987. Ecology of selected streams in the Frank Church River of No Return Wilderness. M.S. Thesis, Univ. Idaho, Moscow. 69pp.

Rich, B.A., R.J. Scully, and C.E. Petrosky. 1992. Idaho habitat/natural production monitoring. Part I, General Monitoring Subproject. Annual Report, 1990. Idaho Dept. of Fish and Game. Bonneville Power Administration Contract DE-A179-84BP13381. Project 83-7.

■*Plant Ecology*

Ongoing research in area plant ecology provides information on the effects of early livestock grazing as well as current grazing by wild ungulates–as on this big sagebrush (*Artemisia tridentata*).

The rangelands of the FCRNR historically have been considered depleted as a result of livestock and big game overgrazing. Despite the remoteness of the area, man has had significant effects on the grass and shrub communities of the area. Scattered cattle ranches in the first half of this century and outfitter and recreational horse grazing in the second half, combined with intensive grazing by wild ungulates, have caused marked changes in composition of the plant communities of the FCRNR. Fortunately for the long-term record, early managers were far-sighted and built exclosures on key winter ranges to assess the effect of wild and domestic ungulates on range communities. Forest communities at a regional level had been described for the area. Dale Thornburgh, Humboldt State University, described the potential communities and their condition on and adjacent to the Taylor Ranch. Beginning in 1988, Jim Peek began sampling communities along the Middle Fork of the Salmon River and Big Creek. This sampling included re-sampling exclosures which in some cases spanned >40-year history of vegetation change. This research is ongoing, which will provide long-term monitoring of vegetation change prior to and following designation as wilderness.

Significant Findings:

- Five potential naturally occurring communities described on or adjacent to the field station: black cottonwood riparian habitat, Douglas-fir/ninebark, Douglas-fir/bluebunch wheatgrass, Douglas-fir/pinegrass, and bluebunch wheatgrass/arrowleaf balsamroot types.

- Thornburgh concluded that although much of the area on the ranch has been completely altered by the effects of irrigation, livestock grazing, and tree cutting, most vegetation would rapidly revert to the potential natural vegetation if man's activities ceased; on drier sites and on well-drained river terraces, vegetation will continue to be dominated by non-native plants or native invaders as a result of human disturbance.

- Eight transects in the 5 major upland communities present (mountain mahogany, bitterbrush, bluebunch wheatgrass, big sagebrush, and Douglas-fir) were established in the vicinity of Taylor Ranch.

- Seven exclosures (either still intact or no longer enclosed but still visible) in Big Creek and the Middle Fork Salmon River were sampled, allowing comparisons of plant community response to grazing by livestock and wild ungulates spanning more than 40 years.

- Photographic record dating from 1925, rephotographed in 1968 and 1988, has been collected.

- Preliminary conclusion that non-forested vegetation along Middle Fork and Big Creek is undergoing transition from past disturbance and should not be considered unaltered.

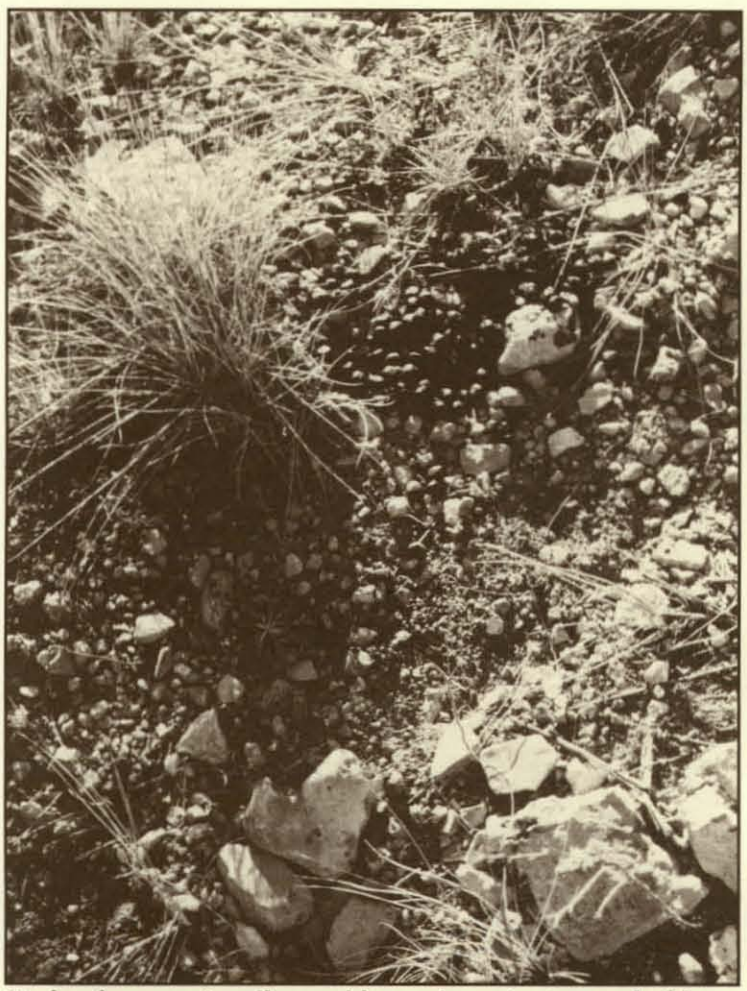
- Hypothesized that fluctuations in wild ungulates (particularly mule deer) was a response to previous grazing by livestock which favored shrubs; following removal of livestock, high deer populations caused long-term change from shrub-dominated communities to grass-dominated communities. Current lower deer populations allow successional return to shrub communities.

Publications and Reports:

Peek, J.M. 1988. Vegetation studies in the Middle Fork, Salmon River, June 1988. Unpubl. Dept. Fish & Wildl. Res., Univ. Idaho, Moscow. 27pp.

Thornburgh, D.A. 1976. Potential natural vegetation of the Taylor Ranch and vicinity. Unpubl., Wilderness Res. Cent., Univ. Idaho, Moscow. 31pp.

■*Soils*



Study of an area's soils provides an important record of long-term change.

Soils provide a long-term record of change: climate, fires, flooding, erosion, vegetation, etc. One internship focused on the soils of Taylor Ranch and vicinity. We know of no other record of soils in the FCRNR.

Significant Findings:

- Field station located at juncture of 3 major formations: Idaho batholith, Precambrian belt series, and Challis Volcanics.

- Map of soil types on and in near vicinity of field station; 4 major vegetation types sampled; 11 soil types identified.

- All soils sampled are relatively young, suggesting the action of stream cutting in bottoms and erosion rates keeping pace with soil formation on steep slopes.

- On south aspects, high soil temperatures and high evaporation rates leave water-soluble salts and minerals intact in the soil.

- On north aspects, water leaching down through soil profile or downslope lowers pH values; soils highly mixed indicating colluvial deposition from land sloughing, physical dislodgement, and short-term transport from overland flow.

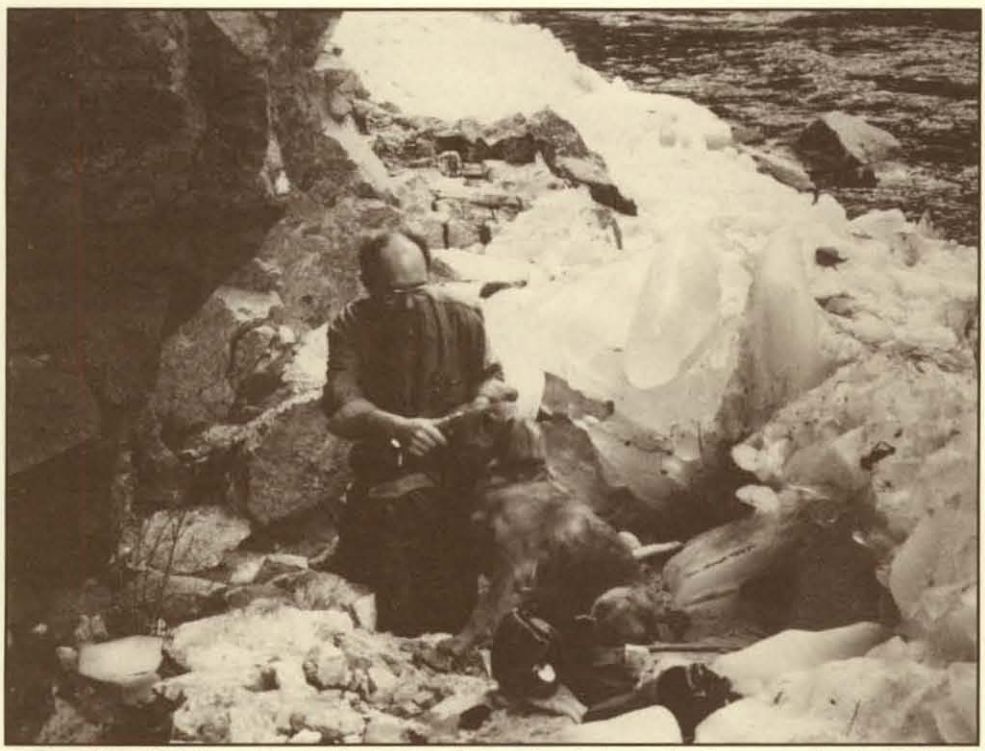
- Soil pH values: on southerly aspects = 6.85, on northerly aspects = 5.94.

- Xeric to udic moisture regime suggested by soils analysis.

Publications and Reports:

Bordenave, P. 1980. Soil relationships of the Taylor Ranch and vicinity. Unpubl. Wilderness Res. Cent., Univ. Idaho, Moscow. 20pp. plus photographs.

■*Anthropology*



University of Idaho anthropologist Frank Leonhardy investigates an archeological site on Big Creek, with a bit of help from a friend.

Original peoples of the Salmon River Mountains (Tukudeka = "sheepeaters") were members of the Bitterroot Culture Group who occupied the area at least 8,000 years BP. These people probably were ancestors of the Northern Shoshoni. Other than accounts resulting from the Sheepeater Campaign in the late 1870's, we knew little about the prehistoric people inhabiting the FCRNR. And the Indians of the Sheepeater Campaign may not have been Sheepeaters but multi-tribal bands seeking refuge after the Nez Perce and Bannock Wars. Research under the direction of Frank Leonhardy, deceased, UI Department of Anthropology, was the first intensive attempt to determine the settlement and subsistence patterns of the prehistoric people over the past millenium. White settlement of the Big Creek drainage also has been poorly recorded, residing mostly in memories of the few remaining early residents. Graduate student John Hartung interviewed these early residents, and surveyed and photographed the cultural resources of the Big Creek drainage.

Significant Findings:

- Approximate dating of terraces along Middle Fork Salmon River and lower Big Creek and Camas Creek covering last 30,000 years BP; terraces most suitable sites for human habitation.

- At least 11 different aged terraces identified; new human habitation sites identified.

- Fifty archeological sites inventoried in Big Creek and Cold Meadows area.

- Excavations along lower Big Creek and upper Cave Creek suggest that early occupation by prehistoric humans in the Salmon River Mountains was in small family groups; subsistence in winter was dependent on bighorn sheep in canyon bottoms, summer subsistence in dispersed camps in the uplands, hunting deer and elk and plant tubers, whitebark pine nuts; no evidence for stored foods or population aggregation.

- An intensive survey of historic structures of the Big Creek drainage, dating from early settlement following the Sheepeater Campaign of the late 1870's. Sites mapped and photographed. Provides a history of the past century in the Idaho Primitive Area; 67 sites investigated and photographed; interviews with long-time residents of drainage.

Publications and Reports:

Hartung, J.W. 1978. Documentation of historical resources in the Idaho Primitive Area, Big Creek drainage. M.S. Thesis, Univ. Idaho, Moscow. 161pp.

Leonhardy, F. 1983 The late Quaternary alluvial chronology of the Middle Fork of the Salmon River: First approximation. Unpubl., Laboratory of Anthropology, Univ. Idaho, Moscow. 17pp.

Leonhardy, F. and F.S. Thomas. 1985. Archeological excavations in the River of No Return Wilderness area. Unpubl., presented NW Anthropological Meetings, Ellensburg, WA, March, 1985. 6pp.

Thomas, F.S. 1988. Mountain sheep and mountain sheep hunters. M.S. Thesis, Univ. Idaho, Moscow. 99pp.

■APPENDIX II: ADDITIONAL PUBLICATIONS

The following is a summary of unpublished reports, theses, dissertations, and publications by students, faculty, and cooperators who have worked at Taylor Ranch.

Unpublished Reports

Akenson, J. 1992. A century of Taylor Ranch History. Unpubl. Mss. on file, Wilderness Research Center, University of Idaho, Moscow. 40pp.

Akenson J. and H. Akenson. 1991. Bighorn sheep herd composition and movements in lambing areas and summer ranges on Big Creek in central Idaho. Unpubl. report for Idaho Department of Fish and Game and Foundation for North American Wildld Sheep. On file, Wilderness Research Center, University of Idaho, Moscow. 39 pp.

Anderson, S.J. 1976. The ecology of pocket gophers in a wilderness environment. Wilderness Research Center, University of Idaho, Moscow. 52pp.

Anonymous. 1987. Competition among mountain lions, bobcats, and coyotes in the River of No Return Wilderness. Wildlife Reseach Institute, Moscow.

Bender, J. 1980. A preliminary survey of the rattlesnake (*Crotalus viridis*) in the Idaho Primitive Area. Wilderness Research Center, University of Idaho, Moscow. 13pp.

Bordenave, P. 1980. Soil relationships of the Taylor Ranch and vicinity. Wilderness Research Center, University of Idaho, Moscow. 20pp plus photographs.

Elliot, C.L. 1975. The effect of altitude upon various physical and reproductive factors in a population of Peromyscus maniculatus. Wilderness Research Center, University of Idaho, Moscow. 16pp.

Haley, K. 1979. Beaver distribution, abundance and habitat characteristics along Big Creek drainage, Idaho Primitive Area. Wilderness Research Center, University of Idaho, Moscow. 23pp.

Leonhardy, F. 1983 The late Quaternary alluvial chronology of the Middle Fork of the Salmon River: First approximation. Unpubl., Laboratory of Anthropology, University of Idaho, Moscow. 17pp.

Leonhardy, F. and F.S. Thomas. 1985. Archeological excavations in the River of No Return Wilderness area. Unpubl., presented NW Anthropological Meetings, Ellensburg, WA, March, 1985. 6pp.

Lombardi, L. 1979. A survey of yellow-bellied marmot colonies in the Big Creek drainage with a special reference to behavior. Wilderness Research Center, University of Idaho, Moscow. 11pp.

Peck, S.A. 1977. Habitat influences on the weight cycle of the Columbian ground squirrel. Wilderness Research Center, University of Idaho, Moscow. 21pp.

Peek, J.M. 1988. Vegetation studies in the Middle Fork, Salmon River, June 1988. Dept. Fish and Wildlife Resources, University of Idaho, Moscow. 27pp.

Quigley, H., G.M. Koehler, and M.G. Hornocker. 1987. Mountain lion population dynamics over a 20-year period on Big Creek in central Idaho. Wildlife Research Institute, University of Idaho, Moscow.

Steuter, A.A. 1975. Some aspects of blue grouse, *Dendragapus obscurus*, summer ecology in the Idaho Primitive Area. Wilderness Research Center, University of Idaho, Moscow. 24pp.

Steuter, A.A. 1976. Modeling of some aspects of a blue grouse population. Wilderness Research Center, University of Idaho, Moscow. 11pp.

Thornburgh, D.A. 1976. Potential natural vegetation of the Taylor Ranch and vicinity. Wilderness Research Center, University of Idaho, Moscow. 31pp.

Thurow, T.L. 1977. Raptor populations and nesting season ranges in the Idaho Primitive Area. Wilderness Research Center, University of Idaho, Moscow. 13pp.

Wynne, K.M. 1978. An investigation of lungworm infestation and intermediate host presence of two bighorn sheep ranges of central Idaho. Wilderness Research Center, University of Idaho, Moscow. 15pp.

Theses and Dissertations

Buettner, E.W. 1987. Ecology of selected streams in the Frank Church River of No Return Wilderness. M.S. Thesis, Univ. Idaho, Moscow. 69pp.

Claar, J.J. 1973. Correlations of ungulate food habits and winter range conditions in the Idaho Primitive Area. M.S. Thesis, Univ. Idaho, Moscow. 85pp.

Elliot, C.L. 1980. Ecology of Columbian ground squirrels in the Idaho Primitive Area. M.S. Thesis, Brigham Young Univ., Provo, UT. 100pp.

Hartung, J.W. 1978. Documentation of historical resources in the Idaho Primitive Area, Big Creek drainage. M.S. Thesis, Univ. Idaho, Moscow. 161pp.

Hayward, G.D. 1983. Resource partitioning among six forest owls in the River of No Return Wilderness, Idaho. M.S. Thesis, Univ. Idaho, Moscow. 132pp.

Hayward, G.D. 1989. Habitat use and population biology of boreal owls in the northern Rocky Mountains. Ph.D. Diss., Univ. Idaho, Moscow. 113pp.

Hornocker, M.G. 1967. An analysis of mountain lion predation upon mule deer and elk in the Idaho Primitive Area. Ph.D. Thesis, Univ. British Columbia, Vancouver, B.C. 115pp.

Koehler, G.M. 1987. Demography of a low productivity bobcat population. Ph.D. Diss., Univ. Idaho, Moscow. 32pp.

Seidensticker, J.C. 1973. Mountain lion social organization in the Idaho Primitive Area. Ph.D. Diss., Univ. Idaho, Moscow. 146pp.

Tank, S.L. 1983. A winter passerine ecology study in the River of No Return Wilderness, central Idaho. M.S. Thesis, Univ. Idaho, Moscow. 70pp.

Thomas, F.S. 1988. Mountain sheep and mountain sheep hunters. M.S. Thesis, Univ. Idaho, Moscow. 99pp.

Publications

Elliott, C.L. 1977. Easternmost record of the band-tailed pigeon in Idaho. Western Birds 8:107.

Elliot, C.L. 1978. Cannibalism exhibited by the Columbian ground squirrel. J. Idaho Acad. Sci. 14:51-52.

Elliot, C.L. 1979. Seasonal home range of a colony of Columbian ground squirrels in the Idaho Primitive Area. J. Idaho Acad. Sci. 15:53-55.

Garton, E.O., P.H. Hayward, and G.D. Hayward. 1989. Management of prey habitats and populations. Pages 298-304 in Proc. West. Raptor Manage. Symp. Natl. Wildl. Fed., Washington, D.C.

Hayward, G.D. 1986. Activity pattern of a pair of nesting flammulated owls (*Otus flammeolus*) in Idaho. Northwest Sci. 60:141-144.

Hayward, G.D. 1987. Betalights: An aid in the nocturnal study of owl foraging habitat and behavior. J. Raptor Res. 21:98-102.

Hayward, G.D. and E.O. Garton. 1983. First nesting record for boreal owl in Idaho. Condor 85:501.

Hayward, G.D. and E.O. Garton. 1984. Roost habitat selection by three small forest owls. Wilson Bull. 96(4):690-692.

Hayward, G.D. and E.O. Garton. 1988. Resource partitioning among forest owls in the River of No Return Wilderness, Idaho. Oecologia 75:253-265.

Hayward, G.D., P.H. Hayward, and E.O. Garton. 1987. Movements and home range use by boreal owls in central Idaho. Pages 175-184 in Proc. Northern For. Owl Symp., Winnipeg, Manitoba.

Hayward, G.D., P.H. Hayward, and E.O. Garton. 1987. Revised breeding distribution of the boreal owl in the northern Rocky Mountains. Condor 89:431-432.

Hayward, G.D., P.H. Hayward, E.O. Garton, and R. Escano. 1987. Revised breeding distribution of the boreal owl in the northern Rocky Mountains. Condor 89:431-432.

Hayward, G.D., P.H. Hayward, and E.O.Garton. In press. Habitat use and population biology of boreal owls in the northern Rocky Mountains, USA. Wildl. Monogr.

Hayward, P.H. and G.D. Hayward. 1989. Lone ranger of the Rockies. Natural History 98(11):78-85.

Hornocker, M.G. 1969. Winter territoriality in mountain lions. J. Wildl. Manage. 33:457-464.

Hornocker, M.G. 1969. Defensive behavior in female bighorn sheep. J. Mammalogy 50:128.

Hornocker, M.G. 1969. Stalking the mountain lion to save him. National Geographic 136(5):638-655.

Hornocker, M.G. 1970. An analysis of mountain lion predation upon mule deer and elk in the Idaho Primitive Area. Wildl. Monogr. 21. 39pp.

Hornocker, M.G. 1971. Suggestions for the management of mountain lions as trophy species in the Intermountain Region. Proc. 51st Ann. West. Assoc. State Game & Fish Commissioners. Snowmass-at-Aspen, CO, July 19-23, 1971:399-402.

Hornocker, M.G. and W.V. Wiles. 1972. Immobilizing pumas, *Felis concolor*, with phencyclidine hydrochloride. Intl. Zoo Yearbook 12:220-222.

Hornocker, M.G., J.J. Craighead, and E.W. Pfeiffer. 1965. Immobilizing mountain lions with succinylcholine chloride and pentobarbital sodium. J. Wildl. Manage. 29:880-883.

Koehler, G.M. 1988. Bobcat bill of fare. Natural History 97(12):48-57.

Koehler, G.M. 1989. Demography of a low productivity bobcat population. J. Wildl. Manage. 53:197-202.

Seidensticker, J.C., M.G. Hornocker, R.R. Knight, and S.L. Judd. 1970. Equipment and techniques for radiotracking mountain lions and elk. Univ. Idaho For., Wildl. and Range Exp. Stn. Bull. No. 6. 20 pp.

Seidensticker, J.C., M.G. Hornocker, W.V. Wiles, and J.P. Messick. 1973. Mountain lion social organization in the Idaho Primitive Area. Wildl. Monogr. 35. 60pp.

Tank, S.L. and W.B. Sidle. 1986. Habitat relationships of wintering passerines in the River of No Return Wilderness area of central Idaho. Northwest Sci. 60(4):238-242.

Thurow, T.L. 1978. An ecological and taxonomic investigation of *Peromyscus maniculatus serratus* in Idaho. Great Basin Nat. 38:469-472.

Thurow, T.L. and S.R. Peterson. 1978. A preliminary survey of raptorial birds in the Idaho Primitive Area. Idaho For., Wildl., and Range Exp. Sta. Note No. 31. 5pp.

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