

Name: David Klein
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Interviewer: Karen Brewster

Brief Summary of Interview: In this transcript, Mr. Klein is talking about wildlife management and management policies, and discusses how politics came into play in certain instances involving the oil industry and the university under different governors. He also shares a few stories about colleagues and students that he had while working for the wildlife unit.

KAREN BREWSTER: Today is August 28, 2014 and this is Karen Brewster with Dave Klein continuing to talk about Dave's life. So last time we kind of left off you were just starting to talk about, sort of, the philosophies of wildlife management, and management policies that have happened in this state off and on. So maybe we'll start with that.

DAVID KLEIN: Yeah. Okay. And I've done -- sort of talked to Alaska Chapter of the Wildlife Society. At times, I did a -- a few years ago they wanted me to give a talk on the transition between territorial system versus the state system after statehood. And since I worked for the territorial government as a wildlife biologist after I had finished a master's degree and then put my one year in the Army during the Korean War, then I got this job to work mainly with deer, deer management and ecological studies based in Petersburg, but I worked throughout southeast Alaska. In those days, the job of the biologists -- well, there was -- I was the only biologist, strictly biologist, in wildlife in all of southeast then. But my focus was understood to be mainly on the deer because that was mainly what was being hunted among terrestrial wildlife. But I occasionally did a little work with the moose on the Stikine River, which was aerial surveys sometimes. And then that work included hunter surveys to find out what sex and age deer that were being killed by the hunters, and use that to try to extrapolate the sex and age of the population. But then I started -- I initiated some studies of the habitat, the vegetation that was important, especially winter habitat, but also summer habitat. I was fascinated by habitat relationships and at that time the management of wildlife in Alaska was -- the biologists and game wardens were all federal employees. And technically we were working for the territorial government. But since it was a territory, the federal government had responsibility for management, so it was the Fish and Wildlife Service that we were working for. It was that branch called the Bureau of Sport Fisheries and Wildlife, I think, the branch of the Fish and Wildlife Service. They had federal aid through wildlife restoration funding, which was part of the Pittman-Robertson legislation, congressional legislation that portions -- money from a tax on firearms and ammunition that then went to the federal government. And then the federal government apportioned that to the states on the basis of the size of the state. In other words, how much wildlife habitat they had, but also on the number of hunting licenses sold per state, so it was population-based, too.

So it was a formula that included area of the state plus, or territory in this case, and then human population. But it was how many hunting licenses sold was the human population thing. So that meant states like New York with a huge population and not as big an area as Texas or Alaska, they qualified for the full amount. And Texas and Alaska qualified for the full amount because we had such a large land area. And so, I think California also qualified, but other states didn't qualify for as much as Alaska did. So it was certainly a good deal for Alaska, because we had a low population and a relatively low population of hunters because there were not that many people in Alaska, but we had a lot of wildlife habitat. And so, federal government focused on management. Did include habitat work, partly because the waterfowl studies, which were migratory birds were under the federal government anyway, and stayed with them even after statehood. But they were interested in the wetland habitats from the standpoint of wildlife. And then at the University, the Cooperative Wildlife Research Unit was focused heavily on wetland communities, partly because the head of the program at that time, my advisor was John Buckley who was trained with a PhD from the University of New York at Syracuse, I think. And he studied the wetland habitat. Waterfowl, furbearers that were wetland types. So here when we didn't have -- the Cooperative Unit didn't have a lot of support money from the state. They had some from Fish and Game, not Fish and Game, from the territorial government, but it was minuscule. It was like about 15,000 a year, and that was divided into maybe three stipends of 5,000 a year per. Or maybe it was more than three because they didn't pay much for graduate students.

KAREN BREWSTER: Those were, yeah, student stipends.

DAVID KLEIN: Yeah, student stipend. At any rate, the unit leader's idea was to focus heavily on Minto Flats, because it was such a short distance from Fairbanks and they had a cabin that had been built out there. And they did studies of waterfowl, including work with Brina Kessel who was a new faculty member then and she was trained as an ornithologist. So she could work and advise students on waterfowl studies. But then Buckley would advise students on furbearers and that included marten and mink and beaver. There were several early theses on beaver, but not only on the Minto Flats beaver there but also in the Chena River. The upper Chena River there's a lot of beaver as there are now and Chatanika, as well. So there was a heavy emphasis on those species. And I was one of the outliers that had become fascinated with hoofed animals and especially alpine. So I did my master's degree on mountain goats. But I worked for one of the Fish and Wildlife biologists who was focusing on mountain sheep. And so I worked for him and had a lot of good experience in alpine areas. And I sort of fell in love with alpine environments and the animals that existed there. So at any rate, an opportunity to get a job was unique at that time, there wasn't a lot of money for this. And the transition from having biologists working in the field was sort of a new phenomenon after the Second World War. Before that, you know, it was always the game wardens were supposed to make some kind of estimates of what populations were doing. So hunting seasons were based upon what hunters thought was the situation, rather than any hard data because no one was doing any studies.

KAREN BREWSTER: And the game wardens were not necessarily biologists, they were just out there?

DAVID KLEIN: They were law enforcement people, but they also had Predator and Rodent Control people who were controlling animals that were thought to be detrimental to the interests of residents of Alaska. And that included wolves, coyotes, and seals. And even eagles were unprotected until about 1947 or '48. Not only unprotected but there was a bounty on them, and you could get like 50¢ or so for a pair of eagle feet. Maybe it was more than that, but not more than a dollar and a half at the most. So eagles, even though it was considered the national bird and was given protection in other states earlier and then finally nationally, they were given protection I think around 1948, something like that. But the Predator and Rodent Control people were poisoning wolves in the wintertime by killing seals and putting strychnine baits in the seals, in some blubber, seal blubber. Pills, strychnine pills. Then putting those in the carcasses and scattering them around. In the wintertime, in theory, the bears were in hibernation, so bears wouldn't be attracted to these. And then they were dropping these baits on lakes when they're frozen in the winter down in southeast Alaska and the wolves would be attracted to them. They'd be loaded with all kinds of smelly herring and rotten herring and stuff that would attract the wolves out there. And the theory was, and it was a pretty reasonable theory, if you wanted to kill wolves, this was the way to do it and you could be -- Frequently, the wolves would die before they get off of the ice so you could spot them from the air, then maybe land on the ice and pick up the carcasses.

KAREN BREWSTER: Now they were doing this with seals to increase the salmon population?

DAVID KLEIN: No, the seals were not protected in Southeast but they did start controlling seals in some areas because the seals were taking -- It was mainly the seals were -- when the salmon were running up to the big rivers like the Stikine and the Copper River, the seals would aggregate and take salmon out of the nets of the drift netters, which was frustrating. Of course, some of the drift netters, fishermen, would've been happy that all the seals would be killed. But they would -- it was mainly to stop -- they wanted the seals to be reduced or frightened away. They tried frightening them away with explosive charges. That didn't work very well during the salmon fishing season. So then, they also would harass the seals just before the salmon arrived when they were hauled out on an offshore sand spit. And so the seals would go in the water and then they'd drop explosive charges in the water that would create concussions and kill the seals. That was the technique for killing seals that were aggregating around those entrances to the rivers. And then they finally passed a law, put a bounty on seal's scalps, of seals. And this was the territorial legislature that did this. And this lasted into statehood, and I don't know the exact timing of all this. But also those Natives on the North Slope who ate seals on a regular basis and they said that this was discrimination against them because they couldn't sell the scalps of the seals they killed to eat. And so they did extend the bounty onto the seals, which then it was obvious it wasn't a bounty at all, it was a welfare program for the Natives. But this was after statehood. It only lasted for a few years and then finally all the bounties were eliminated. But it was an era where you killed

everything that killed salmon, with the exception of bears. And especially brown bears were so valuable for sport hunting and there were a lot of guides that lived in these Southeastern communities that were sometimes fisherman part of the year, but they also guided hunters and brought in thousands of dollars a year for them through this guided hunting. And so the bears were protected even though it was known that some of the troll fishermen, particularly, who trolled close to shore in their boats, they didn't like bears because they ate salmon, and they were fishing for salmon. Some of them were violating the law by just shooting bears on the beach that they'd see on the beach and not recovering them at all. So it was difficult to enforce that because it was just bears were bad because they ate salmon mentality. And it was the same with eagles for a while until they finally were given protection. And it wasn't until many years later that there started to be an appreciation for the fact that the salmon were dying. Many of the salmon that were taken by bears or eagles were already spawned out, but not necessarily all of them. But then the bears and eagles and other birds, gulls, were scattering these carcasses and were eating them themselves and then passing on the nutrients through their feces as they moved around through the landscape. And so, then it wasn't until the 1990's that there were stable isotope studies showing that the nutrients from the salmon, the marine nutrients, were brought up. And the Pacific salmon were unique in this regard. After they spawned, they died and left those nutrients there in the north. And whether the nutrients were passed through bears and gulls and eagles, or whether they just decomposed along the beach, on the banks of the streams, the nutrients went back into the stream or into the vegetation by the streams or was spread around and even the deer were moving by eating the vegetation close to the streams, were moving it around. The whole watersheds were being fertilized by these salmon. Pacific salmon are unique in this regard. The Atlantic salmon don't do that, and they go back and spawn again. So this value was overlooked. And a lot of the -- even with the commercial fisheries biologists felt that if too many salmon escaped to spawn, that was bad. This was waste and you could get too many and it might destroy the eggs to have too many decomposing salmon there. And, of course, the salmon evolved doing this and evolved this relationship and created very nutrient rich streams and watersheds that otherwise wouldn't have existed as such. I mean a sterile stream when a glacier recedes is not very productive until salmon get in it and start bringing nutrients in and build up runs and eventually the whole system benefits from the salmon. And this still today, a lot of people don't appreciate how important salmon are. And that means you've got to maintain the populations to continue to bring in these nutrients on an annual basis. So it's a case of not understanding how nutrients affected both the salmon, and the young salmon that hatched and had to feed in these streams before they went to sea, and the insects they were eating were more available because of the nutrients from the decomposing salmon. But it's an example of how habitat is not appreciated. And it's easier to understand in the case of the marine environment with a species like fish, where it's hard to understand what's going on in the marine environment because we're air breathers and it's very difficult to get information on what's going on in the water column. So you can't have ships and submersibles everywhere and studying this, and it's just too costly to get that. So you manage the commercial fish on the basis on the number of fish that you think that are going to be coming back each year. And you may be able to do some estimates as fish are coming into the river systems for the long rivers like the Yukon and Kuskokwim. It'll give you an

idea of how many are going to come through and then you set the seasons and bag limits on that basis, rather than on how many fish were actually successfully produced, how many eggs hatched successfully and young survived and they went to sea. And then the problem, of course, for commercial fisheries, when it comes to salmon, is who has major responsibility for the salmon? It's split between the National Marine Fisheries Service and NOAA, National Oceanic and Atmospheric Administration. And they're responsible technically for the salmon as a marine fish. And then how do you avoid catching them when you don't want them to be caught along with other fish? So by-catch. But they don't have any control over what's happening in the river systems and streams where they're spawning. And then the state, through the state of the Fish and Wildlife Service, or the Alaska Department of Fish and Game, after statehood, I mean their job only was restricted to the salmon in territorial waters and in the streams. So basically, the streams and then they could blame -- things were not looking good, they could blame it on what was happening in the marine environment and it was the federal government's responsibility there. And the federal government was sort of acting in a similar fashion that the runs were going down, it was because the state was not gathering information on successful escapement, successful spawning, and successful rearing of the young salmon. And so it was the habitat that was being ignored. Well, going to the terrestrial environment where I was working with deer primarily in southeast Alaska, we did studies on bears on Admiralty Island trying to determine how many there were and what effect they were having on the salmon population. But part of our study showed that there weren't just a few bears, there were a lot of bears and that they -- during the salmon runs, they didn't move around between streams, they stayed on given streams. And they were part of -- they were connected to the salmon and the salmon were connected to the bears by the nutrients that bears were spreading around. So -- and even if you just argued that the salmon attracted the bears and the bears could be hunted and big money made from them by guide outfitters. And so the bears were protected with open seasons and bag limits, etc. But what happens with transition from federal government with regard to the work I was doing with deer is that I was encouraged to investigate what was required for deer to survive tough winters. And was there significant winter forage, were they having a significant impact on the winter forage? The browse that they were feeding on was mostly blueberries in extreme conditions. But there were other food available. If there wasn't much snow, there was a lot of food available on the forest floor, dwarf dogwood and other species that we just -- We didn't pay much attention to what deer were eating. And so I started getting into studies of what deer were eating and what effect were deer having on the vegetation. And started building enclosures for one thing. That was very difficult to assess populations because it was a rain forest then and you can't see the deer very readily. You can go into the woods, but you don't know how many you're seeing versus how many you're not seeing. And even when the snows would get very deep and the deer were forced down on the beach, there would be -- we didn't know how many were on the beach in relation to -- We could count the numbers on the beach, but we didn't know how many were in the woods. And so, we used indirect methods and finally we started some other techniques including pellet group counts in different habitat types. But you could never get to all of the habitats where the deer were because we didn't know. They changed seasonally as the snow depth increased or decreased, deer moved around the landscape. And we knew that in the summer the deer, if there were alpine

areas above tree line, that a lot of deer moved into those alpine areas because that's where I got started on my PhD studies while I was still working for the federal government. This was before statehood. I was fascinated with why some deer were bigger on some islands than other islands. And was this forage or was it genetics? Well, we could see that there were different reasons. The bigger deer were frequently where there were deep snows in the winter, and deer populations would fluctuate widely there. And after a series of mild winters the deer would -- population would grow very rapidly whereas on the outer coast, the western coast, then because of the maritime, strong maritime influence, it didn't have deep snows except extremely rarely. So it was mostly open and you'd get storms with temperatures just above freezing and it'd be rain and it would get rid of all the snow. Whereas in closer to the mainland, some of those islands as well as the mainland in southeast Alaska and the panhandle, there were much more difficult winters for the deer. So it showed that the bigger deer came from where the snows were deeper and where there was a lot of alpine range available. West coast, the deer were smaller. And it was largely related to the fact that the quality of the forage. The deer populations would go high and they would reduce the high quality forage whereas that wasn't happening where there's heavy snows. The deer couldn't get down and clean out the high quality forage so that mild winters, yeah, the deer rebounded. The populations rebounded and produced big trophy-sized deer. Whereas on the west coast, the density of deer was moderately high but they were all relatively small and the productivity was low because the quality of food available to them was more limited. So you had to factor in hunting pressure and predation pressure by wolves, primarily, and made it more complicated but that was the focus idea. For my PhD studies, I focused on one island close to the entrance, close to the estuary of the Stikine River, and closer to the community of Wrangell, whereas I was based in Petersburg. There was an island there, Woronkofski Island, which was relatively small, wolves could get there from adjacent islands and the deer population was high, the wolves would move on, but they wouldn't. It was usually when the population was expanding and the deer weren't greatly impacted by the wolves. And then another study island for comparison was Coronation Island, which was about the same area but it didn't have as much alpine habitat and it also didn't have the extreme snow depth in the wintertime because it was on the outside coast. And it had no wolves. So that the wolves, apparently because of the small size of the island the wolves had a hard time getting there because even though the Kuiu Island was fairly close, there were strong coastal currents and waves that made it difficult for wolves to swim across channels to get to the island. So that study showed, yeah, that it definitely was a combination of high deer density over time caused the deterioration of -- they actually ate out the highest quality plants and types of plants and were forced to live off poorer quality forage. And then they were competing with one another for that forage that was remaining. And so the age structure was much older animals and low productivity of young there in contrast to the other island. And this was -- the study was sort of verified by studies that were going on at the University of British Columbia at that time where I did my PhD, and worked with Ian McTaggart-Cowan, who was my advisor and head of the biology program there. And he was working with captive deer from -- some of which I had sent down to him as fawns that had been orphaned. And showing the different feeding that the Sitka deer in southeast Alaska were considered the smallest of the

subspecies of the black tail deer along the west coast. Where there's Sitka deer, the northern ones, the Columbian Black Tail in the middle, in southern British Columbia and Washington and Oregon, and then the California Black Tails, which are semi-arid region and tended to be larger and the middle ones larger than the Sitka deer. But in captivity, provided with optimum food, the Sitka deer could grow bigger actually, at least as big, or bigger than the others. And their behavior was quite different.

KAREN BREWSTER: So you were saying that in the territorial days, which was when you were starting and you were doing all this work, they were looking at habitat?

DAVID KLEIN: Right.

KAREN BREWSTER: But that is no longer the case?

DAVID KLEIN: There were -- It's not a question of no longer the case, the focus is no longer there. And what happened was, at the time of statehood, the new state then had to take over management of fish and wildlife. And so they developed the Alaska Department of Fish and Game. For fish, there was a Division of Commercial Fisheries and then a Division of Sport Fisheries. And for wildlife, there was -- which is now called the Department of -- or Division of Wildlife Conservation, it was at that time called the Game Division. So their job was to manage harvests, and, of course, it's the same basis of the wildlife. This was mainly the big meat producing ungulates like moose, caribou, and in southeast Alaska, deer. And to a lesser extent, the mountain sheep and mountain goats. And so most of the land, at the time of statehood, remained federal land because the state, according to the Statehood Act, could select a large portion, or relatively large portion of land, but a small portion of the total. I forgot the exact proportion. It's like about a -- Well, I can't pull it out of my head at the moment. But initially, this was a slow process, so most of the land was in federal control so there was national parks, there was national forests. National wildlife refuges, just a few had been established. But then there was the public domain land, which was managed by the Bureau of Land Management. But initially there were no Native lands because there hadn't been a Native claims settlement, and there was very little private land. Less than 1% of Alaska was in private land. So that the attitude of the Fish and Wildlife Service had been, yeah, habitat is all important for these animals and it's highly variable in different parts of Alaska in different situations. But the state, when it came into existence, their mandate was not clearly spelled out in the same way as it was for the Fish and Wildlife Service. Their mandate was to -- for the Department of Fish and Game, was to manage the animal populations on a sustained basis with no emphasis on habitat. In fact, the state constitution said that habitat fell largely within the Department of Natural Resources. So they had primary responsibility and they could sort of delegate it to Fish and Game if they needed a focus there. And then it also stated that the Division of Environmental Conservation had a responsibility for water quality in Alaska from the standpoint of human health. They didn't want pollution to be going on and the Department of Environment Conservation would focus on that. But it stated in the constitution that they also were responsible for the quality of water as habitat for fish and wildlife. Now that's primarily fish, because water itself is not so

much the habitat for other mammals. But nevertheless, their attitude of the state department was, well, most of the habitat's in federal government and they have responsibility then for habitat. But the federal government, by the Statehood Act, lost management responsibility for the fish and wildlife and retained it for migratory species like the waterfowl. So it was partly -- and it's hard to put the blame on the Department of Fish and Game or the Department of Natural Resources or the Department of Environmental Conservation, but technically all three had responsibility for wildlife habitat, but wildlife habitat was federal. And so the tendency was to ignore habitat. And then with three agencies, three state agencies, none of them took really responsibility to assess habitat. How was habitat changing over time? Was there significant change? The assumption frequently was made that habitat is -- since it's all wild land and it hasn't been developed and very little agriculture, it sort of takes care of itself. It's like wilderness. Do you manage wilderness, and how do you manage it? Well, we knew that it wasn't that simple. They knew that in interior Alaska wildfires were a normal part of the ecology, but they varied. Sometimes there would be periods without any, a lot of area burning for five years or so, and then suddenly you have a lot of fires in one year or two. So no follow-up studies were being done to determine, well, what were the consequences? It was mostly limited observations. There wasn't good quantitative studies that could make the assumption that fires improve habitat generally for moose, but it doesn't happen instantaneously. After a fire, three to five years later, it starts to become moose habitat and then it exists for another 25 years before the trees grow out of reach and the spruce dominate, which is not eaten by the moose and caribou. And then it tends to dominate and the habitat deteriorates for moose. Whereas for caribou, a winter forage for caribou is dominated by lichens, which are very slow growing and grow mostly in older growth forest stands that are fairly open. Well, those occur on the northern fringes of the arboreal forests, and these are the wintering areas usually of the caribou. But fires occur in those areas, too. They dry out faster if you have fairly dry conditions. And then fires are mostly lightning-caused in interior Alaska, and so it's not a human cause event directly. So the best we could do is say, well, some fires, might as well just let them burn. And that is okay up to a point but you can't let a fire burn if it's threatening a village or cabins and what. You try to protect those areas and the infrastructure, the human cause, because it's very costly to lose these. But it was not fully understood whether it's desirable to have patchy burns or extensive burns. It was understood that if you have too many fires in the wintering areas of the caribou, then they're not going to have enough forage to support them. And the caribou populations were known to fluctuate over time, but there was disagreement as to what caused the fluctuation. Was it overharvest by -- and usually blamed, in the early days, Native people because they didn't have any data indicating how many animals the Native people were harvesting. And so it was just easy to blame somebody. Or they blamed it on wolves, of course, as major predators. And then later on it was shown that bears could be serious predators on newborn calves of caribou and moose. Well, then they went overboard and blamed bears more than other creatures. And eagles on the North Slope kill newborn calves. And so there was a tendency to go for the predators, and put the blame on them even though it may have been a combination of factors. And there are other factors of the habitat for caribou, for example, they have to forage very efficiently in the summer, in the short summer, where the forage is high quality in the Arctic. But if there's -- if it's hot and dry it may mean the insects are going

to be -- especially mosquitos in the early season, and then the warble and the botflies can parasitize the caribou. And they don't kill them outright but they can weaken them and so that they don't grow as well and therefore productivity can go down. And if the winter is a severe one, and if there's stress because of inadequate food, we might have a larger die-off and then poor recruitment. So the caribou, because they're so unique in having all these multiple factors that influence them, we didn't factor in habitat changes. And so again habitat was ignored by the state and their management program for caribou. Some studies were done. Some of the better studies were done through the Cooperative Wildlife Research Unit. And one of the problems with habitat studies is that you don't learn much unless they're long-term studies. Things change slowly. Whereas if you want something to happen fast, well, kill the predators. And so these different approaches were not well organized or designed from a technical basis. Well, there was -- later when I was Wildlife Unit Leader, the state was going through the problem of -- a large segment of the hunters, the sportsmen, were arguing that there were too many predators and there should be more intensive predator control because there weren't enough moose to go around and the caribou were declining and they wanted to put the blame solely on predators. So then the environmental groups and some environmental anti-hunting groups and animal rights groups in the Lower 48 particularly, were threatening to boycott tourism in Alaska because we were just killing, shooting wolves from aircraft. Using that as an excuse to bring about recovery of moose populations. Often other factors were ignored. Severe winters, for example, were ignored. And winters reduced availability of forage, made it more costly for animals to forage for their food and buried some of the good quality food in the snow. And these were overlooked. And fire was not adequately understood and was overlooked. So habitat itself was not examined and none of these agencies in the federal government restricted their studies of animal populations to federal lands that were national interest lands like Forest Service and --

KAREN BREWSTER: And the Parks.

DAVID KLEIN: And the National Parks and wildlife refuges primarily. And so Bureau of Land Management really didn't have a mandate for managing for wildlife. So it was easy for the state, from a budget standpoint to focus only on factors which they could relate directly to population, animal population dynamics. But that was excluding the role of forage and herbivores, and how the availability may change both in relationship to the density of the animal population but in relationship to fires and recovery from fires, which lichens require close to 50 years. If it's been severely overgrazed or following a fire, it might be a hundred years before you're getting good lichen stands coming in or even longer. We didn't have this kind of information available. And it's the kind of information that you can only acquire through long-term studies. And there are some long-term studies of fire ecology, but we're still not in a position to prescribe how fire under different fire regimes -- For example, if it's -- what kind of vegetation was there before the fire? Was it white spruce dominated, was it white and black, was it black spruce, was it wetlands, was it birch, birch and spruce dominated? When was the last fire in that area before this one, and what was the heat of the fire? Was it very dry and so it burned down to mineral? Was it patchy and made it easier for the vegetation to recover more quickly? All of these factors were so complex and remain that way that we still

have so many questions about fire ecology that we can't draw firm conclusions about specific areas. We can generalize a bit, but we can't do it for specific areas. And then we have to factor in more human activity, and some increase in agriculture in clearing, and then the climate change.

KAREN BREWSTER: Now you had started to say that the wildlife unit was doing research. So the state was not doing research related to habitat? They were doing population dynamics. But you're saying your students and faculty were doing more habitat-based research?

DAVID KLEIN: Well --

KAREN BREWSTER: And if so, how come that information wasn't being used?

DAVID KLEIN: Well, I shouldn't say that -- It wasn't just the wildlife unit. The university itself in the Department of Biology and Wildlife in the Institute of Arctic Biology, they were also people who were, say, botanists and plant community structure people who -- the wildlife unit was melded in with the Department and the Institute of Arctic Biology primarily for administration and financial management. So that sometimes we were doing studies that we can't take full credit as wildlife unit studies. The funding was coming from state or federal government, usually. So some of the refuge people might want us to fund a study, or the Forest Service would fund a study, or the state would fund us through the Department of Fish and Game. They would fund a study because their budget wasn't sufficient to hire a person full-time to do it, so they figured that, well, this is a controversial issue so let's go for it. And this cooperative unit had the real advantage when there was an issue that challenged both the state and federal government. They tended to polarize and say, "Well, either we do it, or you do it." Whereas when they could do it through the Unit and both contribute some funding, then the project could be done in a less expensive way, and if it was a master's student for example, the answers to their specific questions could be accomplished in a couple of years associated with a student thesis project. So that was done, especially when animals were in new areas. For example, like the Arctic Refuge was established. Well, the state had some responsibility there, the federal government had some sort of responsibility. The Canadian government through the Yukon Wildlife branch and the Canadian Wildlife Service had responsibility, because it was an international herd, the Porcupine Herd. Well, the Cooperative Unit was frequently able to play a role of working with funding from multiple sources and the one advantage of this is that if the study -- if one agency had provided the funding and they got a budget cut, whether it was federal or state, the other agencies, they couldn't get away by just saying we're going to stop the study because the other agencies and other states or countries would say, "No, we made a commitment, we have to follow through on it." So it was usually the amount of money was not great that each component contributed, but put together it made for a successful project. The real advantage of this cooperative unit program was, state and federal worked together frequently through the Unit, the students get better experience in training. Frequently, some of the support from one of these agencies, was say, aircraft support or other type of logistics support. To get boat support in southeast Alaska to get

the students to the areas. And this helped to avoid polarization between state and federal agencies or even federal agencies themselves within that, or state agencies. So you can't put your finger on one state or federal agency and say, "Well, these things weren't done," even though they were primarily responsible for it. You have to factor in the fact that both at the state level and the federal level, the budgets change politically and seasonally and with the changes in the economy. And you can't put all the blame on one component over time. And it's better to have a cooperative program of this nature for, in this particular case, wildlife habitat studies. So, yeah, we did more studies through the wildlife unit and my own work there as a master's thesis was habitat. In southeast Alaska there was the University of British Columbia that was I working for the degree but it was habitat-related. And I collaborated and had exchange programs with British Columbia and especially Vancouver Island where they had a lot of experience with deer, which we hadn't -- and logging, which we hadn't at that time, when I started, much experience with logging. So there was a lot to be gained by these exchanges. To me, I was right obvious that Alaska should be sort of international in how it operates in terms of biological studies and environmental studies. And I've always -- since then, it was easy to move to take opportunities to do comparative studies in other countries of the world, especially in Arctic ecology issues. But it was -- And we had the advantage, too. I mean, Alaska, our closet neighbor was Canada and we had a program at the University of Alaska where students from Yukon, Northwest Territories at that time and still is the case, I believe, they could come to the University of Alaska and pay in-state tuition. And then we created a similar one after the new university was created in northern British Columbia. And there we still have that agreement. Students from Alaska can go to the Northern British Columbia on a similar kind of arrangement. So this -- We can learn a lot by learning what's done in other similar areas and that includes Canada and the whole circum-Arctic countries where ecosystems and ecosystem dynamics are similar in many ways, but they are different and very frequently benefit. We generally always benefit by exchanging information and exchanging students. Student exchanges coming from those countries to here and vice versa.

KAREN BREWSTER: But I was thinking, so if you guys were doing all these habitat research with this state and federal funding, the results of your research were available to those agencies to use in their management decisions. And it sounds like they were still not using that information.

DAVID KLEIN: Well, yes and no. You have to realize that the Co-Op Unit had, in those early days, we might have only five graduate students. And you spread those around on different, say, waterfowl projects on Minto Flats and occasional study of caribou. And a lot of the studies weren't focused solely on habitat, but they were -- habitat was part of what was -- specific herds, for example, the Fortymile Caribou Herd student project would be on aspects of calving and the calving grounds. So for a massive project you couldn't take the whole picture, you could only do parts of it. And, yes, some of this information was used by Fish and Game. And in other cases we -- you could probably say it wasn't used much because they didn't feel it was needed. It wasn't what was critical at the time. And so it's always the case when there's good science being done, it isn't necessarily applied right away. And that has to do with the momentum of existing

programs frequently doesn't make room for major changes which should occur when data becomes available and studies are done. So it's not a perfect system. And especially ecological studies, which if you're studying animal populations in relationship to the environment or ecological studies, are very complex and the return is slow in terms of information. And they frequently get -- it gets polarized by the user public. In this case, say the hunters who would -- or trappers or fishermen depending what you're talking about. And a student thesis project may not be enough to convince the general public that some change is necessary, because it may not provide enough information. It's a start, say, but it may not provide enough information. And jumping to conclusions when you don't have enough information is a mistake also. It may reflect poorly on the research that's done, if you jump to conclusions when you still don't have a good answer. And nowadays, we talk about modeling whole systems, and you can do that more effectively with computer models. But it acknowledges that modeling is a way of dealing with complexity and making it more understandable, but it doesn't say that you can duplicate the natural environment. And draw conclusions as to how to proceed in the future because when you're modeling, what you do learn is there's a lot of information you don't have yet and can't get yet. And sometimes we don't have the technology to get it yet, but maybe five to ten years down the road it is possible. And for example, there's been some good advances in use of radio collars on caribou so that we can better locate the herds and components when we want to do an aerial count. Or we can tell where they are and then we go and check and what kind of habitat are they in at a given time of the year, and when are they there. Is it conditions ideal for them there in those areas from the standpoint of forage or the predation pressure higher there than in other areas if they'd not gone there? I mean, it gets so complicated that it's hard to get the public, let alone members of Congress or the legislatures or even Fish and Game biologists, the management biologists themselves, to convince them that we have enough information to draw firm conclusions. So it's not an exact laboratory type of science where you have control over all of the variables. And that's what it tends to boil down to. But on the other hand, just ignoring, say, habitat is not a solution, and that's, to a large extent, that's what happened with the state government over time. That habitat is ignored. They use other techniques such as body condition, what is the body condition of the animals, how does that tell you about the habitat? Well, sometimes it tells you things, but if you should go out and look at the habitat and see whether it fits with what is there, and we just don't look at habitat. Part of the problem nowadays, is we have these new technologies for remote sensing with satellite imagery and radio collars and we don't spend enough time -- The management biologists don't spend enough time in the field with the animals. The best information they get, they think, is by looking what's coming through their computer from, say, satellite images or satellite locations of the animals. Well, this is where they are and they must be doing this and that, but they don't -- they're not on the ground. What are snow conditions, for example? How deep is the snow? What is the energy cost of animals moving? They don't have that kind of data from satellite images. And so there's some things you can get, but you should have the work on the ground, and you should have people on the ground. And that's hard, especially if -- Well, one of the students I had worked on the energy costs of migration in the spring to the calving grounds. And you've got to be with the animals quite a lot, measure snow depth and hardness. While they're migrating, it costs energy to move through snow, so they

tend to -- In the springtime when they're heading for the calving grounds, they try to move at night. Of course, the light has pretty much come back so it's almost 24 hours of daylight. But it cools at night because the sun is low, and then the snow hardens it up and then it's better for them walking. But they have to feed, too, because they don't want to draw down all their fat reserves. Females still have to bear a calf when they get to the calving grounds, and then they have to produce milk for it. And they're under greater physiological stress for better quality food and nutrition after they give birth to the calf, rather than when they're pregnant, because the calf is growing very rapidly and it's drawing, initially, on the milk of the mother. And so she has to have optimal food available and feed almost 24 hours a day and take breaks to digest the food and ruminate and they don't sleep much. In the wintertime, they might 'cause they're eating poorer quality forage and it digests more slowly. Their whole physiology changes. They run the food through their gut so fast and it's high quality, new green vegetation, that they're getting all these good nutrients. But if they can't feed on it because they're harassed by insect or by predators, then they are going to suffer and will not be in as good condition in the fall if it's a summer that's very good for the mosquitoes and flies, parasitic flies, but not for the feeding by the caribou.

KAREN BREWSTER: Well, as you say, it is so complicated that understanding these animal populations and what they're doing and why they're doing it and it's all these factors. So how do you end up being able to make a decision or understand what's happening at any one point in time?

DAVID KLEIN: Well, part of the problem is you've got to realize that there are multiple factors and therefore we should have an eye on them. And that's where I say habitat is an important factor that we should have a better eye on it. Now, we don't necessarily have absolute information, but if you take the simple way and say in a cause and effect relationship by the average hunter, well, we hunt them and we don't have long enough seasons now and there aren't enough animals to go around. It must be predators because they can see a cause and effect relationship. Then it's hard to get them to -- they go out there hunting and everything is green. At the beginning of the hunting season, they think there's no shortage of food, it's a green world. Well, that's not true. I mean, people starve to death in the green world if there's not edible food. And it's even more difficult when animals are living so close to their physiological capabilities in a northern environment where summer is short, they have to eat and grow and do most all of their growth in the summer and reproduction and nurturing the young. And then the wintertime is long and they have to be able to survive that winter based on the previous summer. And, well, that's why there's so few animals up, and you go higher into the Arctic, the density of caribou goes way down. If there's a few there, they can't -- you can't have the big herds.

KAREN BREWSTER: Because the habitat just can't support it? The ecosystem can't support it?

DAVID KLIEN: That's true, yeah. Not support the situation. For example, in the work I did in northern Greenland focusing mainly on muskoxen because there's no caribou there, but there had been caribou and there were caribou there until about 500 years ago.

And then looking at old bones and set antlers of caribou, the caribou weren't there continuously in earlier times than 5,000 years ago. They were there and then the population would die out. And where did they come from? Well, they came across from Arctic Canada to northern Greenland. The muskoxen stayed during these times when the caribou died out, and so northern Greenland now doesn't have caribou but it does have muskoxen. So muskoxen were able to persist in small groups. And, of course, the wolves would die out when the prey population went way down. And the wolves had to come back again when the caribou increased, which they did but they were absent for 60 or 70 years. And so it -- the muskoxen could get by on poorer quality food in the wintertime, whereas the caribou lived a more energetically costly life in the winter than muskoxen. Muskoxen are very conservative energy-wise, they don't move around much, they stand their ground from predators instead of running and they don't have to be as selective for food. Caribou have to select food that is readily digestible, high in energy, and lichens are a good one. But lichens grow even more slowly in the Arctic and a little bit of grazing by caribou -- the lichens aren't able to produce enough forage. So the caribou that go up there have to live off of dwarf willows and buds and high quality food, but it's not very abundant so the animals have to move over a vast territory. They can do it fairly efficiently in the winter because there's not much snow, it's a polar desert. But they don't have to spend a lot of time wading through snow or digging through snow for forage. But it's just not simple for them to -- and there are wolves that they have to deal with, too. So there's not too much human harvest, but there's some.

KAREN BREWSTER: I would say it's all so complicated that how do you ever know what all the factors are? Well, you know what the factors are but how do you know which is more or less a factor?

DAVID KLEIN: Well, that's a good point, and that's exactly the case in managing any kind of wildlife in northern extreme, and the same would be true in desert areas. It's very difficult because you can't be aware of all these. Even in Africa, you know, we hear about conditions where suddenly elephants are being threatened, whereas in other situations the population may be booming. And there you have to factor in the human element and then the major predators on elephant calves there, which are lions. But it's not simple. And then, of course, then the water is a key factor in those areas and have drought situations.

KAREN BREWSTER: And here you have to factor in the human hunting element.

DAVID KLEIN: Yeah.

KAREN BREWSTER: At least, for certain species.

DAVID KLEIN: So we can, you know, we've been talking about terrestrial environment, and the marine environment for, say, fish, and particularly salmon, we have the same problem. We don't have enough information about the environment in the terrestrial situation in rivers and streams, and we certainly don't have enough in the marine environment. Plus, we're catching other fish that are probably related to -- they're

feeding on the same -- Those other fish are probably feeding on the same thing the salmon are and some of them are feeding on young salmon and vice versa. So we don't have that kind of information, so how do you manage? You manage on the best information you have available and sometimes it's proven not enough. And that's usually the case in commercial fishing in the marine environment. We overharvest. As long as you can catch fish, they think there must be more coming. And they'll base it, for major fisheries, you base it on the size of the fish that you're catching and then the younger ones that you catch along with them, are there going to be as many fish the next year as there were this year? And that's probably the best if you don't have any more information, but if you have more information maybe there's other factors involved. And nowadays, of course, we have to factor in climate change, and we know very little about what's going on in the marine environment associated with climate change. We know that the seas are getting warmer and that they're getting more acidic, but we just don't know what the long-term consequences of that are. We can speculate, and we do that sometimes beyond what's reasonable in terms of what knowledge we have. And the same would be true in fresh water fishery management where, on the one hand, we could say there's more spawning streams coming into existence as glaciers recede. And that's true. But we're not doing adequate studies to determine how soon that happens after the glaciers recede and is it happening fairly rapidly or is it overcompensated for by other factors such as drier, longer summers, more melting. And are some streams that have already been good salmon streams declining in quality because of that factor? We don't know that. And then you get new things coming in like if you see some kind of a disease or parasites, and we do see that sometimes with fish and salmon coming back. Well, what caused that? Was it a phenomenon we don't know anything about or is it associated with too many fish in one area or is it some introduced by, say, agriculture with salmon in cages? We've got hatchery production of salmon in the coastal areas, it seems to result in -- well, it does result in increased high risk of fish coming back to the hatchery. Well, is this a positive or negative for the other fish that are out there feeding with -- competing with them for food? Is that competition significant? And how is it affected by the other species of fish coming in, moving north into the waters that were primarily -- where they weren't present previously?

KAREN BREWSTER: Well, the other thing, disease not only fish, but you hear periodically somebody on the North Slope, who finds a caribou that has something unusual and they report that.

DAVID KLEIN: Right. And we know that disease that's been there in the past, and probably there have been times when it seems to be more common, but we don't have a good enough data from periods -- studies that were focused on disease. Disease has never had too much attention. There's been more attention on disease in Canada relative to caribou than in Alaska. And part of it is because the Native people in Canada were more concerned. Well, there's more caribou scattered across northern Canada, but in different herds. But there were other problems that some of the -- that made -- may not be considered disease. Might be pollution from containments from industrialization. But sometimes it is related to disease, as well. And so Native people understandably want to know more about these. Is there any risk in eating these animals that appear to have some

problem? Yeah, that's normal human behavior and wise to know. And again, this has made some good advances but it's pretty complicated. And some of this is happening in Alaska, too. It's much better at the university is doing -- putting more focus on animal diseases and checking for heavy metal presence in the tissues of animals for -- Mercury is the chemical of concern. And we know that there's been problem areas in the world with excessive mercury and the effect on humans eating this. And how does Alaska compare to other areas and is it changing or is it stable? So, yeah, it seems overwhelming, but there are people working in virtually all of these areas. And you can't lay it all onto the management agencies. I mean, there has to be -- the universities have to play a major role. You know, their research components. But I think the oversight by the federal government is definitely needed and sometimes it's not there because that costs money, too. And when the budgets are tight, frequently we don't look at these things.

KAREN BREWSTER: And some of it too is the human management aspect. You know, you were talking about the salmon, and I think about, well, or moose hunting. People are so accustomed to being able to harvest these animals that they fight very hard. They do not want to give up those opportunities.

DAVID KLEIN: That's right, yeah.

KAREN BREWSTER: So then the wildlife managers are dealing with managing people as much as they're trying to manage for the animal population.

DAVID KLEIN: That's right, yeah. I mean, it's, you know, wildlife management you could say is a social science because you're dealing with people to a large extent. But obviously, it's a social science in one regard, and it's a biological science, and the environment is both biological and physical. So it's very complex and it's not simple. And the mistake frequently is assuming one of the -- you could say successful management is getting the users to understand what's going on. And it may mean the population is going down for, let's say, climate change or something like that, and if good management, okay, the users are informed. And if sometimes it's something they can take some action on themselves, but if they know what's going on, they can perhaps do this. And, you know, if there's a decline, say, in caribou in some areas or in marine mammals, then, well, then regionally the Native people may decide, well, let's take -- let's move some of the meat from areas where we don't have a problem of overharvest and reduce the harvest in those areas that have been overharvested and make the meat available to these other people. So that sometimes can happen, but it requires understanding by the users of the resource and that's true in general. And some people want to just see wildlife. Tourists want to see wildlife and hunters want to kill more wildlife. And there's plenty of wildlife -- and if you hunt them in areas where people want to see them, well, maybe you can argue that if you don't take too many it's not -- but what you might be doing is training the animals to be more wary and be less visible. And is that -- from the standpoint of wildlife management, that's not a goal if your job is to try to make animals available for people to see. On the other hand, you don't want to make them tame, so it's just a like zoo, an outdoor zoo. And so it can be argued that some hunting is desirable. And I think that you can argue that in places like Africa, as well, that

some hunting is desirable because animals are used to predators. If you clobber the predators, and without hunting, the animals become tame.

KAREN BREWSTER: That's interesting. I've never heard that before.

DAVID KLEIN: Yeah.

KAREN BREWSTER: Your thing about wildlife viewing versus hunting, makes me think about wolves at Denali where that is certainly a --

DAVID KLEIN: Well, then the predators are of interest to people who want to see wildlife. Whereas the hunters, they want to see the products of the prey, they're only interested in the prey. So that, you know, if you're interested in the whole system, which people are encouraged to do if they're going into national parks, yeah, that's good if they can see them. But they have to realize that the density of predators versus prey is very low and that's the way it normally is and should be, and the predators often are wary. So if the predators are not hunted, then they could be a problem. One of the problems in Denali Park is the moose tend to -- female moose, pregnant moose in the eastern part of the park, move down into the park headquarters area where the tourists are and there's not as many bears to prey on the moose calves. But the bears are starting to learn that that's a good place to get moose calves, and therefore it results in more interaction between people and bears, which is not particularly desirable.

KAREN BREWSTER: Yeah, I was thinking about the wolf issue, how they're saying that -- There's -- one perspective is there are fewer wolves visible along the park road, claiming it's because they're all being hunted on the boundary.

DAVID KLEIN: Right.

KAREN BREWSTER: And then, of course, the hunters will say something different.

DAVID KLEIN: Well, that's -- there's a relationship there, that's true, and I don't know how significant it may be. I mean, it's a very difficult situation. Of course, the tourist -- a lot of tourists want to see things but they don't necessarily want to understand or they don't make the effort to understand.

KAREN BREWSTER: Or nobody's trying, maybe, to teach them.

DAVID KLEIN: That's true, that's sometimes the case.

KAREN BREWSTER: Maybe a combination. Yeah.

DAVID KLEIN: But for example, you know, if you want to see ptarmigan, females with chicks, well, the female is -- if there's birds of prey around and foxes then they're going to be very wary. They have to be if their chicks are going to survive. And the same would be true of other animals. They're going to respond in relationship to the threats to their

wellbeing. And the predators are going to do the same thing. Or if they can't get what they need then they go someplace else, especially arboreal, or aerial predators. Hawks, owls, eagles.

KAREN BREWSTER: It's easy for them to go someplace else.

DAVID KLEIN: Pardon?

KAREN BREWSTER: Maybe it's easier for them to go someplace else?

DAVID KLEIN: Yeah, definitely. I think the owls and big hawks do that readily.

KAREN BREWSTER: Well, sort of the last thing I was thinking about this, the human management side of it all is that often turns into a political pressure. And how do wildlife managers, how do you handle that once it sort of becomes a politicized issue?

DAVID KLEIN: There's no easy way. When things become politicized, there's no simple solution. I think the best solution from the standpoint of wildlife management is just try to stay as objective as possible and try to serve the interests of the -- put major emphasis on the wellbeing of the resource. And then its allocation, you leave that up to some fair method. And there aren't very many. Like the Board of Game, and then you get in conflicts between federal and state, and overlap and that kind of thing. But there's no one tourist that's going to be representative of all tourists. It has to be some kind of oversight by the agency that's managing for tourism.

KAREN BREWSTER: Well, the thing about the fair method of allocation, of course, gets into questions about, well, who's making that decision? That's the Board of Game, for instance. And who's on that board of game?

DAVID KLEIN: Right.

KAREN BREWSTER: Is it a fair -- is it "fair?"

DAVID KLEIN: Yeah.

KAREN BREWSTER: But maybe you don't want to comment on that?

DAVID KLEIN: Well, its attempt, originally, was to have a fair system. The problem is we don't have balanced membership on the board. And that's been a political issue because the governor approves membership and the board can recommend people to fill vacancies or replace vacancies. And the governor can -- they can recommend even removal of people from the board and the governor can approve of that. That's where it becomes political. When it becomes political, then the only thing is -- the best way to deal with that is for those people in the public who want a fair operation to make -- to focus on the fact that it's not fair and that it should be adjusted and corrected. And that's a political process, too.

KAREN BREWSTER: So what do you think about -- so those people on this board of game who are making these allocation decisions but they are not biologists, they are users. And should the people be making these decisions be the biologists and the managers who understand, in theory, understand the bigger picture?

DAVID KLEIN: Well, according to the legislation, as I understand it, setting up Board of Game, is they're supposed to base their decisions on allocation of information provided by the biologists, who they present every year. Every time before a board meeting, the biologists are expected to submit their recommendations. They're also our advisory committees that are made up of users and that -- again it should be all of the users of the wildlife. But it's usually only those that are the most active users like the hunters. So tourists obviously can't be represented very well on the board.

KAREN BREWSTER: Well, a tourist organization, the tourism industry could somehow.

DAVID KLEIN: They could be, or in the case of a park they could have someone from the park sitting on a local board. And there are cases like -- there's one case of co-management, sort of like co-management for the Western Arctic Caribou Herd. There's a good example where it was the Department of Fish and Game that came up with this idea. The local biologists who were working with, to some extent, with Native people and with representatives, federal agencies and hunters, non-Native as well as Native hunters, and then registered guides and outfitters. And so they argued for -- and sort of initiated an effort to create a co-management board. In other words, that the decisions regarding management of that herd wouldn't go to the Board of Game, it would go to this board, the co-management board, which had the users outnumbered the managers. So that the Native, in that case, the Native population -- the Natives had the majority of the members of the board, so they had a stronger potential vote. And this was a model that was tried in Canada and is still tried there. It's worked well in the Western Arctic Herd, much better than in Canada. And it -- the advantage of this is that all of these people with an interest, they're mainly users including the outfitters and other representatives of the wildlife refuge and the park. 'Cause the refuges and even the park, for sure, there's hunting allowed and so they have a voice but they acquiesce to the Natives in the case of the parks. But the advantage of this is that the users that are on this board are informed about what's going on by all of the agencies and especially by the -- so they can see it from the different perspective of this. And that's good government really when that happens because people talk to one another but they are also aware of what kind of survey work is being done and what kind information is available from -- what kind of information is the Department of Fish and Game gathering, say, on body condition of animals, on radio collaring, and where the animals are located seasonally. They can produce good printed material that -- This has to be funded, of course. And Fish and Game had initially started it but other agencies are contributing that benefit from it and that includes Park Service and wildlife refuges, Bureau of Land Management, and Fish and Game. And so that means some financial assistance to get the members of the board present when they meet, so there'd be particularly Natives from villages which wouldn't be able to have money

out of their budgets. They don't have a budget in order to get there. And the system has worked quite well for that herd.

KAREN BREWSTER: But even in that case, it's users making decisions about allocation. So my question is having a system like these boards where it's membership of users versus -- aren't all those allocation decisions made by the staff of Fish and Game who are the biologists who were out there?

DAVID KLEIN: Well, the biologists are there on the board as representatives of the Fish and Game biologists on the board. They just don't have the numbers to -- if there's a controversial issue, they don't have the vote.

KAREN BREWSTER: So what do you think about this system where there's these boards that makes these decisions versus having scientific staff of these departments making those decisions?

DAVID KLEIN: Well, they mostly don't, scientific staff in terms of wildlife harvest. Well, maybe in the Park Service they do, but it's not a question of harvest there.

KAREN BREWSTER: Right, but so, why can't a Department of Fish and Game be making decisions about harvest? Why don't they have staff people who do that? Why do you have to have a Board of Game doing that?

DAVID KLEIN: Well, how would they know what the people would prefer to have in terms of seasons and bag limits and stuff? It seems to me the hunters should have a voice in this, as well as other users, yeah. So I mean it's just -- Well, some of the things that happened in Canada when they first started this co-management is Native people were sort of, "Well, it sounds like a good deal." But then, one of the first things they did was they didn't like putting radio collars on caribou. They said they have a certain respect for the animals and they thought this doesn't fit with their culture. And so they had to stop the -- the provincial and Canadian Wildlife Service had to stop this radio collaring for two or three years. And then the Natives that were on the board began to realize, "Well, it's true, it's a problem but we need this information if we're going to do a better job of management." And so they then -- they were happy to get an acknowledgment that those people that were radio collaring would be more respectful of the animals that they were handling, which seems a reasonable request. And it's changed a lot in Alaska. I remember it used to be, for example in territorial times, ravens were protected in southeast Alaska because it was part of the Tlingit and Haida culture. The raven is highly respected and they have clans, relationships to animals. Whereas in interior Alaska at that time, partly because there are fewer -- there was less interaction between Native and non-Native cultures because the population of Natives in interior was very low relative to southeast Alaska. And different resource bases, mainly. But there were other areas where the --

KAREN BREWSTER: So in Southeast, the ravens were protected, but in the interior they were not?

DAVID KLEIN: No.

KAREN BREWSTER: Okay.

DAVID KLEIN: So hunters didn't -- They were sort of like crows, I mean, in the south in some areas where you didn't have a lot of things to hunt, people would -- crows were quite edible and ravens could be edible, too. But, no, it was the respect. And once it was -- the Natives in their culture frequently take the attitude when acculturation is occurring that, "Well, we don't want to drag our feet about issues like this. If the non-Natives don't want to shoot the -- We respect all animals and we respect the ravens, too. And if you're not going to eat them, why would you shoot them?" Which is a good question. But it can be sporting, let's say. Why shoot a clay pigeon when you can shoot a real live pigeon or -- ?

KAREN BREWSTER: And so were ravens actively hunted in the Interior at that time?

DAVID KLEIN: No, but they were shot occasionally. I remember I was out with graduate students and we were sitting around the campfire and we were on the Fortymile area. And this one guy, Cal Lensink, he was a great waterfowl hunter, so he was a good shot on -- wing shot on birds. And about the only thing we could hunt then that was there were grouse, and they were frequently spruce grouse. So we -- this was in November or something. We were camped out up there on the Taylor Highway. And we had shot a couple of spruce grouse, and so they put them in the pot and skinned them and put them in the pot to boil. And put some salt and pepper in there with them, maybe we put onions. We probably didn't have a lot more. And we're sitting around and we're cooking and this raven flew over and Cal had his shot gun right beside him and he picked it up and he shot this raven out of the air. It came down and he said, "Well, let's put it in the pot." So we put it in the pot. And, yeah, it was edible along with the spruce grouse. And spruce grouse, some of them were pretty "sprucey" flavored.

KAREN BREWSTER: Maybe the raven --

DAVID KLEIN: And we were hungry.

KAREN BREWSTER: Maybe the raven helped mellow the "spruciness?"

DAVID KLEIN: And then there was an annual game dinner that the Wildlife chapter --

KAREN BREWSTER: The Wildlife Society?

DAVID KLEIN: No, the university had a wildlife club.

KAREN BREWSTER: Okay.

DAVID KLEIN: And so we would put on a game dinner. Well, we had, sometimes, mystery foods. We would -- some trappers would turn in carcasses for us like lynx and other carcasses, including wolf. So if it was fresh killed, we would frequently just dress it out and save it for the game dinner, put it in the freezer. So one time we put raven out as a mystery meat on a plate along with the grouse. And we had -- I think we had sharp tail and roughed and spruce grouse. But we'd usually have some mystery meat and we'd ask people to tell us what it was. And the raven came out pretty high, but you know we put bay leaves and spices and stuff in. And it was usually cold afterwards. That it had been cooked and it was put out, and so they could pick up some and taste it. And the raven came out okay. And then we did this with wolf once. And it smelled terrible when it was being cooked in the old main building. But it was cooked with bay leaf and some onions and stuff with it and then sliced. It was the back legs, I think, sliced thin so you couldn't tell it from, say, mountain sheep and other things and put it out there. And the wolf came out really high. And I remember tasting it. But we did cook it a long time and the odor was -- We got rid of much of that stuff apparently.

KAREN BREWSTER: So it came out high, meaning people really liked it?

DAVID KLEIN: Yeah.

KAREN BREWSTER: People voted and they liked it?

DAVID KLEIN: Yeah.

KAREN BREWSTER: Did people guess what it was?

DAVID KLEIN: No. Not in the case of the wolf, we had to tell them after the fact. But they -- you know, it reminds me that in the bear hunting, now there was a problem -- You know, the big bear hunters, they like to -- you can get your name in the record book based on the skull size. And you go to official measure, a Boone and Crockett Club, and they measure it. There was a problem down in -- I think it was in the Bristol Bay area. The Native people there they didn't -- and then you had to turn in the skull when you harvested.

KAREN BREWSTER: Right.

DAVID KLEIN: And the Native people didn't want that. They believe that the skulls should be turned -- go back into the woods and decompose. At that time, at least. And they ate brown bear meat, and so they did harvest them for eating. And so they objected to this and I forget how it was resolved, but this was several years ago that that happened. But it's like they're different cultural attitudes and it's important especially when -- you know, the subsistence hunters usually aren't well represented on advisory boards because they don't think they're going to have as much voice and it will be overridden by these urban people.

KAREN BREWSTER: Well, and also are the subsistence regulations managed differently than the recreational hunting regulations? So does that board make subsistence -- does the Alaska Board of Game decisions affect subsistence hunting?

DAVID KLEIN: Yes and no. I mean, in most cases, state law doesn't allow distinguishing on a racial basis for qualifying for subsistence hunts.

KAREN BREWSTER: Right.

DAVID KLEIN: So it's based upon your history and residence in an area, whereas the federal government does recognize it.

KAREN BREWSTER: Well, and there's the whole problem of state versus federal management of subsistence and that political battle that's been going on.

DAVID KLEIN: There is a federal subsistence management component. And their job is primarily is to work out, I don't know the exact wording of this, but to work out the system so that the federal -- in some cases, only Native people are allowed to do things like shooting sea otters.

KAREN BREWSTER: Marine mammal hunting, yeah.

DAVID KLEIN: Yeah. But there are these problems too of subsistence hunting of other things. And usually there's -- well they make -- but even that, it gets challenged every time it goes. Like traditionally in Native communities, they hunt for people who can't hunt, the widows and older people, especially older women. And so now they allow sort of a party permit so that hunters can take something and give it to someone else.

KAREN BREWSTER: Yeah, you can assign a proxy hunter.

DAVID KLEIN: And I think now that's been challenged, and you can do it for the non-Natives, too. A similar kind of thing.

KAREN BREWSTER: But yeah, this subsistence management is a whole other complicated scenario.

DAVID KLEIN: It's unique to Alaska and has been a very complicated and difficult issue to deal with. It's a major challenge, and in retrospect, I think, Alaska's done moderately well. By that, I mean, both federal and state have done reasonably well in trying to handle this. And at first there was this tendency that the federal government would back off and let the state do its thing. But then they weren't fulfilling their responsibility regarding federal law. And it's -- in the long run, the state constitution is probably the desirable thing, but in the short run, it's not. The Native Claim Settlement (Act) hasn't been that long, and it wasn't -- you just don't wipe out tradition instantly with congressional action and settle it with cash and land. It's more complicated than that. And so the --

KAREN BREWSTER: So what you're saying is that in the long run the state constitution where it's supposed to be equal access for everybody? Is that what you mean about the state constitution?

DAVID KLEIN: Yeah, that you cannot discriminate on the basis of race. Whereas the Alask Native Claims Settlement (Act) and Alaska National Interest Land (Conservation Act), both provide some special consideration for Native people. Not a lot, but --

KAREN BREWSTER: Well, there's that subsistence priority that if a resource has to be limited then subsistence would get the priority.

DAVID KLEIN: Yeah. But under federal law where, like waterfowl for example, no, migratory birds for example, the Natives can be allowed to gather eggs from seabirds, but non-Natives can't. Those kind of things.

KAREN BREWSTER: Well, as I say, that federal subsistence priority thing, I don't know if it said Native versus non-Native, it just says subsistence. And then that leads to the whole debate about, well, what is subsistence? Can a non-Native person be a subsistence person? I mean, it gets into a whole other debate.

DAVID KLEIN: And so the state defines subsistence in different ways than federal might.

KAREN BREWSTER: Right. So that's getting all the way away from the wildlife and the science behind what's happening with the animal population into a whole other political arena. But you have talked about before with the management of wildlife and those decisions being made by biologists versus people doing wildlife management who are not biologists.

DAVID KLEIN: Right.

KAREN BREWSTER: And how that affects things.

DAVID KLEIN: Right. Yeah, the problem is a lot of people, hunters and non-hunters, say, "Why do the professionally trained biologists should be the ones that could make all these decisions?" But it's sort of -- It doesn't work that way because they're not trained to consider the interests of special interest groups like Native cultures and communities, which are not all the same everywhere. They're highly variable. And that's where local advisory representation is important.

KAREN BREWSTER: What about the people running these agencies like the head of Fish and Game or the head of the Department of Wildlife Conservation, whatever it's called now? Or the Department of Natural Resources? They are not always trained biologists.

DAVID KLEIN: They're not what?

KAREN BREWSTER: They're not trained biologists.

DAVID KLEIN: Well, some of them may be, but not all.

KAREN BREWSTER: Would it be better if they were or is it better if they're not?

DAVID KLEIN: Oh, yeah. I mean, it depends on how -- under the state constitution the commissioner, deputy commissioners and heads of divisions can be political appointees. I think that's the way it is, but maybe it isn't with the head of divisions. I don't know about that, but I think it is. And early on this new state department of Fish and Game was headed by a PhD, a fisheries -- Clarence Anderson, who had been on the faculty at the University of Washington, but he had worked as a commissioner down there in Washington State. And so he was professionally trained, and then he appointed people as deputy commissioner and as division heads who were also professionally trained. This stayed that way after he retired. Then the next one was, I think, a professionally trained person who had been a deputy commissioner or something before. And then there were some of our students. Like Ron Skoog who did a master's degree here through the wildlife unit in caribou, he became commissioner. And Jim Brooks also became commissioner of Fish and Game, although he had started working for the Alaska Department of Fisheries under Clarence Anderson a couple of years before statehood and he was doing studies on marine mammals including -- just yesterday John Burns and I were discussing this and he was studying sea lions, walrus, and polar bears, and beluga whales in the Nushagak River particularly. And what they were trying to -- they didn't have -- Nobody knew anything about beluga whales. And so he sort of volunteered, but he was recommended by Clarence Anderson to go up there and what could they find out about how much salmon were these things eating. And were they single animals that come up or were they ones that were coming back? And so Jim was one of the first to figure out how to capture them.

KAREN BREWSTER: Was that in what the '60's?

DAVID KLEIN: Pardon?

KAREN BREWSTER: What time period was that?

DAVID KLEIN: That would have been in the '50's.

KAREN BREWSTER: In the '50's, okay.

DAVID KLEIN: In '57 or so. And he was able to catch some of these belugas and he learned a hell of a lot. And he was a really excellently trained, and a good scientist, even though he didn't start out that way. He had the training but he was -- He had been a pilot in the war and done a lot of bombing up out of Europe from England. And before the war, he grew up in Detroit and he was this outdoor guy and finally he wanted to leave

home. And he was close to his dad and his dad said, "Well, we don't have any money to send you any place. You've got to get a job and do things." And he said, "No, I just want to go. I can hop a train and what, or something." Which he did. And he was going to go. He didn't have any money and his father gave him like twenty bucks, I think. And so he rode the trains to -- he somehow got into Canada and did -- worked in woods work for a while. And worked his way to Southeast and Ketchikan. In the meantime, the war had started and he was considered by the Canadians a draft dodger. He hadn't even thought about the war. And he went to Ketchikan and he worked briefly for the CCC.

KAREN BREWSTER: Civilian Conservation Corps.

DAVID KLEIN: Yeah, doing some logging and trail building. And then he met somebody and they went commercial fishing, so and he learned about that. And then he wanted to see more of Alaska so he went -- he was able to get a boat ride to Seward or someplace and went up to Anchorage, and then he decided he wanted to go trapping. And so he went and trapped over in the Kantishna area for a couple years. Put together a dog team and he trapped for two or three years. Trapped wolves and other animals and got that out of his system. And then he came back and I think about that time he decided, "Well, maybe I should register and go to war. I have a responsibility." So he did and he ended up quickly -- because he was a doer, he was able to get selected for pilot training and he became a bomber pilot and led a squadron, bomber squadron, with a very good record and then he retired, or the war was over, and he came back and he went to the Seward Peninsula and spent time there. And he knew how to fly then, so he was doing flying. He married a Native women. And worked for the Weather Service and he finally worked with some of the reindeer herding a little. No, I don't think he worked with the -- He knew about -- he checked it out, I think. But then, he finally was offered this job down in -- Oh no, he came to the university.

KAREN BREWSTER: He got a degree at some point in all this.

DAVID KLEIN: He got a degree and he brought his wife with him and she also got a degree. Native woman. And so, yeah, he got the degree and he started working part-time, I think, for this new fishery agency, or maybe he worked for the federal government. But then he even wanted to go on for a -- he did a master's degree here, and he wanted to go on and maybe do a PhD at the University of British Columbia. And I don't think -- he might have went down for one semester, but then he got offered this job. And then with statehood he went to work for them as heading up the Game Division.

KAREN BREWSTER: And so then, the difference now is that the people in these commissioner and department level positions are no longer professionally trained people?

DAVID KLEIN: It changed gradually. I mean, it was, I think under the Hickel administration was the first time there was someone who was made Commissioner of Fish and Game was a either shoe salesman or clothing salesman, an ardent hunter, in Anchorage. And I remember the wildlife faculty wrote a letter in opposition to it. And

indirectly were told that Hickel might be considering cutting the funding for the university if we didn't -- if we pushed that.

KAREN BREWSTER: And so what difference do you think it's made to have these political appointees no longer be professionally trained?

DAVID KLEIN: Well, in practice, you should be able to have someone who's not necessarily professionally trained to be commissioner. But it set a precedent that we didn't approve of. And partly because this guy had been -- really supported Hickel's campaign for governor and so this was a reward and that's a major problem. I mean, you put someone in a position like that, it's not because they have good qualifications, necessarily, to be commissioner. And he didn't have much experience about fisheries or wildlife. He hunted wildlife, but I don't think he had much experience about fishing or commercial fishing. And it is hard to get someone who's trained in all of those areas, or understands all those areas well. So then overtime, I think it -- and I'm not sure whether I can say this statement with -- that I'm knowledgeable enough about the situation, but it seemed to me it got worse maybe under the Murkowski governorship. And that got -- some of that stuff that was there was Murkowski didn't approve of the work that the state was doing up with the caribou up at Prudhoe Bay. So the state supported -- and the oil industry, initially, was to split money. The oil industry and the state -- the oil industry agreed to support a person up there if the state put in half of it or something like that. So this guy, Ray Cameron, who did a PhD here at the university, and he was a pilot. And he got assigned to work and monitor the movements of the caribou because the question was being raised, "Is the pipeline and the haul road fracturing the Central Arctic Herd?" And so he did all these survey flights, and so the oil industry didn't like his findings. He was showing, that, yeah, it's being fractured. There's now two separate calving grounds and the bulls tend to move across more readily, the pipeline and the haul road, then cows. And cows with calves. And so it's fracturing the herd. The herd was staying fairly stable and increasing a little bit. And it was, you know, the oil industry say, "Everything is fine here, you know." And at the same time other herds were increasing more rapidly. So the Porcupine and others were increasing more rapidly. And so then the oil industry hired a consultant firm that was known to do the bidding of the oil industry, if the oil industry funded. So they hired a team to -- especially this one guy, who had a PhD from Yale in forestry. And hired him to -- supported him to -- I think hired him. And he worked with a team and they used bigger aircraft and did some flying some of these same routes that Ray Cameron was flying with a Super Cub. And they claimed they were coming up with different kind of data that said he was wrong in his studies. And so this got to be a real touchy issue. And so finally the wildlife profession stood behind the state guy. And, oh, about that time the oil industry withdrew their funding for him, so it was all funded by Fish and Game. And so then -- I'm pretty sure this was under Murkowski. So then they tried to publish data on this stuff that they had through the journal, *Arctic*. And the paper was sent out for review to some of us and, well, it wasn't good science and we pointed that out. And so they couldn't get this stuff published. And we made the case and environmental groups -- we passed this information on to environmental groups, like the Northern Environmental Center and others. And said that Cameron's work has been published and it's withstood the criticism review, etc., etc., so that it wouldn't -- And so it

was -- Murkowski then, one of the things he tried to do is -- this guy was working for this consulting firm, he was based in Anchorage. And so he tried to get him hired as a deputy commissioner of Fish and Game, and with the idea of moving him in to become the commissioner of Fish and Game. And that stirred up a big controversy because it was so obvious that this was political. And for this particular case where his -- it had been shown that he did the bidding of the oil industry rather than doing good science like ABR (Alaska Biological Research) has a record for. And so then this carried on for quite a while and he didn't get -- when it came to filling the position he didn't get appointed to the commissioner position. And he was becoming a real activist and criticizing Fish and Game's work and well as any other work that was being done on the oil industry, or on caribou up there. And so then he pulled -- Murkowski pulled a shrewd one. He contacted the head of -- Carol Lewis who was head of the Agriculture and Land Resources Management.

KAREN BREWSTER: The department here at the university?

DAVID KLEIN: And said, "We're going to give you a full-fledged faculty member." And she was not the greatest person in this regard, she went where the money was and was political, too. And so she announced that they had this position that she was being offered and considering. So I don't know whether she asked for a response from the faculty or not. I think she did, because the faculty required that really. That they have a voice in it. So the faculty contacted us in the wildlife program, and said, "Whoa, this is a disaster. She's just going to try to push this thing through, and we don't think this guy is a -- and we think if we just stand up by ourselves, she'll just hold it against us." So we all wrote letters and said we reviewed his application and said, in effect, "No, he's not qualified and this isn't the way we fill positions." And so, it was a "no" vote of the faculty in land resources management, as well as the outside, other biologists in the area. Because he was being hired as sort of a wildlife biologist by them. And so she couldn't pass up having a faculty member, so she went ahead and she was, of course, in the good graces of Murkowski. And they hired this guy and assigned him to the Agricultural Experimental Station in Palmer. And yet, he was supposed to teach courses. So it was like he could teach courses in both Fairbanks and UAA, but he was being employed by UAA, UAF rather, here through the Agriculture and Land Resources Management, but he would be based in Palmer because the faculty had said they didn't want him here. So he offered a couple of courses and he did it through like teleconference kind of. He came up and gave a couple seminars. And I had a grad student and she took one of his seminars, was on a reading assignment and then they would discuss it. And she said, "Oh man, this guy is just not scientific, he's not objective." And she just was very unhappy with this man. And I don't blame her. So then -- And he still has some kind of affiliation with the university and he still sits down there and they don't send him up here any longer. I sat in on a couple of his seminars and, you know, he could see -- it was a teleconference, he knew I was there. And he tried two or three times to get us to join in with him, people up here, and we said, "You know, what's the basis for this?" And to do some more research up on the North Slope. And it was obvious that he was not being an objective scientist. So at any rate, on the (teleconference) he said something like, "Well, I'm glad to see Dr. Klein is there." So he tried to butter us all up, you know, and we'd been opposing what

he was doing. So at any rate, it was -- you'd ask these questions and he would try to weasel his way out. And then the only thing he'd accomplished, he had given a seminar up here when he wasn't there.

KAREN BREWSTER: Now I suppose you don't want to say his name.

DAVID KLIEN: I can't remember his name, but I will think of it. No, I'll be glad to tell you his name.

KAREN BREWSTER: Well, you said something in a sentence that I'm not sure I understood. You said, "Somebody who's doing this science funded by the oil industry, so he came out with pro-oil industry data." And then you compared him to science -- to the work at ABR. Were you saying ABR is doing the same thing or they're doing something different?

DAVID KLEIN: No, I'm saying they have a reputation of not being bought by the oil industry, but they do good work with the oil industry. The oil industry uses them because when they want the data to be accepted.

KAREN BREWSTER: Okay.

DAVID KLEIN: And good.

KAREN BREWSTER: That's what I thought you were saying, but the way the sentence came out it was not necessarily --

DAVID KLEIN: I'll think of this other guy's name.

KAREN BREWSTER: Anyway, I just wanted to clarify.

DAVID KLEIN: He has done some good science. He does a lot of DNA work on reindeer and caribou and he's still doing some of that kind of stuff.

KAREN BREWSTER: But all of that was because we were talking about people appointed to the commissioner and department level who were not professionally trained.

DAVID KLEIN: Right. Right. And then it got worse under the Palin governorship.

KAREN BREWSTER: Palin. Sarah Palin.

DAVID KLEIN: Palin, rather, Palin governorship. And it's continued that way.

KAREN BREWSTER: What I'm hearing you say is that you think it would be better if these appointments were professionally trained people.

DAVID KLEIN: Right. And not political motivated. Under Pollen [Palin], she appointed this guy who had a correspondence degree in wildlife conservation from down in the Lower 48 someplace. West. And he lived in Wasilla and he worked -- he might have worked briefly for Fish and Game. Rossi, I think, was his name.

KAREN BREWSTER: Yeah, that's a familiar name.

DAVID KLEIN: Yeah. And so she put him head of the Division of Game, I think. And then he was involved in some illegal hunting activities for black bears on the Kenai. That was just so stupid to do -- get involved in something like that

KAREN BREWSTER: Right. So if they're professionally trained, you feel like they understand the issues better and what the biologists -- the science the biologists bring to them and the decisions are made better?

DAVID KLEIN: That definitely would be the major concern, but in addition it was politically motivated. And then, they put all attention on, say, wolf control, and ignore everything else. And so they ignored -- and not only that but then they started moving people around in the Division of Wildlife Conservation. And dismissing, well, one of the -- the fellow that was head of the Division of Wildlife Conservation was a guy that had worked up through it and he was just a top-notch guy. He had a degree from the University of Idaho, I think it was, or maybe it was Missoula, Montana. But he was just a top-notch guy. He was great for the wildlife unit. He was very supportive of it and they'd come up with funding for student projects that were of importance for the department. And he had been regional biologist in Southeast, but he'd been up in southcentral Alaska. But I knew him pretty well and he's really a top-notch guy. He was liked so much by people working under him. The morale went *bleugh* after that, moving him out of there. It affected the morale of the whole department. It's never recovered from that since then.

KAREN BREWSTER: Okay. Well, should we call it a night?

DAVID KLEIN: Yeah, fine for me.

KAREN BREWSTER: Have you said everything you need to say on this?

DAVID KLEIN: No, there's a lot more to say, but no I'll write more --

KAREN BREWSTER: Okay.

DAVID KLEIN: -- of this.

KAREN BREWSTER: We'll talk about it more next time, maybe.

DAVID KLEIN: Yeah.