Oral History Cover Sheet

Name: Fritz Knopf
Date of Interview: July 28, 2014
Location of Interview: Fort Collins, Colorado
Interviewer(s): John Cornely

Approximate years worked for Fish and Wildlife Service: 26 years

Offices and Field Stations Worked, Positions Held: **Wildlife Biologist (Research)**, USFWS, Denver Wildlife Research Center, 1980. **Acting Chief, Ecology Section**, USFWS, Denver Wildlife Research Center, 1981. **Project Leader, Nongame Studies** (1982-1984) and **Project Leader, Avian Studies** (1984-1993), USFWS, National Ecology Research Center. **Leader, Vertebrate Ecology Section,** USGS Biological Resources Division, Midcontinent Ecological Science Center, 1994-1996. **Senior Scientist,** USGS Biological Resources Division, Midcontinent Ecological Science Center/Fort Collins Science Center, 1996-2006.

Most Important Projects: (1) Evaluating winter cattle grazing on riparian areas to see if there was a way to graze them without doing much damage to the habitat. (2) Work on mountain plovers.

Brief Summary of Interview: Fritz talks about growing up on a self-sustained farm, going to college, being drafted into the military during the Vietnam War, getting his master's, his PhD, the experiences he had while getting his degrees, and where he worked before joining the Fish and Wildlife Service. Fritz talks about work he did for the Fish and Wildlife Service and some of the changes that took place while working there and the transition of research from FWS to the Biological Survey and then to USGS until he decided to retire in 2006. At the end of this oral history is a complete list of Fritz's education accomplishments, his professional employment, research experiences, additional professional activities, awards, presentations, and publications.

THE INTERVIEW

John C: This is John Cornely with the U. S. Fish and Wildlife Service Heritage Committee and Retirees Association. I'm here with Fritz Knopf today; it's July 28, 2014, and we're at Fritz's home and we're going to do an oral history interview. This is one of the special emphasis interviews I do bringing in our former research personnel from the Fish and Wildlife Service that ended up finishing their career with another agency, but they're still part of our family. So Fritz, without any further introduction, I would like you to start off and tell us about your life growing up and your education and your career.

Fritz K: Okay, thank you, John. I was born on June 6, 1945, one year after D-Day, which is kind of interesting with a name like Fritz Knopf. And that was on a small family farm in northeast Ohio on the edge of Amish country. And we were a totally self-contained farm family, raised all our own food, and all our own crops and dairy farm; income came from selling milk. And I had a really good childhood and worked on the farm all through my early years and junior high years and then high school. And eventually, my passion at that time in life was baseball. And in 1950's, the Cleveland Indians were hot and I was a pitcher and ended up in high school starting as the starting varsity pitcher as a freshman; got fairly good. And then come my senior year in 1963 I decided I was done in baseball and started to look at other things. And I was getting sick of loading hay on a wagon, because of allergy issues especially in all that humidity and 110 degree hay mounds and dairy barns; it's just not a promising lifestyle. And my folks encouraged me to try to go to college; they hadn't been.

And so I went to a small liberal arts school starting in 1964 in northeast Ohio called Hiram. To this point I'd always been outdoors a lot, a lot of fishing mostly, not too much hunting. And farming was drying up in that country anyway because of suburban growth around the greater city of Cleveland. And when I got into liberal arts school I took every biology course they had; I had 72 credit hours in four years. I was not a sterling student; I was just a good old B student. One course I really remember the best more than the others, I remember them all, but invertebrate zoology I think is just one of those fascinating things that people don't think about when they think about wildlife biology, and fisheries people would think about it much more than I. And we had a nice trip down to the Chesapeake Bay in my junior year and got to go out and work on the bay with a lot of scouts and things like that and just to see the diversity of oceanic life, which I hadn't seen an ocean prior to that. Probably my favorite college course, however, of all things was romantic poets, which is really kind of a bizarre one-course choice, but I really liked the idea of the spirit of the landscape as being expressed through the romantic poets. So I'm getting ready to finish college there and we had a biological station started by a Dr. James Barrow in the biology

department at Hiram College. And he just started collecting waterfowl that people would donate and then he'd get a wire fence and put out on the college property somewhere. He really got into animal behavior and studying Konrad Lorenz's types of head movements of geese and things like that, and would go on and on about behavior of animals and all his lectures and really he was out of Tulane [University} and he had a really deep southern accent and he always spoke very comically. I remember he gave a full lecture once on the mating life of "ellafonds," and it wasn't until the very end of the lecture everybody realized that he was talking about elephants just because of the accent. So he had a sterling biology department, he was it really; there was a Dr. Berg was a botanist, and a geneticist who I don't remember the name of, but he [Dr. Barrow] was really the core of the biology department. And that little old liberal arts school with 12 biology students here, maybe 6 graduates a year, 18 total. The students were all very hands-on working with the geese he had around, he actually got a farm donated. We started converting that to a biological station at Hiram College, which is still there and is thriving.

John C: What's the town?

Fritz K: It's Hiram, Ohio.

John C: Hiram, Ohio; okay.

Fritz K: And they now have a very well developed biology department but back then even on the ACT tests or the graduate exams [GRE], whatever they call those things now to go to graduate school. The biology department students always rated in the upper 95 to 100% nationally as far as their background training and in the core biological disciplines, which is heavily influenced by physiology, and genetics, of course. But I wasn't interest in all those internal type things, I went to college, initially I was going to go to Hiram to do a two-year prep to go to Ohio State and be a veterinary student like a lot of students or people who came into the wildlife profession back in the '50's. But by going through all those other diverse interests in biology I decided I just didn't like the idea of the inside of an animal as much as the outside of an animal. And one of Dr. Barrow's former students was named David F. Bell, who also graduated from Hiram College, and he was the son of an Indian missionary, Indian as in eastern Asia. And he was on the faculty at Utah State University and needed someone to work on some behavior ecology of ground squirrels for the summer towards a Master's degree. So I drove across the country not knowing where Utah was, like most people, and for the next year and a half really fell in love with Rocky Mountain area. And then was drafted in the Vietnam conflict on Valentine's Day in 1969. And so after spending about three or four months in Fort Ord, California, which is a beautiful place if you're not wearing a uniform. They shipped me to Boston to work in an environmental research institute in Framingham, Massachusetts where I was pretty much involved as a biological technician working on high altitude physiological, cardio physiological responses in a volunteer unit. So you

were cranked up to 22,000 feet in altitude chambers and then required to undergo a lot of endurance testing. So that was my first exposure to computers, the binary system was just coming in, computers were just coming in, and I got a little bit of background there. I got out of the military on December 21, 10:05 pm, 1970; not that you remember those kinds of things. And went back to Utah State to finish my Master's and put in another field season back there working on Uinta ground squirrels; behavioral ecology of those squirrels and how their life style changed from 6,000 feet to 10,000 feet during the course of the year, and how it shifted to accommodate the weather and things like that. And had a fairly decent time, had a wife and a young daughter and I finished my Master's up.

John C: Who was your major prof?

Fritz K: My major prof was James Barrow.

John C: Okay.

Fritz K: Dave was originally from Hiram. Also on my committee was a very influential fellow called Allen W. Stokes, the Stokes of Stokes Pelee Island Pheasant population. He's also one of the heirs of Stokes Cash Register Company, and a very strong Quaker, and a very strong personal idol, personal mentor, but not at all a big scientist. He's well known ethnologically, but he influenced me more on a personal level than he did, he and his wife Alice, than on the scientific level.

John C: And so this Quaker ended up at Utah State?

Fritz K: He was at Utah State, and his wife Alice was the secretary of Aldo Leopold, and he got his degree at Wisconsin under Leopold. And so I was finishing my Master's, I didn't know what I was going to do, and I started looking into jobs that interpretive naturalist programs were developing around the country at small sanctuaries. And nothing seemed to work there, and I thought well if nothing works, I'll just try to get a scholarship to stay on and get a PhD, even though I had no real desire to get one at the time. And so I went down and talked to Jess Low at the Utah Cooperative Wildlife Research Unit, who was a well-known waterfowl biologist in the country, and has ties all over the country having served in D.C. with the Fish and Wildlife in research. And I told him I was really not a mammal person, birds were the love. And if I was going to do it, I wanted to do it on something I wanted to do and I said I really liked white pelicans. And I would really like to study colonial nesting birds and there was a big colony on the Great Salt Lake. And he said, "Well, write me up a proposal and I'll see what I can do." So I wrote up a ditzy little proposal in modern standards and he fired it off to Clarence Cottam down at The Welder Wildlife Research Foundation in Texas. Clarence and Jess were old friends, Mormon friends from way back and Clarence was even a bigger name in waterfowl than Jess was. And Clarence also for some reason loved pelicans and he liked coming to Logan all the time. And so he gave me a scholarship, through The

Welder Wildlife Foundation for three years to study colonial nesting white pelicans on the Great Salt Lake. And that scholarship was for $5,000; that included my stipend and all field expenses; by then I was pushing a family of four. But it was fine, happiest time of my life as a graduate student. And ended up working around the university getting salvage boats and stuff, finding a way to get out on the north end of the Great Salt Lake, which is almost impossible at that time, 'cause it's so shallow you can't float a boat in it. And the water density was so high that when a boat's in it, the weight of the water lifts the prop out of the water if you get any kind of chop on the water itself. So it's a dangerous eight miles the lake to get to the island where the pelicans were. So I started in '72 and then full-time '73 and '74 I lived on that island, Gunnison Island on the north end of Great Salt Lake with about 5,000 pelicans, and 15,000 gulls. We'd go out Monday and come back Friday night, and had a field assistant with me, a young undergraduate who was on a drug rehab sponsored education. He ended up, name is Al Bachman, he ended ultimately working for and retiring from the Utah Division of Wildlife Resources as a waterfowl biologist, and a manager, I think, on Ogden Bay Wildlife Management Area. And then 1975, then I was finishing up the master or the PhD, I finished the master's in '73 and '75, I finished the PhD on the pelicans and again was in the dilemma of what I was going to do next and started looking for jobs. And just one of those typical things, I still had not had any wildlife courses. Right at the end of my PhD, I decided, you know, I'm getting two degrees in wildlife and I've had nothing but pure ecology courses, and behavioral ecology, and my favorite classic zoology and evolutionary ecology. So at the very end I decided to take a few wildlife courses, because that's where the jobs were, of course, in many of the universities; ecology was coming on strong, but it still wasn't engrained. So I took a really good course in big game wildlife relationships from John Malechek at Utah State University, and another really good course on wild land water quality, which I think was a major, both of those were major assets in my career. And then I picked up a range management course from the Department there at Utah State, which is one of the better ones in the country. And after about a year of applying, well, I was applying for jobs for about a year and went to work for Bill Ziegler, former Department Chair in fisheries in the department there at Utah State University of Fishes and Wildlife Biology. And he had a big contract looking at Bureau of Indian Affairs water complaints on Truckee River in Pyramid, Nevada. And they had a large pelican colony over there on Anaho Island and he was very concerned about, or interested in how the pelicans were interacting with the fish in Pyramid Lake relative to dewatering of the lake or diversion of the Truckee River, same thing.

John C: Are there Lahontan cutthroats in the lake?

Fritz K: Yes, and that was the main concern was survival of the Lahontan cutthroat and the lake had dropped like 60 feet, and the salinity was increasing and that was the main problem. For 1976 summer and '77, I was essentially flying aerial surveys all over

western Nevada and just into California monitoring, weekly monitoring, pelican use of surrounding reservoirs and the [Pyramid] lake itself, which is very interesting because the pelicans essentially were nesting on Anaho Island, but were foraging almost exclusively surrounding lakes not in Pyramid Lake itself, except when the tui chub, a little chub in the lake, spawn, which spawns near the surface, then all the pelicans for two to three weeks were really hammering the schooling and spawning chubs. But most of the forage base essentially carved out of the Humboldt Sinks, Carson River Sinks and in one area, we watched Washoe too, but another area we really looked at was Honey Lake in California, which is drying up. And we actually got a whole 2,000 bird colony developed on Honey Lake as that lake dried up, and we had a big breeding colony there; it was just that one year, which is really insightful because it helped me understand how the pelicans mating system evolved to changing water levels rather than predictable ones like most colonial-nesting birds. Their whole mating system is adapted to water moving across the landscape, drying up and filling up, and drying up. And then you get up into the Dakotas and a lot of those potholes don't even have fish, but they have a lot of tiger salamanders when they're wet, and when they start drying up, just like the pond behind my house here in Fort Collins right now, pelicans just really hammer it, and then the tadpoles and salamanders come in.

John C: Let's back up just a second, and was Jess Low your advisor for your PhD?

Fritz K: Jess Lowe was my advisor on PhD.

John C: Was Clarence Cottam on your committee?

Fritz K: Clarence was not on my committee, he passed away in the process.

John C: Okay.

Fritz K: And Jess was my advisor, although I don't think he understood what I was doing. And that was fine, he gave me the avenue and I was very grateful for that, and he stayed out of the way and he made sure the logistics were in place and that's all you can ask for; as good as it gets in many ways. And let's see, from there, about that time I'd been applying for jobs, I had maybe eight jobs where I came in second at different universities, San Jose State, Boise State, Arizona State, oh the one in particular Kentucky, Murray State, all the things like that. And finally I had an interview at Oklahoma State University in the spring, April maybe, of 1977, no '76; I think that's right. And had a new faculty position and that's one thing I've learned in my career from then on, never take a position where somebody's been there before. The best positions are the brand new ones because you don't have the history to live up to or down to. And I got a new position there and had a wonderful three and a half years at Oklahoma State on the faculty teaching basic old wildlife courses, game identification, food plots, things like that, that personally I was not that interested in, I considered

somewhat an artifact of a profession that was moving in another direction but it was still big stuff in the south, primarily because of quail, and especially in Oklahoma and Missouri. So I had a half dozen graduate students there and ended up in four years with about 25 graduate committee assignments and it seems like I was writing theses and dissertations for everybody. And one day Bill Keeton from Cornell came through and was doing interviews and came around to visit all the faculty; and came in and sat down, he says, "Well, what do you do?" And I said, "Well, I've got a student working on Lesser Prairie Chickens in western Oklahoma, and another one up here in the north on greaters [prairie chicken]. And I've a student working on snowy plovers and least terns at Salt Plains National Wildlife Refuge. And got these other things…" He said, "Wait a minute," he said, "what do you do?" And the lights went off, and I realized that I had fallen right into that trap of no longer being a field biologist. And that I did not have my own identity, my identity is expressed strictly through my lineage. And I decided Oklahoma is hot, it's a wonderful, Stillwater is a wonderful place to live; it's more native than it is agricultural like everywhere else in that part of the country, lots of turkeys, lots of deer, also lots of ticks and chiggers. And I decided I wanted to go back west and try to do what I always did. And I applied for a job with Chuck Stone at the Denver Wildlife Research Center for someone, a new positon again, to start investigating riparian bird communities, which became a big issue in the late 1970's, which was a spin-off of Bill Platts working in Idaho over the previous five years working on trout habitat in riparian health. And so things had come around and Bob, not Bob, what was his name at Arizona State University, the big riparian guy?

John C: Bob Ohmart.

Fritz K: Bob Ohmart had put together a couple symposia on how important riparian was, and for birds. And so it had fostered this energy in the Fish and Wildlife Service, and Chuck Stone or somebody above him, probably Chuck had a lot to do with it, created this positon for a new riparian bird biologist. He came to Stillwater and interviewed me and offered me the job, and I said, "Well, I have to tell my students. I'd go anywhere west and work on anything, but I didn't want to involve in the personality development and territoriality of riparian birds," which is just a consequence of being in a profession where there's money all of a sudden everyone's looking to having a piece of the pie. But he said, "Well, that's what it is." And I said, "Okay." And this is at a time when biological diversity is just starting to come on board, riparian really kicked that off. And Robert MacArthur's books and species richness types of thinking and niche theory played all into that. And modeling started to take off, and everybody was looking at all kinds of way to pack species into areas and help areas get more species and things like that. And riparian was the example in the west, 'cause you concentrated things because of water. And I took the position and Chuck said, "Okay, I'll move you to Denver." And I said, "How about putting me in Fort Collins?" I said, "Most of

your people are in Fort Collins." He said, "Yeah, but I want a biologist in the Denver office with me." But he did it very reluctantly and very politely and stationed me in Fort Collins with his, his whole branch really was already stationed in Fort Collins in part because of research for access to the University and also with the [FWS Office of Information Transfer] information transfer people up here. And I had a probably wonderful, well I did; I spent the rest of my career in Fort Collins. But we started out in a warehouse down on Blue Spruce Avenue; it looked like some sort of industrial complex. And it turns out it was the best office we ever had 'cause it was just really a big wake-up call and an exciting time for me because in that office we only had about a dozen biologists, three or four of them were older and getting ready to retire, but the younger, dynamic ones we had one from each of the vertebrate professions, or taxonomic groups. So we had two or three ornithologists, we had a herpetologist, we had a couple mammologists, we had some ichthyologists, and I learned more about vertebrate ecology from working just in that little group than anywhere else.

John C: Could you try to name some of those folks just for the historical record?

Fritz K: Some of those people in that group when it ultimately settled down after I got there, John Oldemeyer was the main one for the long run. He passed away about a year and a half ago, day after Christmas in 2012, I think that's correct. And he was a big game biologist and worked in Alaska most of his career, a lot on moose and some fellows up there, and then he came down here and did a lot of deer studies. His last project was a big project on Malheur National Wildlife Refuge, and the antelope range out there, I can't remember the name, Sheldon Animal Range.

John C: I think that's how I got to know him.

Fritz K: And so he was sort of running that group as a sub to Chuck Stone out of Denver, and then Chuck left within a year when Clyde Jones was to direct the division DWRC. And Clyde immediately, Clyde came in from the Smithsonian or from the U.S. National Museum, and he immediately brought behind him Mike Bogan, his Chief Mammologist; Clyde and Mike were both mammologists. And they brought Mike out there to help curate the approximately 10,000 specimen mammal collection here that was housed at Fort Collins. And Mike became the supervisor of what they call ecology group at that time. In that group was myself, as the more recent, more senior ornithologist, and Virgil Scott who did a lot of cavity nesting bird stuff in association with the Forest Service over the previous 20 years, was about to retire; he was an ornithologist also. And a fellow named Vince Reid who was a small mammal biologist, had about a 35- year career with the Service as a researcher working mostly on burn evaluations and stuff like that. A fellow named Curt Halvorson, who I don't know what he actually did, he was small mammals also but he retired very quickly.

John C: I've seen some of his work.

Fritz K: And Bob Finley was a classical [mammalian] taxonomist.

John C: I was going to ask you about Bob if he was there.

Fritz K: And he was there running the museum when Mike Bogan came in. And he retired maybe three or four years later, and Mike continued to run the museum along with Cindy Ramotnik, who came out from the [U.S.] Natural History Museum also as the museum tech. So when I got here, about a year here Clyde Jones me acting for a year before Bogan got on board as the head of the group, not knowing what I was doing of course 'cause I had no real interest in administration. But everybody was getting along fine, we're all just doing our own work and our own research, and I was building my riparian program. I was in Clyde's office and he let me know that Mike was coming in, and I said, "That's fine, that's fine with me." Bruce Bury was also in that group, I had to mention Bruce Bury the herpetologist.

John C: It was Bruce, so he was in Fort Collins at that time?

Fritz K: He was at Fort Collins also.

John C: Okay. He's one of my oral history victims.

Fritz K: Yep, he's wonderful; I just had breakfast with him in Corvallis last year. And Bruce and I flip flopped in running the group until Bogan got here. And then we were being dismissed and I was in Clyde's office and he let me know, and that's fine; I liked Clyde and Clyde supported me as much as he could, you know mammal guys don't like to support bird guys too strong. So I was getting ready to walk out and he said, "Anything else?" I said, "Well, you never asked me why I'm here." He said, "Why're you here?" Typical Clyde, you know he just poured his heart right out, right there. And I said I wanted to build a Center of Applied Avian Ecology. Bring in a few applied avian ecologists and sort of have a little epicenter of western non-game bird applied ecology. He said, "Okay." And so that was the end of that conversation. And from there I went on to start to design my riparian program for my job description. Having grown up working on a dairy farm, I did not come into the profession at that time like most people with a very anti-cattle attitude. I actually like cows, I've used this through my career and talks especially with agricultural audiences, which are always very difficult for a technical person to address and I'm often on a panel, or I would often be on a panel with a bunch of university professors in suits talking to somebody like the Cattle Stockman's Association trying to introduce some of the idea of riparian significance down in West Slope [Colorado] towns like Salida, something like that. So invariably when I would get up in those kinds of audiences and everybody's sitting there half asleep and just heard about all the stream invertebrates and things like that, which they have no ability to even track the conversation. I would just get up and say, introduce

myself as a farm boy and just tell them I was there to give them a little bit of an idea of what I had, and what I knew. Essentially to crack the ice, I'd also start with some sort of a line like, "I've had more intelligent conversations with cattle than half my peers." "And I really like cows because one thing you can do with them, is you can just talk to them and they look at you, they put their ears up and listen, and they don't talk back." And it would always crack the audience up something terrible, and I knew I had them awake. Then you keep your presentation short and you try to make sure you get a couple of very simple points across and it always worked beautifully. And as a consequence of my whole career, I gave probably 240 talks from anything from a keynote at the Society of Conservation Biology meetings, and EESN, and ESA [Ecological Society of America] meeting, and Department of Defense National Resource Council meeting at the Air Force Academy, and down to the lowest level of any grazing associations you can possibly imagine, three or four people in the room. But the key, I think, in all of that was and I offer that to anybody in any profession, is if you don't keep the audience awake, you might as well not even be there. And so I always had a very visually rich presentation and I always tried to break it up very frequently throughout the presentation and fragment it as much as possible, much like reading USA Today or just a book, you know people just can't stay awake all the time, especially right after lunch or late in the day. Anyhow, so I started the riparian stuff, and I know I was working on cows, I had an interest in cows. The first project was set up with the Colorado Division of Wildlife out at their Tamarack Ranch area, which in, it's sort of brackets around Crook, Colorado, on the South Platte River. And we introduced, I convinced and I have no idea how I did this, I convinced CSU Agricultural Department to give me their entire 250 head herd of experimental cattle over at Akron. And I put in ten experimental pastures, five controlled and five grazed, 40-acre pastures and went to winter grazing; I wanted to evaluate winter grazing on riparian areas to see if there was a way to graze riparian areas without doing so much damage to the bird habitats. Well, that worked beautifully, we did it for three years; trucked the cattle back and forth, I paid for the trucks, they gave me the cows, I weighed them before, I weighed them after. And we went on, probably a bunch of papers from that, and I had a fairly large field crew working those bird surveys at the time. And we had a lot of other things going on, had one big flood year, and one that year. And the bottom line of the whole thing was there were two real good bottom lines. One is going when the ground is dry and the grasses are starting to cure, forces the cattle to move from a grazing animal to a detritavor, which means it is now recycling nutrients there and they were not flushed away [in spring runoff], and it's not really tearing up the surface and the root structure because the ground is hard. And the real surprise was that the preferred food item was the cottonwood leaves when they started to fall. So we added crude protein and digestibility contents of the cottonwood leaves, and they were like 10 times more forage quality than anything on the ground. So what we were doing when we were grazing these big

cottonwood riparian areas is grazing when all the "hay" is up in the sky. And if you just wait until the "hay" falls to the ground, you recycle it there and put it right back in the soil. Now that's a fairly major observation in my mind, although it probably just never really got an acknowledgement in the literature or anything, but the fact is it really changed my thinking about grazing, total obliteration of grazing. As I said I always had a less negative view of cattle, and here it was actually a positive.

John C: I assume that the cattle did just fine.

Fritz K: Cattle weights were perfect, yeah, no problem. And the second study I started at the same time, 1980 both of these studies, was the Arapaho National Wildlife Refuge. Gene Patton who was the manager up there at the time; Gene was an old school Minnesota waterfowl biologist. And he said, "You can do anything you want up here, just don't find a ferret." And that's when black-footed ferrets were coming online as an endangered species, and he did have prairie dogs. But Gene was wonderful to work with, just like Jess Low; anything I wanted he just took care of the logistics. If you checked in that's fine, you know let me know what happens someday. So we put up four experimental pastures, he had four experimental pastures he was just getting ready to go into with a new grazing system he wanted to try called a rest rotation system; there's all kinds of grazing systems. But of these he had to have three pastures, in 1981 we added a fourth for control. But these three grazing pastures, he would graze them, every third year he'd graze them really hard with the idea that he could enhance waterfowl nesting cover. Well these pastures didn't have a lot of grass down the riparian, it was mostly sedge and a lot of iris and stuff like that. We did a ten-year cycle of monitoring that grazing that system, and monitoring the bird response to that grazing system. And from that we were able to divide up the entire bird community, we had like 80's, high '80's number of species recorded over the ten years in the riparian area. And we were able to take that bird community and partition it out as to how they respond to grazing versus being sensitive to grazing, being tolerant to grazing, or being somewhere in between or totally intolerant. And we had about three key species in each guild. So out of the 80 species on the refuge, only about 12 were there every year, and I need to get back to that point. But of those twelve they fall out into the four different categories; Yellow Warblers, Song Sparrows, Savannah Sparrows, they could tolerant anything the cows did, didn't bother them a bit. Once you get down into the Willow Flycatchers, and Lincoln's Sparrow, they're very sensitive; any kind of grazing at all in that previous year they just sort of avoid the area. Then there were the intolerant crazy ones down on the fourth pasture we had it in a control, which is actually the old Senator Allard Ranch that was added to the refuge. And those species, like the Veery just did not go into those grazed pastures at all, they were only in the control pastures. So that was very interesting, and it was sort of a guild approach of lumping birds into guild, which is very popular and made by Jared Verner of the Forest Service out of the California about that time. I

called it a response guild, a grazing response guild approach; what it does is it enables you to go into those lower densities, especially sensitive species like the sensitive ones, the stentopic ones and lump their numbers in some sort of field for how birds were responding to the grazing system you're using. The spinoff of that ten years, a lot of papers came out of that, we did a lot of side stuff. I always encouraged my technicians, I always had one or two key technicians, I always encourage them to develop their own projects. Jim Sedgwick did a lot of Willow Flycatcher studies on the Arapaho that ultimately led on to doing flycatcher studies at Malheur National Wildlife Refuge. I had another fellow named Bill Howe, who worked for me for four years, who ultimately went on to become the Nongame Bird Coordinator in Region 2 of the Fish and Wildlife Service after he left here and ran a stint through the bird banding lab. Bill did a beautiful little experimental study we set up to look at nest site selections by Yellow Warblers and cowbird predation relative to that; one of my passions has always been the lack of experimentation in field studies. So what we did is, went in and took a small area and marked all the bushes, found all the nests of Yellow Warblers, banded birds, then went in after the nesting season and cut out that exact bush. Then went back the next year and looked at the next selection, and see how that bush compared to the original one to get some sort of idea of what the birds were really responding to. And that was really fun, and we also did a lot of pattern detection, vegetation pattern detection and monitoring them and plotting of the plots. And it turns out the main thing the birds were responding to on the refuge were the size of the patches of bushes; bushes grow together, they become one bush, the bigger the bush patch, the lower predation rate, and the more successful the birds were and the more attractive the site was. So that was another really fun basic ecological understanding of how the birds were working in that riparian system. So ultimately down the road from that, after I retired in 2006, I still had that 10-year data set with 42,000 bird observations and in 2010 I summarized that into a simplistic table, which is to my knowledge is not available anywhere, but should be on every refuge. I took the number of years in 10 years that each species occurred on the refuge and looked at the distribution of the species, and tried to get some insight into what was driving the bird community on the refuge. So the 80-some species, 82 comes to mind, only 10 of them made up 90-some percent of all individuals, which means any monitoring program out there is recording the same thing over and over and over and it's probably not getting a whole lot of information about what's driving 90% of the curve. So I broke down the others, by year, how many occurred each year and 25% of individuals over a ten-year period were only there once. So that essentially says, that's just vagrants, you could probably throw in the two and three year individuals. So essentially you're managing your refuge for everything that's already there, or nothing that isn't there and that's a philosophical conservation conversation, and some people say if it shows up there's a chance it will colonize eventually so you should be managing for that species, which I would

have a counter argument for. But, as a consequence those species that are 4, 5 and 6 years, those are the ones you want to look at, and identify those species and every one of those were things like green winged teal, or a wader; everything driven by water and less tolerant of water change, not in dry years, not in wet years. And so that becomes the driving force on that refuge, as it is on many refuges, of course. At least there was a quantitative way to look at it and a specific way to identify which species you really wanted to monitor to know how your refuge is doing. So anyway, I put that together and submitted it in 2010 with no fanfare at all. Clait Braun was really excited about it because he had his career working in Colorado and he was editor of the Wildlife Society Bulletin, or Wilson Society Bulletin at that time, and he was really excited about it. And I've sent copies of it to a few other refuges like Kathy Granillo, the current project leader down at Sevilleta National Wildlife Refuge and this is the kind of information that you really need if you want to know what you're talking about as far as the long run. So that was fun. But during the riparian studies in 1985, I asked Jim Sedgwick; my passion had always been shorebirds, I learned about the Mountain Plover. And I asked Jim Sedgwick to show me one, 'cause we drove across the Pawnee National Grasslands every year to get to our Tamarack Ranch studies area. And he showed me one in 1985, in 1986 I decided well I'm just going to wing it on my own here, I'm going to go out and run a bunch of transects, talk to the Forest Service and see if I can run a bunch of transects to see what the population level is. And I drove 128 kilometers of transects on random sections on the pond, and only found nine birds, which is way down from what Walt Graul found in '69 and '70 when he was out there and labeled it sort of the epicenter for breeding in the Mountain Plover. So I sent that report to an area office, which was then in Salt Lake City and never got a response. But in 1986, I went out and did a little more with them, and then by 1990 a fellow named Bob Leachman out of the newer Grand Junction of the Fish and Wildlife Service had jurisdiction and interest in the plover, and he picked up on it. And I started doing a little more plover breeding biology, reprogramming some of my riparian bird money that I had to build up in the Denver Wildlife Research Center. That particular interest blossomed in 1990 to 1994; I was very intensely involved with mountain plover research on Pawnee Grasslands. And then in 1995 the population totally died, and I spent a total of 27 years trying to explain why that population never really came back. And it's a very interesting series of tests given ecological events that involved a lot of history background and understanding the history of the landscape to put it together. And that paper is currently being written right now and will be presented here this year at the American Ornithologists Union Meetings in Estes Park next month. And bottom line was the plover never were on the Great Plains, they moved out there with the Dust Bowl. The first ones historically recorded by John Kirk Townsend about 1834 on the Wyeth Expedition and he didn't see one until he hit Sweet Water River in central Wyoming. Elliot Coues working the Milk River about that same time, a little bit later, 1890, I

think, never saw a plover until he was essentially halfway across Montana. There were no plovers on the Great Plains, they were not even recorded.

John C: Thus they call them the mountain plover.

Fritz K: They call them the mountain plover, originally because you could see the mountain from here, and the mountain from here is the bottom line. And John James Audubon essentially named it the Rocky Mountain Plover based on samples sent back by Townsend, John Kirk Townsend. Even though he himself had never seen one, he named it and he painted it on top of the Continental Divide. And so totally out of habitat and it had kind of a bizarre posture, too, but those kinds of things are history and very interesting themselves, and a side story. So anyway, how the mountain plover got onto the Great Plains is in the Dust Bowl and moved out there. Oh, the other side of that, of the plover thing on the Great Plains, is the prairie dogs; Lewis and Clark Expedition found the first prairie dog in Omaha, Nebraska. Prairie dogs are ubiquitous clear across the Great Plains and nobody has seen a mountain plover in all the subsequent Oregon Trail type travels and all the subsequent Army explorations and such. And plovers love prairie dog towns, they're like big feeding platforms, and they're really attracted to them. So this is really bizarre all of a sudden. And so I put this together in the last couple of years working on the Pawnee Grasslands when they asked me to revisit some of the prairie dog towns out there and see if I could still find plovers and I couldn't, 'cause there were burrowing owls everywhere. And as a consequence, we got the hypothesis now, which we've been able to test and support with data from Steve Dinsmore at Iowa State University, he was one of my last doctorate students, with a 20-year data set showing burrowing, based on some other studies with some of my other people, that we know that burrowing owls are taking young plover chicks. I was able to find one example, and I suspected this for ten years, finally found an example of them taking a chick that was ready to fly at 75 grams. And it turns out the burrowing owl is putting a selective force on recruitment within the plover population, because plovers are attracted to prairie dog towns and then the burrowing owls move on those towns, and the plover does not recognize the burrowing owl is a predator. And neither do the chicks and the chick walks by an owl and the chick is gone. It reduces the survival rate of chicks to fledging from like .25 to .16, which is not quite statistically significant but over a twenty year period, it's biologically disastrous. And essentially that became the mechanism for why the Mountain Plovers pretty much declined on Pawnee National Grasslands and in these other areas where there's a lot of prairie dogs.

John C: Why do think that they came out onto the Great Plains during the Dust Bowl?

Fritz K: They came out onto the Great Plains because of the Dust Bowl because of the removal of vegetation. And they are still on the Great Plains today, on early spring time wheat fields and hay

fields. Essentially the plover on the Great Plains is secure on agricultural fields, they're subject to a lot of nest destruction from sweeping activities and cultivating activities, however that destruction is equivalent to the same destruction they get fox and mammal predation on nests on native range land which they don't nest in a lot, and in prairie dog towns. So it's not additive of mortality, it's almost just comparable. And then when you get into the scenario like in southwest Nebraska and northeastern Colorado where a lot of the wheat fields have dry spots on little rises in the soil. Those become little bare patches in the middle of a wheat field the plovers nest on, which are totally predator-free and are cultivation-free. And so we currently have 200 pairs of mountain plovers in southwest Nebraska that are, in my mind, a secure population even though it's a totally created landscape. And of course wildlife biologists, we are dealing with mostly created landscapes and how we deal with created landscapes and manage them. The mountain plover project evolved, I had my study here in Pawnee, I had Steve Dinsmore work on a PhD and he's continued that for over 20 years of banding up in Montana in Phillips County, on BLM land near the CMR. Had Mike Wunder working in South Park, Colorado on that population, and he and I collectively also managed to do some wintering bird work down in California. That early bird work and wintering birds of plovers was with one my technicians working on the Pawnee with me in the early '90's named Jeff Rupert. And he went down and did the 1993 and '94 California studies for me, and he is now, I think, the head of Wildlife Resources in the Refuges Department in D.C.; a very sharp young fellow and very highly promoted, and has been moving up fairly rapidly. So with that regional approach, and also doing some work in Mexico, and essentially I went everywhere I could find a Mountain Plover; sponsored a master's student, Stan Anderson, the Wyoming Co-opt Unit, Regan Plumb, she did a nice job of trying to put together a statewide survey. And what we were trying to do is come up with the information essential to evaluate the proposed listing of the mountain plover as an endangered, or as a threatened species. And given the support of Ralph Morgenweck, the Regional Director in Region 6 of the Fish and Wildlife Service, his initial financial support and some additional support I got from the U.S. Geological Survey. We had about a six- to eight-year run where we've got all these studies going and we're able to come up with a lot of information to have a strong argument that there are at least 20,000 mountain plovers on the continent, and probably, there were scenarios that would indicate there were not an immediate threat to those, most of those populations. And so the consequence of all of the legal issues associated with trying to list something, the final decision came out warranted but precluded, if I recall correctly. And essentially we used the data, we not only defined the issue as a problem in the first place, but then used data and hard science to resolve the issue to keep the species off any kind of priority listing. Unfortunately that creates enemies in the non-government organizations and they finally have moved on. Some agencies, however, in the Forest Service especially, still place high priority on the Mountain Plover in places where it

really should not be and it's really not a very wise use of conservation dollars in my mind, and it also alienates the public that has other interests and needs, that is their responsibility. So the consequence of all of the plover stuff and my earlier beginnings with pelicans and the plover stuff, I essentially wrote the Birds of North America counts for those two species; pelicans still being the main passion, but plovers are right up there. And to get back to perspectives on where I want to go and how my career evolved, a little more on the philosophical nature. I became very interested in western history, but during the riparian studies for Division of Wildlife on South Platte River. I constantly was bumping into pictures of river with no trees, and is now a gallery forest. And years after working with that and cottonwood regeneration issues, which spawned off into other biologists getting, the vegetation people followed up on it. It turns out the South Platte River was essentially just a sandy wash during the Oregon Trails day and the forests developed and the birds moved across the plains and created hybrid zones and started mixing up the avifauna across the continent and that became very interesting to me. That really spawned the whole diversity conservation thing and how many species do you pack in an area and how we're doing this. And I was coming out of the era of national history when the profession was going into era of very quantitative modeling. And here I was, not only in natural history, I was trying to look at things from regional landscapes when modeling was looking at more and more precise questions, more and more local. So we were going kind of in opposite directions, not that that is not unhealthy, but my perspective was to try to provide the original approach, which I did with the plover which was really key to resolving that political issue. And from there I continued to read on the history of conservation, and really became fascinated with the contributions of George Bird Grinnell and Teddy Roosevelt, and especially as summarized initially in John Reiger book on the origins of American sportsmen. And the impact of Grinnell and just defining, first of all he started the Audubon Societies, essentially he picked Gifford Pinchot to head the Forest Service, he came up with the idea of a Forest Reserve around parks; that's Grinnell's ideas. He came up with the idea of game wardens and with (licenses with fees to fund enforcement, that's Grinnell's ideas. He and Teddy started the Boone and Crockett Club, that's all Grinnell's ideas; Teddy being the hammer, of course, and that's why Teddy's probably our best President ever in conservation, for sure. So that whole scenario led me to just realize what opportunity you have, you have to slam through a door, or blast through a door when you have it because you can't wait for the science to catch up sometimes. So these regional perspectives and these landscape perspectives just became fascinating to me. And from there on, I went to write a number of papers with a co-worker, Fred Samson, who I went to graduate school with and he retired as regional biologist for Region 1 for the Forest Service in Missoula, Montana. And we wrote a number of papers of different levels of diversity, and how to evaluate diversity, and how to interpret it. And really focused on what were the endemic species, the ones

that often go into the endangered species climate, or endangered species political climate that is so disastrously beyond where you can actually work for conservation. And then I got picked up by Jim Clark out of Albuquerque, Region 2 in Fish and Wildlife Service, when he moved to Shepherdstown to the NCTC facility. And for about ten years I would go to his annual refuge manager's workshop and present the biological diversity presentation for half a day, constantly emphasizing the fact that refuges should not be evaluated as something static that is there just to provide a little tiny pocket in a totally broken landscape. It has to be looked at as to what it really contributes to a much larger scale and how do you work towards that scale. In some places, that's very easy, other places it's not easy at all. Obviously it doesn't work very in colonial nesting brown pelicans, like the first refuge. But when that refuge, when that island where those pelicans are moves, then what kind of refuge to you have left, and that all plays into the changing climate issues that we have going on these days now. Basically, I think that it's probably the best career I could have had; I always tell people I was overpaid and I never had a job. And then about 1992 politics came in and U.S. Fish and Wildlife Service researchers were moved to the U.S. Geological Survey, National Biological Survey; new agency. And that was an attempt to monitor and inventory all the biological resources in the country, which have political opposition associated with private lands issues, which are understandable but could have been mediated a lot better. And as consequence to that Tom O'Shea, who is now working with us as bat biologist and a manatee expert, and I were having a conversation one day and he said, "In ten years you won't even be able to find us, we'll be so engrained in the U.S.G.S culture, you won't be able to find us." In fact that's exactly what happened by 2003. At that time I was just starting to wrap up the field side of the plover studies and it was starting to happen. And biologists all a sudden were being regimented into a consulting paradigm as far as their own positions, they had to start bringing in money to support their own salary, which slams in the face of the purpose of government science in the first place, which is supposed to eliminate or remove any outside influence upon the direction of the research which is supposed to be guided internally based on resource and Congressional need per the Economy Act. Well with that process, moving forward from 2003 to 2006, it was obvious that my style of operation and the style of operation of most historic Fish and Wildlife Service biologists, which was to identify resource issue problems that could be of assistance to management and then look for ways to fund that research, not their salaries, just the research, to provide the information to the Service was on the way out. We were told to start trying to look for commercial contracts, other Interior contracts, any place we could find money to support our salary, and an overhead structure that ballooned from 15% to 45% of any money we did bring in. And the bottom line with that was, when I would get a grant to do something in the past they always came in at three to five year stints, and the first year money never came until two months before the end of the year. So the first thing I'd do when I'd get

a new grant was always buy the new truck to last for the entire duration of the project that first year, 'cause that's about how much money I would have the first year is a new truck. And everything worked smoothly, I had my own truck, I could take care of my own truck, I could count on it, and the key was I had the flexibility to go meet with cooperators. The new paradigm was that agencies worked through agencies, you went up the chain of command, chain of command went across and came back down. My paradigm had always been face contact with a key person somewhere where you needed to get into an agency to work with that person; people work with people, agencies don't work with agencies. That and my paradigm was totally frowned upon; in fact it was discouraged to the point of being chastised. And at that point they made it a job and they couldn't pay me enough, and in 2006 I quit. I never in life thought I would retire 'cause I was having so much fun, so that's pretty much the way the ball rolled, and it's a great career. It's great working for conservation.

John C: I've got a couple of questions for you that, when you started working in Colorado, you were working for the Denver Wildlife Research Center. At some point your group at Fort Collins became another entity and was no longer part of the Denver Wildlife Research Center. Do you remember about when that was and anything about why?

Fritz K: We went through a number of administrative transitions, reorganizations is a better way to put it. I probably will miss one. I think we first were combined, with the ecologists from the Denver Wildlife Research Center circa 1988 maybe, were combined with the Western Energy and Land Use Team from another division of the Fish and Wildlife Service, a non-research division. And we created the New Natural Ecology Research Center, Natural Ecology Center that's what it was called. That name lasted about six months, and they decided that conflicted with the Natural Ecology Center in Department of Energy or something like that, Natural Energy Center, the acronym didn't work or something. So they named us the Natural Ecology Research Center, and that name stuck, NERC, stuck for about a couple of years. And then we were moved out Blue Spruce in 1989, maybe, to a McMurry warehouse. And another reorganization occurred in Fish and Wildlife Service and we were renamed the Midcontinent Ecological Science Center to separate us from Northern Prairie Wildlife Research Center, and that separation was never smooth or definitive, and created horrendous problems in bird research especially because the competing territorialities of administrators. Then in 1992, congressional activity resulted in all Interior research being moved to the U.S. Geological Survey, which is really interesting because the U.S. Geological Survey at that time was also on the block to be cut. They decided rather to have; oops I missed one, it was moved, organization called National Biological Survey, separate from Fish and Wildlife and separate from U.S. Geological Survey. The National Biological Survey then became, after about an 18-month existence, a big political hot potato in D.C. between President Clinton and Newt

Gingrich. And it was decided as compromise of sort at some level, which I don't care about, to move, put the National Biological Survey into the U.S. Geological Survey and drop the name, just call it a division; Biological Resources Division. That lasted, again back to the Tom O'Shea conversation, about 10 years. And then we were totally absorbed and totally reprogrammed, and reprogrammed in the consulting mode and therefore outside of traditional government science, and people starting bailing like crazy. And the modern National Geological Survey Biological Resource people don't know the old stories, they're just glad to have jobs, and they are a lot more tolerant of the new consulting paradigm.

John C: Well, thank you very much. And just to finish a little bit on a personal note, you and I worked together over the years. And I always kind of characterize my career as sitting on the fence between research and management, most of my, I think all my jobs basically. And you and your colleagues were always a great assistance to us in refuges and migratory birds and a great pleasure to work with. You probably know this, but Tom O'Shea, who you mentioned, and I were office mates at Northern Arizona for a while. I'm really glad that you agreed to do this interview, it's really important to me to keep you old natural history research guys as part of the Fish and Wildlife Service family and make sure, at least in some small way, your contributions and those of your colleagues are preserved forever. So thank you very much.

Fritz K: Thank you John.

FRITZ L. KNOPF

EDUCATION

B.A.	Biology	Hiram College	1967
M.S.	Wildlife Science	Utah State Univ.	1973
Ph.D.	Wildlife Ecology	Utah State Univ.	1975

PROFESSIONAL EMPLOYMENT

Biological Research Assistant, US Army Research Institute of Environmental Medicine, Natick, Massachusetts, 1969-1970.

Instructor, Departments of Wildlife Science and Instructional Development, Utah State University, 1975-1976.

Assistant Professor, Department of Ecology, Fisheries and Wildlife, Oklahoma State University, 1976-1980.

Wildlife Biologist (Research), USFWS, Denver Wildlife Research Center, 1980.

Acting Chief, Ecology Section, USFWS, Denver Wildlife Research Center, 1981.

Project Leader, Nongame Studies (1982-1984) and **Project Leader, Avian Studies** (1984-1993), USFWS, National Ecology Research Center.

Leader, Vertebrate Ecology Section, USGS Biological Resources Division, Midcontinent Ecological Science Center, 1994-1996.

Senior Scientist, USGS Biological Resources Division, Midcontinent Ecological Science Center/Fort Collins Science Center, 1996-2006.

Ornithological and Ecological Consultant. 2007-present

RESEARCH EXPERIENCE

1967-1968 **The role of social behavior in regulating numbers in a Uinta ground squirrel population.** Funding was by NSF to D. Balph.

1968 **Predation techniques of badgers**. Funded as above**.**

1968

1969 **Water availability relative to the establishment of chukar partridge in Utah deserts**. Funding was by the Utah Division of Wildlife Resources to J. B. Low.

1969-1970 **Respiratory gas exchange by humans at simulated high altitudes.** Activities included reviewing proposals from universities

requesting US Army funding of wildlife research programs.

1972 **Insecticide residues in white pelican eggs.** Funded by USFWS.

1973-1975 **Ecology of colonial nesting by white pelicans.** Funding was through The Welder Wildlife Foundation, Sinton, Texas.

1974-1974 **Avifauna of Gunnison and Cub Islands, Great Salt Lake.**

1975-1977 **An evaluation of the relationship of fish-eating birds to the endangered and sport fish community of Pyramid Lake, Nevada.** Funding was from the Bureau of Indian Affairs.

1976-1978 **Habitats of charadriiform birds relative to desalinization proposals for the Salt Fork of the Arkansas River.** Funding was through the Oklahoma State University Environmental Institute, National Audubon Society, US Fish and Wildlife Service's Ecological Services, and Oklahoma Ornithological Society.

1976-1980 **Range, population status, and habitats of prairie chickens in Oklahoma.** Funding was through the Oklahoma Dep. Wildlife Conservation (Pittman-Robertson Funds), Oklahoma State University Environmental Institute, and the Applications Research Branch of the US Geological Survey's EROS Data Center.

1977-1980 **Competition between cattle and prairie dogs for range forage.** Funding was through the Oklahoma State University Environmental Institute, and US Forest Service's Southern Plains Experiment Station.

1979-1983 **Ecology of migrating American coots in Oklahoma.** Funding was through US Fish and Wildlife Service's Accelerated Research Program for Webless Migratory Gamebirds.

1984-1988 **Ecology of the endangered Yuma Clapper Rail.** A cooperative partnership between FWS Regions 2 and 8, US Bureau of Reclamation's (funding agency) Boulder City Regional Office and Yuma Projects Office, and the Wyoming Cooperative Fish and Wildlife Research Unit. Research was conducted by a postdoctoral associate.

1980-1989 **Conservation and management of riparian vegetation and wildlife assemblages in the western United States.** Major emphases of this program have included studies of vegetation quality as vertebrate habitats, ecological limiting factors for migratory birds using these ecosystems, and impacts of grazing cattle on the systems. Funding was through the FWS' Migratory Birds and Wildlife Resources Programs, with cooperative support from 24 Fish and Wildlife Service offices, 20 interagency offices, 7 private foundations offices, and 16 academic departments.

1985-2006 **Migration ecology of native birds in the western United States.** This effort evaluated the significance of stopover sites to migrating passerine birds in Arizona. Funding ass through Congressional Add-on to FWS' Wildlife Resources Program and Arizona Natural Heritage program.

1988- **Importance of migrational stopover sites to shorebirds**

1994 **on the Great Plains.** This effort examined the ecology and lipid dynamics of shorebirds migrating across the Great Plains. Funding was through NBS base and operating dollars from FWS Regions 2 and 6, and the North American Waterfowl Management Plan.

1988-2006 **Ecology and conservation of biological diversity and native grasslands.** This work was multi agency, multi-regional, and interdisciplinary. Funding was through BRD base funds, FWS, BLM, USFS, Colorado Division of Wildlife, and others. Primary field research developed population monitoring techniques, evaluating habitat quality, monitoring contaminants, describing genetics, and using stable isotopic applications to address conservation issues of the Mountain Plover, a species scheduled for listing under the Endangered Species Act.

ADDITIONAL PROFESSIONAL ACTIVITIES

Editor: Prairie Grouse Symposium, Oklahoma State Univ., 1980.
Wildlife Soc. Bull. vol. 11-13, 1983-1985.
Ecosystem Management. 1996. Springer-Verlag. New York.
Prairie Conservation. 1996. Island Press. Covelo, CA.
Ecology and Conservatio of Great Plains vertebrates. 1997. Ecological Studies 125.

Committee Chair:
Conservation Committee, Wilson Ornithological Society, 1985-1987.
Publications Committee, The Wildlife Society, 1986-1987.
Special Session: "Biological Diversity in Wildlife Management", The Wildlife Soceity and Wildlife Manage. Institute, Charlotte, NC, 1992.
Special Session: "Grassland birds--the quiet crisis" American Ornithologists' Union, Missoula, MT, 1994.
Ad hoc Committee on Advocacy, Society Conservation Biololgy, 1995-1998.
Ad Hoc Committee to Develop a Managing Editor Office. Cooper Ornithol. Soc., 1996.
Publications Committee, Cooper Ornithological. Society, 1995-1999.
Board of Directors Nominating Committee. Cooper Ornithological Society, 2007.

Committee Member:
Publications Committee, The Wildl. Soc., 1982-85.
Publications Committee, Wilson Ornithol. Soc., 1985-87.
Conservation Committee, Cooper Ornithol. Soc., 1985-86.
Editorial Advisory Board, *Wildlife Review*, 1985-1995.
Ad Hoc Committee "The Role of Wildlife Management in Conserving Biological Diversity", The Wildl. Soc. 1989-1991.
Steering Committee, Symposium on Biotic Diversity in the Rocky Mountains, 1991.
Wildlife-livestock Technical Review Committee, The Wildlife Society, 1991-1992.
Pre-Workshop Planning Committee, Partners in Flight Research Working Group, Washington, D.C., 1995
Steering Committee, Soc. for Cons. Biol., Annual meeting 1995.
Publications Awards Committee, The Wildllife Society, 1995-1996.
Scientific Advisory Committee, Colorado Nature Conservancy 1995-present
Homepage Committee, Cooper Ornithological Society, 1996-1997
Advisory Committee, Colorado Natural Heritage Program, 1997.
American Ornithologists' Union Ad Hoc committee on Conservation Priorities for grassland birds. 1998.
Federal Interagency Rangeland Health Committee (BRD representative to BLM/FS/NRCS Memorandum of Understanding), 1998.
Technical Advisory Committee, Platte River Whooping Crane Maintenance Trust, Inc. 1999-2004.

Northern Great Plains Inter-regional Steering Group of USDA Forest Service, 1998.
Sustainable Rangelands Roundtable. USDA Forest Service and Colorado State University. 2001-2006.
Ad hoc Committee on Publications. Cooper Ornithological Society. KKK
Scientific Advisory Board, Rocky Mountain Bird Observatory, 2002.
Program Committee, 3rd International Wildlife Management Congress, Christchurch, New Zealand, 2004.
Chair, Painton Awards Committee. Cooper Ornithological Society. 2007.

Faculty Affiliate:
Dep. Biology, Colorado State Univ.
Dep. Fish & Wildlife Biology, Colorado State Univ.
Dep. EPO Biology, Univ. of Colorado
Dep. Zoology, Univ. of Wyoming

Advisor: Oklahoma State Univ. Chap. The Wildl. Soc., 1976-1978.

Consulting Ornithologist: *World Book Encyclopedia,* 1980-2005.

AWARDS

American Men and Women in Science, 1982-present.
Elective Member, American Ornithologists' Union, 1985.
Certificate of Appreciation, The Wildlife Society, 1986.
Special Achievement Award, US Fish and Wildlife Service, 1986, 1987.
Douglas L. Gilbert Award for Outstanding Professional Achievement in Wildlife Science, 1987.
Special Achievement Award, National Biological Survey, 1994
Superior Accomplishment Award, National Biological Service, 1995.
Elected Fellow, American Ornithologists' Union, 1995.
Certificate of Appreciation, Oklahoma Department of Wildlife Conservation, 1996.
Superior Service Award, USGS, Biological Resources Division, 1996
Certificates of Appreciation (6), U.S. Fish & Wildlife Service, Refuge Management Training Academy, 1994-1999.
Outstanding Alumnae Professional Achievement Award, Utah State University, 1999.
Outstanding People of the 21st Century, 2000-pres.
Certificate of Appreciation. U.S. Fish and Wildlife Service. 2006.
Board of Directors. Cooper Ornithological Society. 2006-2008.

PRESENTATIONS

Invited Papers

Scientific Meetings:

(1) American Meteorological Society. Salt Lake City, Utah. 1973. "Fluctuating levels of Great Salt Lake: implications to island wildlife."

(2) Streamside Symposium, University of Washington. 1987. "Ecological patterning of riparian avifaunas."

(3) Society of Wetland Scientists. Denver, Colorado. 1988. "Riparian ecosystems: more, worth less, and under invasion."

(4) Society for Conservation Biology. Toronto, Ontario. 1989. "Towards a cosmopolitan, continental avifauna." Paper invited as one of 6 in special symposium entitled "Maintaining ecological integrity in a changing world."

(5) The Wildlife Society. Springfield, Illinois. 1989. "Ecological consequences of modulated hydroperiods in the Platte River headwaters." Paper invited as one of 8 in a special symposium entitled "Managing dynamic ecosystems."

(6) Biodiversity of the Rocky Mountains. Fort Collins, Colorado. 1991. "Faunal integrity *vs*. biodiversity along the Rocky Mountain Road."

(7) The Wildlife Society and Wildlife Management Institute. Charlotte, North Carolina. 1992. Invited to develop and chair a special session of the North American Wildlife and Natural Resources Conference entitled "Biological Diversity in Wildlife Management."

(8) Ecological Society of America. Honolulu, Hawaii. 1993. "Grazing riparian bird habitats". Paper invited as one of 9 in a special symposium on riparian ecology and conservation.

(9) Cooper Ornithological Society. Sacramento, California. 1993. "Avian assemblages on altered grasslands." Paper invited as on of 20 in a symposium in honor of the centennial meeting of the Society.

(10) Joint meeting of the Iowa and Minnesota chapters of The Wildlife Society. Albert Lea, Minnesota. 1994. "Conserving biological diversity."

(11) American Ornithologists' Union. Missoula, Montana. 1994. "Why grassland birds?" The introductory presentation to a special session of that meeting addressing the ecology and conservation of grassland birds.

(12) Idaho Chapter of The Wildlife Society. Post Falls, Idaho. 1994. "Conserving biological diversity."

(13) Soil and Water Conservation Society Workshop for Legislators. Washington, D.C. 1995. "Great Plains priorities for the Farm Bill."

(14) Owl Mountain Interagency Ecosystem Team. Walden, Colorado. 1995. "Grazing programs and neotropical migrant birds at Arapaho NWR."

(15) The Nature Conservancy, EPA, and Texas Parks and Wildlife Workshop on Conservation of the Great Plains. Corpus Christi, Texas. 1995. "Nongame bird conservation on grasslands."

(16) Society for Conservation Biology. Fort Collins, Colorado. 1995. Introductory Plenary: "A sense of place: where the Great Plains meet the Rocky Mountains."

(17) Association of Field Ornithologists Grassland Bird Symposium. Tulsa, Oklahoma. 1995. "Natural history and conservation of the Mountain Plover throughout the annual cycle."

(18) The Wildlife Society. Portland, Oregon. 1995. "Putting diversity into conservation."

(19) The Secretary of Interior. Washington, D.C. 1995. "Declining grassland birds." Invited address to technical press in Secretary's Office.

(20) Society for Range Management. Wichita, Kansas. 1996. Symposium Plenary: "Confusion and conservation--biological diversity on the Great Plains."

(21) Joint meeting Colorado Chapters of the Society for Range Management and Society for Soil and Water Conservation. Colorado Springs, Colorado. 1997. "From wildlife management to conservation biology".

(22) Utah Chapter of The Wildlife Society. Provo, Utah. 1997. "Ecology of the Mountain Plover".

(23) The Wilson Ornithological Society. Manhattan, Kansas. 1997. "Biology of plovers".

(24) Cooper Ornithological Society. Albuquerque, New Mexico. 2001. "Breeding biology of the Mountain Plover in Phillips County, Montana.."

(25) The Wildlife Society, Bismarck, North Dakota. 2002. "Prairie Ecosystems: Past, present and future."

(26) The Wildlife Society, Bismarck, North Dakota. 2002. "Understanding biodiversity patterns and losses in North American grasslands".

Seminars and Lectures

(27) San Josè State University. 1975. "Spatial and temporal aspects of colonial nesting in White Pelicans."

(28) Arizona State University. 1975. "Conservation of colonial nesting birds: the case of the White Pelican."

(29) Pennsylvania State University Colloquium in Forest Resources. 1976. "Breeding biology of the White Pelican."

(30) Colorado State University. 1982. "Landsat analyses of prairie chicken habitats."

(31) University of Wyoming Colloquium in Zoology. 1982. "Biology and conservation of the White Pelican."

(32) Colorado State University. 1982. "Adaptive aspects of colonial nesting by White Pelicans."

(33) University of Missouri, Columbia. 1984. "Riparian wildlife conservation."

(34) Virginia Polytechnic Institute and State University. 1985. "Conservation of birds in riparian vegetative associations."

(35) University of Wyoming. 1985. "Technical writing in the wildlife profession."

(36) University of Colorado. 1985. "Drums along the Platte: restless natives and the new immigrants."

(37) FWS Region 1, Refuge Managers Workshop. Malheur National Wildlife Refuge. 1985. "Grazing impacts on terrestrial wildlife in riparian zones."

(38) Public Lands Council. Denver, Colorado. 1985. "Grazing Management Impacts on Riparian Wildlife."

(39) Colorado State University. 1986. "Conserving biodiversity in riparian vegetation."

(40) International Council for Bird Conservation. Kingston, Ontario. 1986. "Conservation of steppe birds in North America." Paper invited as one from each continent in support of the special symposium entitled "Conservation of the world's steppe birds."

(41) University of Idaho Colloquium in Wildlife Resources. 1988. "FWS' riparian research program."

(42) Department of Animal Ecology, Iowa State University. 1989. "Conservation confusion on the Platte River."

(43) Department of Animal Ecology, Iowa State University. 1989. "Advances in research into habitat selection by birds".

(44) Colorado Riparian Association. Gunnison, Colorado. 1989. "Riparian wildlife habitats."

(45) Colorado State University. 1989. "Changing riparian wildlife habitats." Paper invited for training workshop for mid-career professionals from Bureau of Land Management and U.S.D.A., Forest Service.

(46) Western Regional Agricultural Association Coordinating Committee. Fort Collins, Colorado. 1990. "Conserving biodiversity on rangelands: are cows in Colorado's future?"

(47) South Platte River Workshop. Fort Collins, Colorado. 1990. Ecological succession and conservation confusion in the South Platte floodplain."

(48) South Platte River Workshop. Fort Collins, Colorado. 1990. "Grazing the South Platte floodplain--just a matter of timing."

(49) Platte River Workshop. Grand Island, Nebraska. 1990. "Ecological succession and conservation confusion in the Platte River headwaters."

(50) FWS, Region 6 Fish and Wildlife Enhancement workshop. Denver, Colorado. 1990. "Grazing riparian areas."

(51) Colorado State University. 1991. "Riparian wildlife conservation."

(52) U.S.D.A. Forest Service. Denver, Colorado. 1991. "The relationship of the Endangered Species Act to grazing cattle on National Forests." Presentation invited for Washington Office Review of grazing practices within the National Forest System, followed by field review of ecological impacts of grazing upon species of high federal interest.

(53) Native Plant Society. Boulder, Colorado. 1991. "The Russian-olive dilemma."

(54) FWS, Region 6 Nongame Workshop. Denver, Colorado. 1991. "Riparian wildlife conservation in Region 6."

(55) FWS, Region 6 Nongame Workshop. Denver, Colorado. 1991. "Faunal integrity *vs.* biodiversity on the western Great Plains."

(56) Department of Defense Natural Resources Leadership Conference. U.S. Air Force Academy. Colorado Springs, Colorado. 1991. "Riparian ecosystems: critical resources under Russian invasion." Participation requested by The Office of Assistant Secretary of Defense. Washington, DC.

(56) "Institutional challenges in riparian conservation."

(57) Wyoming Riparian Workshop. Laramie, Wyoming. 1991. "Where does the Wyoming Fish and Game go from here." as a workshop summary.

(58) Black-footed Ferret Interstate Coordinating Committee. Denver, Colorado. 1991. "Status of the Mountain Plover".

(59) U.S. Department of Agriculture, Forest Service Region 2 Ecosystem Management Workshop. Denver, Colorado. 1992. "Conserving biological diversity". (Presented at two separate sessions).

(60) Poudre River Trust and Colorado Native Plant Society. Fort Collins, Colorado. 1992. "Potential impacts of Russian-olive naturalization".

(61) U.S. Bureau of Land Management Regional Ecosystem Management Workshop. Grand Junction, Colorado. 1992. "Conservation of biological diversity on BLM lands."

(62) U.S. Fish and Wildlife Service, Region 1 Ecosystem Management Workshop. Corvallis, Oregon. 1992. "Conserving biological diversity."

(63) U.S. Fish and Wildlife Service, Region 2 Refuge biologists' workshop. Albuquerque, New Mexico. 1992. "Conserving biological diversity."

(64) U.S. Fish and Wildlife Service, Region 2 Project Leaders' workshop. Albuquerque, New Mexico. 1992. "Conserving biological diversity."

(65) U.S. Department of Agriculture Forest Service Forest Ecology Research Laboratory. Albuquerque, New Mexico. 1992. "Conservation of grassland birds."

(66) Colorado Riparian Association. Boulder, Colorado. 1993. "Created landscapes and conservation confusion in the South Platte drainage."

(67) Turnbull National Wildlife Refuge. Cheney, Washington. 1993. "Managing Turnbull for biological diversity."

(68) U.S. Fish and Wildlife Service Washington Office Management Assistance Team. Denver, Colorado. 1993. "Conserving biological diversity." Paper presented at Ecosystem Stewardship Planning Workshop for Great Plains and Western State Agency Planners.

(69) Western Governors' Association and U.S. Environmental Protection Agency Region VII. Kansas City, Kansas. 1993. "Conserving the biotic integrity of the Great Plains."

(70) Western Governors' Association and U.S. Environmental Protection Agency. Denver, Colorado. 1993. "Declining grassland birds on the Great Plains."

(71) Colorado Ecosystem Management Working Group. Granby, Colorado. 1993. "Conserving Colorado's biological diversity." Working group consisted of regional directors of all federal agencies with jurisdictions in Colorado and Directors of all Colorado agencies plus representatives of the agricultural and military communities.

(72) U.S. Fish and Wildlife Service Region 6. Denver, Colorado. 1994. "Historical overview of the ecology of the Platte River." Presentation at request of the Regional Director.

(73) U.S. Department of Agriculture Forest Service Region 2. Denver, Colorado. 1994. "Overview of grassland conservation issues." Presentation to the Directorate at the Regional Director's request.

(74) U.S. Department of Agriculture Forest Service Region 1 Ecosystem Management Workshop. Missoula, Montana. 1994. "Conserving biological diversity." Presentation at invitation of Regional Director.

(75) The Nature Conservancy Midwest Regional Office. Minneapolis, Minnesota. 1994. "Conserving biological diversity." Presentation at invitation of Regional Director.

(76) Denver Museum of Natural History and Denver Audubon Society. Denver, Colorado. 1994. "Conservation status of grassland birds."

(77) U.S. Forest Service Nebraska National Forest. Chadron, Nebraska. 1994. "Conserving the integrity of native grasslands." Presentation at request of Forest Supervisor.

(78) U.S. Fish and Wildlife Service Region 3 Ecosystem Management Workshop. Princeton, New Jersey. 1994. "Conserving biological diversity." Presentation at the request of the Regional Director.

(79) Thorne Ecological Institute Ecosystem Management Workshop. Glenwood Springs, Colorado. 1994. "Conserving biological diversity."

(80) The Nature Conservancy Rocky Mountain Regional Office. Boulder, Colorado. 1994. "Conserving biological diversity." Presentation at the request of the Regional Director.

(81) U.S. Fish and Wildlife Service Region 6 Refuge Management Workshop. Valentine NWR, Nebraska. 1994. "Knee-deep in mud: Grazing riparian ecosystems." Presentation at the request of Regional Director.

(82) U.S. Fish and Wildlife Service Region 5 Refuges and Wildlife Workshop. Patuxent, Maryland. 1994. "Conserving biological diversity in the National Wildlife Refuge system." Presentation at request of Regional Director.

(83) Colorado Native Plant Society. Fort Collins, Colorado. 1995. "What birds tell us about changing Colorado landscapes."

(84) Colorado State University Colloquium in Life Sciences. 1994. "From conserving diversity to managing ecosystems. "

(85) Denver Audubon Society. Denver, Colorado. 1994. "Conservation of grassland birds."

(86) National Park Service Regional Workshop on Prairie Dog Management. Denver, Colorado. 1994. "Declining grassland birds and depressed prairie dog populations."

(87) University of Colorado Colloquium in Biology. 1994. "Conserving biological diversity--what Colorado shows the nation."

(88) Oklahoma State University Colloquium in Ecology and Toxicology. 1994. "From conserving biological diversity to ecosystem management."

(89) U.S. Fish and Wildlife Service, Refuge Management Training Academy. Charleston, South Carolina and Shepherdstown, West Virginia. Annually, 1994-1998. "Conserving Biological Diversity."

(90) California Field Office, U.S. Fish and Wildlife Service. Sacramento, California. 1997. "California's biological diversity: conservation and management."

(91) University of Nebraska Center for Grassland Studies Colloquium. Lincoln, Nebraska. 1997. "Conservation of vertebrate diversity on the Great Plains". (91) "History, Ecology and conservation of grassland birds".

(92) Oklahoma State University. Stillwater, Oklahoma. 1997. "Conservation of grassland birds on the Southern Great Plains".

(93) University of Wyoming Colloquium. Laramie, Wyoming. 1997. "Conserving biological diversity".

(94) University of Missouri Colloquium. 1997. “Conserving the vertebrate diversity of the Great Plains”. Also a second lecture: (95) “Biology and conservation of Mountain Plovers”

(96) North Dakota/Minnesota joint meeting of The Wildlife Society, Fargo, ND, 1998. Invited plenary “Great Plains, Great Prairies, and Conservation.”

(97) Prairie Conservation and Endangered Species Conference. Saskatoon, Saskatchewan. 1998. Invited plenary “From Biological Diversity to Ecosystem Management: The Case of the Great Plains”

(98) Colorado Bird Observatory, Thornton, Colorado. 1998. “Ecology and Conservation of the Mountain Plover”.

(99) Prairie and Plains Audubon Society, Greeley, Colorado. 1998. “The Mountain Plover”

(100) Colorado State Office and Western Regional Office, The Nature Conservancy, Boulder, Colorado. 1998. “Conservation of grassland birds”.

(101) Murie Audubon Society, Casper, Wyoming. 1999. “Status and ecology of the Mountain Plover”

(102) Laramie Audubon Society, Laramie, Wyoming. 1999. “Status and ecology of the Mountain Plover”

(103) South Platte Forum, Ft. Collins, Colorado. 1999. “Ecology of the Mountain Plover”.

(104) Nebraska Ornithological Union. 2000. Banquet Speaker:”Bird conservation in western Nebraska landscapes.”

(105) Fort Collins Library Association. 2001. “Coming to Colorado—rediscovering birds and landscapes.”

(106) Fort Collins Kiwanis. 2001. “Coming to Colorado—rediscovering birds and landscapes.”

Offered Papers before Scientific Societies

(107) Oklahoma Academy of Science. Oklahoma City, Oklahoma. 1978. "Ecology of charadriiform birds nesting at Salt Plains NWR."

(108) Oklahoma Academy of Science. Stillwater, Oklahoma. 1979. "Current range and distribution of lesser prairie chickens in western Oklahoma."

(109) Oklahoma Academy of Science. McAllister, Oklahoma. 1980. "On the hatching interval of white pelican eggs."

(110) Colorado Chapter of The Wildlife Society, Fort Colllins, Colorado. 1981. "Landsat analysis of wildlife habitats."

(111) Cooper Ornithological Society. Utah State University. 1982. "Quantifying prairie chicken habitats with Landsat imagery analyses."

(112) Cooper Ornithological Society. Utah State University. 1982. "Habitat relationships of migrating American Coots and waterfowl in Oklahoma."

(113) Wilson/Cooper Joint Ornithological Societies. University of Colorado. 1985. "Changing landscapes and the cosmopolitism of the eastern Colorado avifauna."

(114) American Ornithologists' Union. Tempe, Arizona. 1986. "Cavity-nesting birds and the cavity resource in cottonwood bottomlands."

(115) Cooper Ornithological Society. Snowbird, Utah. 1987. "Responses of breeding birds to a catastrophic, climatological event."

(116) Wilson Ornithological Society. Utica, New York. 1987. "Cavity-nesting birds in a cottonwood floodplains: habitat relationships and nest site characteristics."

(117) Colorado Chapter of The Wildlife Society. Fort Collins, Colorado. 1987. "Cows and cottonwoods at Crook."

(118) Society for Conservation Biology/American Institute of Biological Sciences. Davis, California. 1988. "Conserving diversity in riparian corridors."

(119) Cooper Ornithological Society. Moscow, Idaho. 1989. "Scale perspectives on habitat selection by shrubsteppe birds."

(120) Society for Conservation Biology. Madison, Wisconsin. 1991. "Shorebird conservation in dynamic landscapes: at what scale?"

(121) Wilson Ornithological Society. Norman, Oklahoma. 1991. "Cavity turnover and equilibrium cavity densities in a cottonwood bottomland."

(122) American Ornithologists' Union. Missoula, Montana. 1994. "Residency patterns of migrating shorebirds at a midcontinent stopover."

(123) The Wildlife Society. Albuquerque, New Mexico. 1994. "Does the myth of Amazonian forest diversity include North America?"

(124) The Wildlife Society. Albuquerque, New Mexico. 1994. "Conservation crisis of grassland birds".

(125) Cooper Ornithological Soceity. Albuquerque, New Mexico. 2001. "Population genetics of the Mountain Plover."

(126) Cooper Ornithological Soceity. Albuquerque, New Mexico. 2001 "Breeding biology of the Mountain Plover in South Park, Colorado."

(127) Colorado Chapter of The Wildlife Society, Colorado Springs, Colorado. 2001. "A disjunct population of Mountain Plovers breeding at high elevation in Colorado."

(128) The Wildlife Society. Bismark, North Dakota. 2002. "Nest survival models for birds."

Presentations at Technical Conferences, Workshops, etc.

(129) Great Plains Agricultural Council. Tulsa, Oklahoma. 1978. "The utilization of tree plantings by Mississippi Kites in Oklahoma and Kansas."

(130) Prairie Grouse Technical Council. Wisconsin Rapids, Wisconsin. 1979. "Status of Oklahoma's prairie chicken studies."

(131) Prairie Grouse Symposium. Oklahoma State University. 1981. "Distribution and status of greater prairie chickens in Oklahoma."

(132) Prairie Grouse Symposium. Oklahoma State University. 1981. "Distribution and status of lesser prairie chickens in Oklahoma."

(133) Prairie Grouse Symposium. Oklahoma State University. 1981. "Concluding comments."

(134) North American Wildlife and Natural Resources Conference. Portland, Oregon. 1982. "Towards a diversity ethic for wildlife management."

(135) Wildlife-livestock Relationships Symposium. Coeur d'Alene, Idaho. 1982. "Structural resilience of a willow riparian community to changes in grazing practices."

(136) Midwest Wildlife Conference. Wichita, Kansas. 1983. "Chronology of migration by American coots."

(137) International Riparian Conference. University of Arizona. 1985. "Significance of riparian vegetation to breeding birds across an elevational cline."

(138) Wetlands and Wildlife Symposium. U.S.D.O.E. Savannah River Ecology Laboratory. Charleston, South Carolina. 1986. "Alternate pathways of succession in a riparian area".

(139) Wetlands and Wildlife Symposium. U.S.D.O.E. Savannah River Ecology Laboratory. Charleston, South Carolina. 1986. "Demography, regeneration, and future projections for a bottomland cottonwood community"

(140) U.S.D.A. Forest Service Special Symposium on "Managing Amphibians, Reptiles and Small Mammals on Public Lands", Flagstaff, Arizona. 1988. "Small mammal responses to the introduction of cattle into a cottonwood floodplain"

(141) U.S.D.A. Forest Service Special Symposium on "Managing Amphibians, Reptiles and Small Mammals on Public Lands", Flagstaff, Arizona. 1988. "Patterns of relative diversity of small mammals within the Platte River Headwaters"

(142) Biodiversity of the Rocky Mountains. Fort Collins, Colorado. 1991. "Transitory populations in dynamic landscapes: the example of migrating shorebirds."

(143) North American Wildlife and Natural Resources Conference. Charlotte, North Carolina. 1992. "Focusing conservation of a diverse wildlife resource"

(144) North American Wildlife and Natural Resources Conference. Charlotte, North Carolina. 1992. "Faunal mixing, faunal integrity, and the hierarchal approach to conserving diversity."

(145) Sustainable land management for the 21st century. Lethbridge, Alberta, Canada. 1993. "Indicators for sustainable land management.

(146) International symposium on cowbird ecology and management. Austin, Texas. 1993. "The role of vegetation in cowbird parasitism of Yellow Warblers."

(147) North American Wildlife and Natural Resources Conference. Anchorage, Alaska. 1994. " A framework to conserve biological diversity through sustainable land management."

(148) Concepts and methods of ecosystem management. Stevens Point, Wisconsin. 1994. "Wildlife management as ecosystem management."

(149) International symposium on grassland birds. Tulsa, Oklahoma. 1995. “Biology of the Mountain Plover through the annual cycle.”

(150) Oklahoma Biodiversity Conference. Oklahoma City, Oklahoma. 1996. "An introduction to the conservation of biological diversity." Invited plenary.

(151) The Wilson Ornithological Society, Manhatten, Kansas. "Biology of the Mountain Plover."

(152) The Wildlife Society. Snowmass, Colorado. 1997. "Annual biology of the Mountain Plover".

(153) The Wildlife Society. Snowmass, Colorado. 1997 "Organophosphate and carbamate exposure and possible cholinesterase (ChE) inhibition in wintering Mountain Plovers"

(154) The Wildlife Society. Snowmass, Colorado. 1997 "Conservation insights from ecological barriers"

(155) The Environmental Defense Fund. Chicago, Illinois. 2001. Member, Blue Ribbon Panel for Grassland Conservation ammendments to The Farm Bill.

(156) USGS Workshop on defining 30-year research vision for Great Basin Shrubsteppe birds. Boise, Idaho. 2001 "Stable isotope technology."

(157) The National Wildlife Federation. Loveland, Colorado. 2002. "Conserving Western Great Plains Ecosystems"

(158) The Nature Conservancy. Loveland, Colorado. 2002. "Review of the Mountain Plover: biology, conservation, and politics."

(159). Fourth International Conference on the Applications of Stable Isotope Techniques to Ecological Studies. Wellington, New Zealand. 2005. Avian migration: pitfalls and promises of isotope tracers.

(160) Geographic structure and dynamics in Mountain Plover. 2007. American Ornithologists' Union. Laramie, Wyoming.

PUBLICATIONS:

Knopf, F. L. and D. F. Balph. 1969. Badgers plug burrows to confine prey. Journal of Mammalogy 50:635-636.

Knopf, F. L. 1974. Fluctuating levels of Great Salt Lake: effects on island wildlife. Proc. Utah Academy of Science, Arts, and Letters 51(2):34-41.

Knopf, F. L. and J. B. Low. 1974. Current activities of the Utah Cooperative Wildlife Research Unit. Utah Audubon News 26:10-11.

Knopf, F. L. and J. C. Street. 1974. Insecticide residues in White Pelican eggs from Utah. Wilson Bulletin 86:428-434.

Knopf, F. L. 1975. Schedule of presupplemental molt of White Pelicans with notes on the bill horn. Condor 77:356-359.

Knopf, F. L. with J. S. Flannery. 1975. The treasure of Gunnison Island. Westways 67(10):34-37.

Knopf, F. L., J.B. Low, and W. H. Behle. 1975. Management recommendations for the White Pelican population on Gunnison Island, Utah. Utah Cooperative Wildlife Res. Unit Special Report No. 32. 10pp.

Knopf, F. L. 1976. Ancient Murrelet in Utah. West. Birds 7:27.

Knopf, F. L. 1976. A pelican synchrony. Nat. Hist. 85(10):48-57.

Knopf, F. L., M. L. Wolfe, and R. W. Haider. 1976. Game birds and mammals: an individualized instruction package. Departments of. Wildlife Science and Instructional Development, Utah State University 72pp.

Knopf, F. L. and V. C. Bachman. 1977. The birds of Gunnison and Cub Islands, Great Salt Lake. Great Basin Naturalist 37:247-251.

Knopf, F. L. and D. F. Balph. 1977. Annual periodicity of Uinta ground squirrels. Southwestern Naturalist 22:213-224.

Knopf, F. L. and J. L. Kennedy. 1978. Potential impact of White Pelicans and Double-crested Cormorants on cutthroat trout and cui-ui in Pyramid Lake. Pages 459-468 in W. F. Sigler and J. L. Kennedy, eds. Pyramid Lake Ecological Study. W. F. Sigler & Assoc., Inc. Logan, Utah. 545pp.

Love, D. and **F. L. Knopf**. 1978. The utilization of tree plantings by Mississippi Kites in Oklahoma and Kansas. Great Plains Agricultural Council 87:70-78.

Knopf, F. L. 1979. Spatial and temporal aspects of colonial nesting of White Pelicans. Condor 81:353-363.

Knopf, F. L. 1979. Status of Oklahoma's prairie chicken studies. Proceedings Prairie Grouse Technical Council 13:3 (Abstract).

Altmann, R. W., **F. L. Knopf**, and R. D. Murnan. 1979. Habitat management for Oklahoma's prairie chickens. Oklahoma State University Extension Facts No. 9004. 4pp.

Cannon, R. W. and **F. L. Knopf**. 1979. Lesser Prairie Chicken responses to range fires at the booming ground. Wildlife Society Bulletin 7:44-46.

Tait, I. C., **F. L. Knopf**, and J. L. Kennedy. 1979. White Pelicans nesting at Honey Lake, California. Western Birds 9:38-40.

Knopf, F. L. 1980. On the hatching interval of White Pelican eggs. Proceedings Oklahoma Academy of Sciences 60:26-28.

Knopf, F. L. 1980. Concluding comments. Pages 87-89 in P. A. Vohs and F. L. Knopf, eds. Prairie Grouse Symposium. Oklahoma State University Press. Stillwater. 89pp.

Knopf, F. L. and J. L. Kennedy. 1980. Foraging sites of White Pelicans at Pyramid Lake. Western Birds 11:175-180.

Cannon, R. W. and **F. L. Knopf**. 1980. Distribution and status of Lesser Prairie Chickens in Oklahoma. Pages 70-74 in P. A. Vohs and F. L. Knopf, eds. Prairie Grouse Symposium. Oklahoma State University Press. Stillwater. 89pp.

Martin, S. A. and **F. L. Knopf**. 1980. Distribution and status of Greater Prairie Chickens in Oklahoma. Pages 65-69 in P. A. Vohs and F. L. Knopf, eds. Prairie Grouse Symposium. Oklahoma State University Press. Stillwater. 89pp.

Vohs, P. A. and **F. L. Knopf**. 1980. Prairie Grouse Symposium. Oklahoma State University Press. Stillwater. 89pp.

Knopf, F. L. and R. W. Cannon. 1982. Structural resilience of a willow riparian community to changes in grazing practices. Pages 198-207 in J. M. Peek and P. D. Dalke, eds. Wildlife-livestock relationships symposium. Proceedings10, University of Idaho Forestry, Wildlife and Range Experiment Station. Moscow, Idaho. 614pp.

Knopf, F. L. and J. L. Kennedy. 1981. Differential predation by two species of piscivorous birds. Wilson Bulletin 93:554-556.

Knopf, F. L. and B. A. Knopf. 1981. Index to volume 45. Journal of Wildlife Management 45:1087-1105.

Cannon, R. W. and **F. L. Knopf**. 1981. Lesser Prairie Chicken densities on shinnery oak and sand sagebrush rangelands in Oklahoma. Journal of Wildlife Management 45:521-524.

Cannon, R. W. and **F. L. Knopf**. 1981. Lek numbers as a trend index to prairie chicken populations. Journal of Wildlife Management 45:776-778.

Martin, S. A. and **F. L. Knopf**. 1981. Aerial survey of Greater Prairie Chicken leks. Wildlife Society Bulletin 9:219-221.

Cannon, R. W., **F. L. Knopf**, and L. R. Pettinger. 1982. Use of Landsat data to evaluate Lesser Prairie Chicken habitats in western Oklahoma. Journal of Wildlife Management 46:915-922.

Grover, P. A. and **F. L. Knopf**. 1982. Habitat requirements and breeding success of charadriiform birds nesting at Salt Plains National Wildlife Refuge, Oklahoma. Journal of Field Ornithology 53:139-148.

O'Meilia, M. E., **F. L. Knopf**, and J. C. Lewis. 1982. Some consequences of competition between prairie dogs and cattle for range forage. Journal of Range Management 35:580-585.

Samson, F. B. and **F. L. Knopf**. 1982. In search of a diversity ethic for wildlife management. Transactions North American Wildlife and Natural Resources Conference 47:421-431.

Knopf, F. L. 1983. Returns of transplanted Pine Siskins released as singles or in flocks. Journal of Field Ornithology 54:67-71.

Knopf, F. L. 1983. Review of: A definitive system for analysis of grizzly bear habitat and other wilderness resources by John J. Craighead, J. S. Sumner and G. B. Skaggs. Journal of Wildlife Management 47:1248-1249.

Knopf, F. L. and B. A. Knopf. 1983. Flocking pattern of foraging American Crows in Oklahoma. Wilson Bulletin 95:153-155.

Knopf, B. A. and **F. L. Knopf**. 1983. Index to volume 47. Journal of Wildlife Management 47:1258-1276.

Knopf, F. L. 1984. Russian-olive may enhance wildlife habitat in riparian zones of western U.S. U.S. Fish and Wildlife Service Research Information Bulletin 84-28. 2pp.

Knopf, F. L. 1984. Impacts of seasonal grazing on willow riparian communities. U.S. Fish and Wildlife Service Research Information Bulletin 84-72. 2pp.

Knopf, F. L. and T. E. Olson. 1984. Naturalization of Russian-olive: implications to Rocky Mountain wildlife. Wildlife Society Bulletin 12:289-298.

Cannon, R. W. and **F. L. Knopf**. 1984. Species composition of a willow community relative to seasonal grazing histories in Colorado. Southwestern Naturalist 29:234-237.

Knopf, F. L. 1985. Review of: Species of special concern in Pennsylvania by H. H. Genoways and F. J. Brenner. Wildlife Review 197:557.

Knopf, F. L. 1985. Review of: A Dictionary of Birds by B. Campbell and E. Lack, eds. Wildlife Review 198:515.

Knopf, F. L. 1985. Significance of riparian vegetation to breeding birds across an altitudinal cline. Pages 105-111 in R. R. Johnson, C. D. Ziebell, D. R. Patten, P. F. Ffolliot, and R. H. Hamre (tech. coords.). Riparian ecosystems and their management: reconciling conflicting uses. First North American Riparian Conference. U.S. Forest Service General Technical Report RM-120. 523pp.

Knopf, F. L. 1985. Establishing priorities for riparian habitat conservation and enhancement programs in western states. U.S. Fish and Wildlife Service Research Information Bulletin 85-91. 1p.

Eddleman, W. R. and **F. L. Knopf**. 1985. Determining age and sex of American Coots. Journal of Field Ornithology 56:41-55.

Eddleman, W. R., **F. L. Knopf**, and C. T. Patterson. 1985. Chronology of migration by American Coots in Oklahoma. Journal of Wildlife Management 49:241-246.

Eddleman, W. R., C. T. Patterson, and **F. L. Knopf**. 1985. Interspecific relationships between American Coots and waterfowl during fall migration. Wilson Bulletin 97:463-472.

Love, D., J.A. Grzybowski, and **F. L. Knopf**. 1985. Influence of various land-use practices on windbreak selection by nesting Mississippi Kites. Wilson Bulletin 97:561-565.

Knopf, F. L. 1986. Changing landscapes and the cosmopolitism of the eastern Colorado avifauna. Wildlife Society Bulletin 14:132-142.

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